White Paper 2019-09

How to Properly Review Project Estimates

Assurance of the quality and accuracy of project estimates is an essential issue for both Owners and contractors. In the previous paper [2019-08] 'What a Project Estimate Should Comprise of' we developed what the components of an estimate should be. In this paper we describe a generic approach for reviewing the soundness of project estimates. We also expose some issues and shortfalls we have often experienced during estimate reviews.

Generic approach to review estimates

Assess the objective of the project estimate

Before reviewing an estimate and assessing its quality, it is essential to understand what the objective of the estimate is: what will it be used for? Is it to decide whether or not to launch the project, to support a due diligence, to decide on various options? This will give an indication of the level of accuracy that is needed and on the level of backup that is required.

Assess the estimate class

As developed in our paper [2019-08] 'What a Project Estimate Should Comprise of' we consider here an extended definition of estimate class that includes schedule and risk. It is essential to determine the target estimate class of the project estimate under consideration. It needs to be consistent with its usage objective (i.e. class 4 for preliminary feasibility, class 3 for Final Investment Decision, class 2 for execution control).

It is possible that the estimate class be different for different parts of the scope, due to different maturity levels, in which case it needs to be clearly exposed and justified with regard to the expected decisions to be taken on the basis of the estimate. Even if certain parts are estimated with less precision, the overall estimate should comply with the class, e.g. factoring allowed for less important parts.

The target estimate class of the project needs to be consistent with its usage objective, and needs to be consistent across the full scope

Checking the underlying maturity of the project

Once the estimate class has been determined in accordance with the estimate objective, the maturity of all underlying project components has to be checked. This includes of course the actual design maturity, but also the relevant maturity of the project execution plan and that of all site-related conditions, including actual availability and productivity of manpower, permitting aspects, soil and general environment conditions, tax and customs aspects etc.

It is also essential to check that the maturity of the estimate model is consistent between the cost estimate, schedule estimate and risk estimate in terms of level of detail, actual estimating methods and backup.

Checking the scope coverage

It is important to check that the estimate covers the entire project scope and that there are no blind spots. This is particularly important for brownfield projects. This should translate into a full Work Breakdown Structure that underlying both cost and schedule. Areas that require particular attention include:

- Owner's costs (including operational readiness, financing, insurance etc.)
- Interfaces with existing infrastructure, Owner provided equipment, other 3rd party stakeholders
- Temporary works and equipment, material handling costs, logistics
- Capital spares
- Contingency

Checking estimate documentation

The quality and thoroughness of the underlying documentation and backup should be consistent with the announced estimate class. The higher the estimate quality, the higher the backup requirements are.

Quality of the Opex estimate (Owners or operating contractors)

When the estimate needs to include Operating expenses (Opex) and start-up estimates (typically for Owners) it is important that those estimates have the same level of maturity and detail as the Capital expenditures (Capex) estimate, so that the data provided to support the business plan is consistent in terms of accuracy. This is particularly important because Opex is a recurring cost that weighs a lot in the overall profitability of a capital investment.

Common shortfalls of project estimates

Inconsistency between apparent detail of estimate and underlying maturity of the project definition

There can often be a substantial inconsistency between the facial detail and accuracy level of an estimate and the maturity of the underlying project definition. This may particularly occur when an experienced estimator is hired early, and the project definition is not yet complete.

Those inconsistencies often relate not to the level of technical definition of the plant, but to the surrounding elements and assumptions underlying the estimate. Common challenges include specific site constraints, productivity issues (e.g. interference with other parts of the plant, access difficulties due to security restrictions, effect of local weather conditions), soil remediation or earthworks definition maturity, and execution plan.

In the execution plan remit, common issues relate to the contracting strategy, poor integrated schedule, logistics and transportation plans, inspection strategy, constraints

leading to longer schedules such as manning constraints on site (density, number or availability) or constraints in concrete volume supply, constraints of specific sequences that need to be followed in construction, etc.
Those aspects which often impact the estimate transversally need to be checked for relevance. It is not because an estimate looks very detailed and precise that it is accurate!

Missing scope

A common stumbling block is also lack of coverage of the complete scope of the project. Major common issues include Owner costs and interfaces with existing facilities (or with existing Owner provided items). In general, a thorough check needs to be made to challenge the comprehensiveness of the scope coverage.
This is particularly applicable if the total estimate of the project is built from various contributions put together by the Owner.

Estimate must cover the entire project scope and be consistent with the project maturity level.

Poor estimate of allowances and of Owner estimate

In general, parts of the estimate which are identified to be much less mature than others in terms of estimating approach or estimating class should be investigated. This is particular the case of all allowances. Their benchmarks need to be reviewed and challenged, as appropriate.
The Owner scope is often less detailed or mature while it can constitute a substantial part of the total estimate. This area needs to be reviewed appropriately. Costs related to financing, financial costs, insurance, legal fees etc need to be properly estimated and backed-up by relevant competent departments. Other specific areas for attention include engineering and project management, which are always under-estimated if only estimated from documents and man-hours without accounting for coordination and project follow-up.

Opex receiving much less attention

While from the economic perspective, recurring Opex costs may have a substantial impact on the overall economic soundness of the project, they are often not estimated with the same care as the Capex part. One reason may be that the Capex needs to be financed by third parties and is thus subject to more scrutiny and due diligence that the Opex estimate. Nevertheless, proper estimate of the Opex at a maturity level consistent with the Capex estimate is paramount.

Insufficient contingency

Estimate class gives a first view of the accuracy to be expected from the estimate. Another approach is quantitative risk analysis (QRA). This needs to be performed on the estimate and include both a schedule risk analysis (to support an analysis of possible schedule extensions) and a quantitative cost risk analysis. The QRA which is based on the input of the project team, tend to be rather optimistic in their result. It absolutely needs to be checked against orders of magnitude provided by well-known parametric estimates based on statistical analysis of many projects. One often finds that the contingency of the estimate is underestimated and that it needs to be reassessed before requesting for funds appropriation. It is not uncommon for the Owner to have an additional Management Reserve on top of the estimated contingency backed-up by experience or parametric contingency estimates.

Conclusion

It is not because an estimate has taken much pain to develop and looks very detailed that it is accurate. It is essential to check the consistency of the estimate detail with the detail of project maturity, not only in terms of technical maturity but also in terms of detailed project execution planning.

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