



## Cost Estimation

We also appreciate the value of a high integrity cost estimate and understand the cost drivers associated with projects and appreciate where costs can be driven downwards and controlled. Cobra's cost data is industry-sourced and is held in a database that is maintained using up to date project data from all the major geographic areas of the world.

Our cost estimating capability has been built over years of carrying out conceptual studies and then progressing to the later stages of engineering. Our estimates take account for fixed equipment and bulk materials:

- Cost of fixed equipment, those that are primarily called off in an Equipment List, generally based on project specific vendor quotes and past vendor costs held in the database.
- Cost of bulk materials, those that are not called off in an Equipment List, such as piping, electrical, instrumentation, etc. generally based on cost per tonnage held in the database.
- Duties, freight and inspection charges are included in the costs of fixed equipment and bulk materials.
- Global fabrication costs: Based on the weight of fixed equipment and bulk material with outfitting, pre-commissioning costs included. Cost are generally established from manhour estimates, allowing for appropriate productivity, multiplied by a man-hour rate.
- Transportation and installation costs: Based on anticipated marine vessel spreads using appropriate day rates and mobilization and demobilization costs.
- Hook-up and commissioning: Based on anticipated tasks and evaluated using typical manhour estimates and required logistics such as helicopter, work boats, accommodation, etc.
- Project Management: Based on anticipated consultant, contractor and client cover.
- Indirect costs: Based on pre and post production costs typically due to insurance, client indirect costs, vendor representatives, commissioning, operating, insurance spares and certification.
- Operational expenditure (OPEX) allows for the cost incurred by the client to run its business operations and maintenance on a yearly basis.
- Abandonment expenditure (ABEX) allows for the potential abandonment costs of an installation following the cessation of production.

Top down or bottom up, we use our wealth of industry experience to competently compile Capital Expenditure (CAPEX), Operational Expenditure (OPEX) and Abandonment Expenditure (ABEX) cost estimates appropriate for all phases of projects serving the offshore and onshore Oil and Gas industry.



## Accuracy aids Investment gates

Cobra Engineering understands that the level of project technical definition highly influences the cost estimate and can drive the estimating procedure to be adopted. Depending on the engineering information available, and the end-user requirements, cost estimation approach can take the form of either a factored or parametric approach, top-down, or a detailed estimate based on material take offs, bottom-up. To achieve this, we use as a guide the ACCE classification shown below.

## Cost Estimate Maturity Definition

*Cost estimation services used throughout a project life cycle:*

Cost Estimate Class	Engineering Maturity	Project Phase	Typical Methodology	Accuracy Range
5	0-2%	Concept Screening	Capacity Factored or Parametric Model	-50% / +100%
4	1-15%	Feasibility Study	Equipment Factored or Parametric Model	-30% / +50%
3	10-40%	Budget Authorisation	Semi-Detailed Cost with Budgetary Quotes	-20% / +30%
2	30-75%	Bid/Tender	Detailed Unit Costs with Preliminary MTOs	-15% / +20%
1	65-100%	Bid/Tender	Detailed Unit Costs with Detailed MTOs	-10% / +15%

*Cost estimation can be customised to provide confidence to areas of uncertainty to allow for project sanction*

In order to ascertain cost variations and interrelations within cost estimates, Monte Carlo Analysis methods can be used to evaluate project risk for the various strategies selected. This method generates a probability distribution for project outcomes instead of a single value estimate by considering potential ranges for key project variables. This technique involves identifying significant cost elements within the overall estimate and assigning possible high- and low-end values to each of the elements. By using simulation techniques involving random numbers, a probabilistic cost curve is generated to enable assessment of cost exceeding certain criteria.

We have the expertise to carry out rigorous facilities reviews and subsequent cost estimates to the level that you require to make your investment decisions. Allow us to help you with your process..

Cobra Engineering understands that compiling cost estimates can generate large amount of data and, as a result, will work alongside client representatives to prepare an estimate into a user friendly, easily understandable and updateable format to minimise any rework by the client for inclusion into their financial model.