COBEAL®

Front-End Engineering and Design (FEED)

Whether initiating a brownfield or greenfield project, success is dependent on the proper planning.

Front-End Engineering and Design

Will we meet the deadline? Are we staying within budget? Can we incorporate design changes without affecting cost or schedule? What risks come with installation and commissioning? These questions are critical and require thorough planning.

Front-end engineering and design (FEED) helps set projects up for success. It goes beyond cost estimation by providing a clear project scope, complete budget, timeline, and initial risk assessment. By addressing these factors upfront, FEED reduces risks and uncertainties during later phases, ensuring long-term value throughout the production lifecycle.

Through a FEED, you can realize:
- Lower lifecycle costs
- Reduced project technical, schedule and cost risks
- Faster time to achieve plant startup and turnover
- Reduced EHS and compliance risks
- Improved risk identification and mitigation

FEED helps establish a well-defined scope, budget, schedule, and identifies risks, resulting in greater success during implementation, start-up, and beyond. By undertaking FEED at the beginning of your project, you can minimize your overall project risks.

In fact, benchmark studies show benefits of up to 30 percent reduced cost and shorter project execution times when FEED studies are performed.

"An evaluation of 975 light and heavy industrial projects by the Construction Industry Institute found that only 5.4% met "best in class" predictability in terms of cost and schedule"

pwc, April 2013

Reducing Risk and Creating Value Throughout Your Production Lifecycle

Feasibility & Conceptual Studies → Front End Engineering & Design → Design & Engineering → Installation & Commissioning → Operation & Maintenance → Upgrades & Migrations

Why The Cobeal Group?

The Cobeal Group, in partnership with Hollsten Enterprises, Pte. Ltd., and Equatoriale Advanced Pte. Ltd., delivers industry-leading FEED services through decades of experience and a global pool of domain experts. With expertise across sectors like oil & gas, life sciences, and more, their mission is to reduce risk and maximize ROI.

Our FEED process

The Cobeal Group ensures meticulous project planning to prevent cost and schedule overruns. We believe in challenging assumptions early on to strengthen the project's foundation. Thoroughly reviewing and refining the design basis helps avoid costly surprises during execution. Poorly defined projects, rushed estimates, or unchecked assumptions can haunt a project, but our gated process ensures all stages are carefully managed. With an emphasis on reducing risk, we aim to complete projects within budget and on time, delivering consistent results.

"Poor planning estimates and missed deadlines are among the largest contributors to project failure, according to Insights and Trends, PwC's 2012 Global Project Management Survey of participants in 38 countries"

pwc, April 2013

Survey - The Cobeal Group starts by holding a project kick-off meeting to ensure that all stakeholders clearly understand the technical and commercial objectives of the FEED process. Afterward, we gather the necessary project documentation, which may include conducting an on-site survey, especially for brownfield projects, to ensure a comprehensive design foundation.

Resourcing & Execution - Cobeal assembles a dedicated team of experienced engineers with industry-specific expertise. Working closely with your team, we define the basis of design, scope of supply, and project schedule. We develop a tailored strategy to address your project's unique requirements, ensuring all cost, resource, and schedule constraints are factored in.
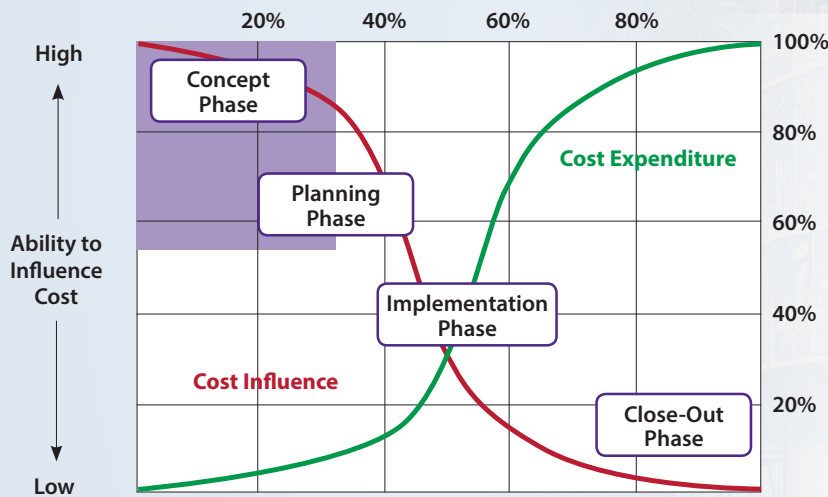
Source: Construction Industry Institute

The graph from the Construction Industry Institute highlights how engineering completed during the FEED phase has a greater capacity to influence overall project costs. Although the expenditure for FEED is minimal compared to the total project budget, some organizations reduce investments due to perceived lack of value, time, or cost constraints. This, in turn, limits their ability to define the project scope accurately, which often results in budget overruns and delays.

What is the Deliverable from a FEED?

At Cobeal Group, we adhere to a standard execution approach for FEED, which includes critical design deliverables that ensure project success. These deliverables may encompass:

- Requirements specifications
- Package specifications
- MCC, panel designs
- Advanced control and optimization specifications
- Migration strategy
- PFD, P&ID electrical diagrams
- Equipment general arrangements
- Utility loads
- HAZID reports
- Basis of design
- Equipment, instrument, motor, and I/O lists
- Control narratives
- Control, safety, and operational procedures
- Network architectures
- Validation strategy

These deliverables would then be used to generate:

- Overall project cost estimate,
- ROI justification, and procurement scenarios
- Project schedule / Gantt chart

"Projects that were well-defined had facilities costs approximately 15% lower than the industry average, while poorly defined projects experienced a 15% increase. This creates a 30% variance, which translates to a substantial impact on annual costs, considering the typical scale of spending on facilities."

Offshore Magazine, 2003

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FEED Capabilities

Process

- Generation of Process Flow Diagrams (PFD) and P&IDs
- Process modeling
- Technical specification and basis of design development
- Equipment specification and sizing
- Safety device sizing and selection
- Full hydraulic calculations
- PFD review, estimate and report of process performance with MPC system

Mechanical

- Development of modular process solutions
- Layouts
- Process and utility piping systems
- Including hygenic processes

Power/Electrical

- Power system load studies
- Electrical design diagrams
- Electrical load list
- Equipment specifications & design (LV/MV Switchgear, MCC, etc.)
- Electrical heat trace
- Cable sizing

Control & Network

- Preparation of system architecture
- Preparation of operation and control philosophy
- Preparation of control narratives
- Advanced process control reviews
- Hardware specifications
- I/O lists, drawings
- Installed base assessment and obsolescence study
- Network design, security assessment
- IT infrastructure assessment

Safety

- Hot safety system migration strategies
- Risk analysis, HAZID studies
- Safety system design and documentation
- Preparation of safety philosophy / narratives
- SIL target determination and analysis
- ATEX (Hazardous Area Classification compliance)
- Machine safety assessments

Quality

- GMP risk assessment
- Gap analysis vs current regulation study
- Quality documentation (quality plan, validation master plan, etc.)

Instrumentation

- Instrument specifications and selection
- Preparation of instrument indexes and I/O lists
- Preparation of Instrument data sheets
- Cable block diagrams
- P&ID review of instruments required for unit or plant-wide model predictive control (MPC)
- Gap analysis report on optimization instruments

Information (MES/MIS)

- Installed base assessment
- Preparation of requirements and/or upgrade specifications
- Line integration, line performance
- Plant / multi-site reporting, KPI dashboards, web-forms, analytics

Packaged Equipment

- Site-wide standards and specifications for packaged equipment
- Package equipment upgrade specifications
- Packaged equipment integration

Presented by The Cobeal Group, in partnership with Hollsten Enterprises, Pte. Ltd., and Equatoriale Advanced Pte. Ltd., delivering industry-leading Basic and Detailed Engineering and FEED Services.

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