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How to Avoid Underestimating Cost Expectations during Project Definition Phase for Owners

Many owners fail to properly understand the concept of estimating uncertainty. Particularly during project definition phase, inadequate grasp of estimating uncertainty can lead to inadequate expectations of senior management regarding cost at termination, and insufficient funding for the project. In this White Paper we investigate the issue of accounting for, and presenting, estimating uncertainty.

Estimating uncertainty versus contingency

Estimate uncertainty

Estimating uncertainty depends on the project definition level and typically decreases as project definition improves and actual bids are received for equipment and services. It is still not zero at project final investment decision, the estimating process aims at typically a maximum uncertainty of 10 to 15% with respect to the base estimate at that stage.

A professional estimator would always include an assessment of the estimate uncertainty together with the base estimate. Guidance of the AACEI regarding estimate class provides a well-used general benchmark, however, it would normally need to be made specific by benchmarks for the particular industry. Estimators do not always sufficiently or correctly communicate on the level of estimate uncertainty, and management tends to focus on the base estimate disregarding its qualifications (e.g., inclusions and exclusions) and uncertainties.

Funding requirements and business planning must fully account for estimating uncertainties to be realistic

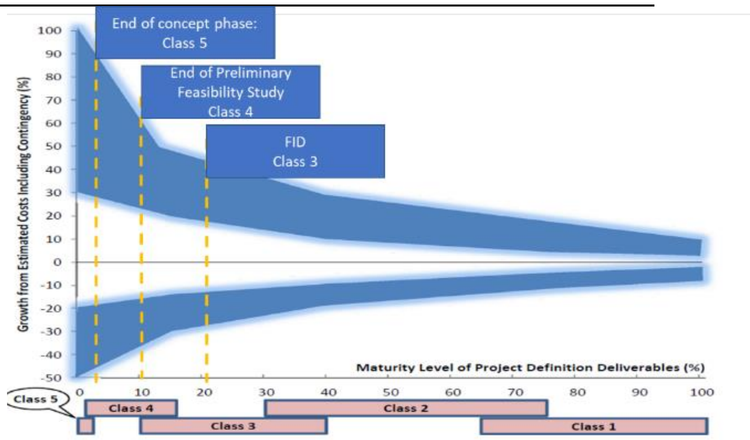
Contingency

Contingency is an amount of money calculated so as to protect the project from a number of known risks (and estimated for example using Monte Carlo analysis or other methods). It is thus not directly related to the systemic estimating uncertainty. An analysis must be carried out whether the risk register includes risks that could also be qualified as estimating uncertainty to check whether there may be an interference; normally the contingency should not be computed taking into account those aspects so as not to double dip.

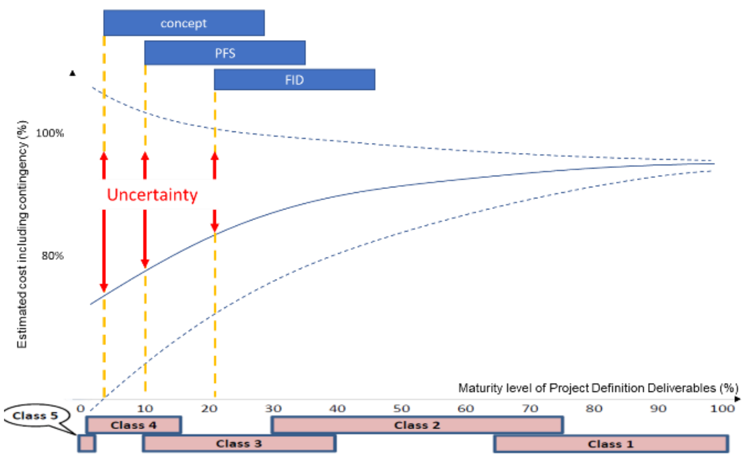
Contingency is estimated using a standard method validated by the organisation; for example it should specify the order of magnitude of lines used in a Monte Carlo model or how low probability, high impact risks or opportunities are considered.

Taking decisions too early during project development

The typical graphics found in the literature regarding how estimating uncertainty evolves for the Owner during project development are as follows (reference is made to AACEI estimate classes):



This graphic provides a very wrong image to management, because it shows uncertainty relative to the base estimate, and it would look like the base estimate remains flat. However, the base estimate itself evolves as the definition of the project improves, and it generally tends to increase (as more details are considered, the more the overall estimate increases, unless some value improvement process is implemented that would tend to decrease the estimate). Hence in reality, this graphic should rather be shown as follows in terms of actual estimate value:



This graph shows how a decision taken on the basis of a base estimate too early during the definition phase, without accounting for uncertainty, can seriously mislead management.

At PVD we have encountered this situation many times, where management held in mind the base estimate value at the end of Preliminary Feasibility as a reference for decision-making.

In that case, even if the project is successfully completed, questions will be asked about a visible 20 to 25% increase in actual cost at completion relative to the baseline budget something which will almost inevitably occur as the result of estimating uncertainty at the decision-making time. The reason for this increase may not be poor project management, but rather inadequate management of senior management expectations. Nevertheless, this situation can create significant issues in the middle of project execution if senior management questions actual project performance compared to its expectations.

PVD often has to remind senior management to add uncertainty on top of Capex estimate when reaching Final Investment Decision.

Funding requirements and business planning

At any time, to determine the amount of money needed for funding, one should add up at least the estimating uncertainty and the contingency to the estimate. This is also often misunderstood by senior management focusing only on the base estimate number. However, to avoid later issues in getting additional funding, even if the project is executed successfully, it is essential to account for estimating uncertainty from the start.

PVD often has to remind senior management of this fact when reaching Final Investment Decision. This reminder is not necessarily well received as it may make it harder to get the initial funding in place. However, it should reduce the likelihood of having to seek additional funding later in a less favourable negotiating position.

Similarly, it is important to check in the business plan how the Capex and Opex estimates have been included: with their base value or with their uncertainty accounted for? While it can be interesting to model what happens in different cases of uncertainty application, one should also remember that uncertainties generally tend to rather materialise as a downside.

Summary

A proper understanding of the concept of estimating uncertainties is required for owner senior management, so as to fully appreciate the estimating values provided and take decisions in full awareness of the implications. In particular, funding requirements and business planning must fully account for this concept to be realistic. Senior management expectation management is often an essential project success factor, and it is important to provide the fullest and correctly represented information. When presented to senior management, a base estimate must always be qualified and used carefully, including making its uncertainties visible. The number used as an anchor as the value of the project for the organisation must always be considering proper qualifications. This is an essential educational role of the project manager and the lead estimator.