

# € TRAINING

Project Analysis : Tools & Techniques for  
Managing Risk & Uncertainty





# Project Analysis : Tools & Techniques for Managing Risk & Uncertainty

## Introduction

Large capital-intensive projects in all major industries require substantial - and mostly risky - investments in the acquisition, exploration, and subsequent operation and maintenance of new organizational assets.

The decision on whether or not to invest in new capital projects starts with critical decisions during the exploration phase of a new development or the expansion of an existing field. The decision-making tools used to analyze project risk under conditions of uncertainty will help companies to determine the probability of success or loss and will drive the decision to develop or abandon the well.

Of paramount importance, therefore, is the systematic and comprehensive evaluation of potential investments, and the development of detailed cash-flow analyses to determine as accurately as possible, the expected returns to the organization under varying conditions of uncertainty over the expected productive life of the project.

This requires the development of sound, realistic, and carefully structured cash-flow projections, reflecting both the initial capital expenditures required for the acquisition of the asset, as well as the operational expenditures required for successful operation and maintenance of the asset over its anticipated productive life.

Worldwide an alarming number of large capital projects fail to meet or overrun their planned budgets, failing to realize both the financial and strategic goals of the organization - the very reason for their being undertaken in the first place - often with sizable increases in capital and operational expenditures, and with substantial financial losses to the organization. In the majority of cases, this is the inevitable consequence of failing to apply the tools and techniques of modern project decision-making, evaluation, financial planning, capital management, and cash flow analysis when considering investment into new capital projects.

## Course Objectives

At the end of this course, the participants will be able to:

- Understand how to manage an organization's investments in large capital-intensive projects
- Identify how to make and understand financial decisions and be able to present these back to the stakeholder community
- Identify how to manage the cash flow of projects and manage and appraise the financial risk mitigation strategies
- Understand proper cash flow and sensitivity analyses to forecast and control potential future conditions
- Define and manage project success factors and maximize the return on the capital invested in projects
- Understand how to define financial strategies and incorporate these into project risk mitigation strategies

## Targeted Audience

This Project Analysis training course is designed for program and project management professionals, project leaders, project engineers, cost engineers, and other senior project control and business services professionals who are responsible for or involved in evaluating projects and managing cash flow throughout the duration of project delivery.

## Course Outline

## Unit 1: Fundamentals of Decision Analysis

- What is project management decision analysis?
- The purpose of the project business case
- The need for systematic risk management for decision-making
- Risk and uncertainty on projects
- Option analysis
- Identifying key decision-making factors

## Measures of Project Profitability

- Fundamental tools of engineering economics
- Time value of money
- Appraisal methods - Discounted Cash Flow Projections
- Time equivalence

## Unit 2: Cash-Flow Modelling and Project Decision Analysis

- Financial Modelling and Project Evaluation
- Internal Rate of Return computations IRR
- Determining the Internal Rate of Return IRR
- The risk of not understanding IRR

## Analysing Project Specifics

- Understanding the project context to assist in decision-making
- Determine stakeholders and their level of influence
- Capture requirements
- Determine the scope of work

## Unit 3: The Cost of Capital

- Capital & Operating Expenditures CAPEX / OPEX
- Estimating the cost of capital for a project
- Benefit-Cost Ratio BCR
- Dis-benefits

## Risk Modelling in Practice

- Identify Risks
- Forecasting risk impacts & probabilities
- Opportunity costs, sunk costs & salvage value of a project
- Determining the Risk Priorities
- The need for company cash flow

## Unit 4: Decision Analysis: Expected Value Concept

- Basic Probability Concepts
  - Fundamental probability concepts
  - Mutually & non-mutually exclusive, independent events
- Quantitative Project Risk Analysis

- Semi-quantitative bow-tie process
- Detailed risk quantification and prioritization
- Expected monetary value
- Scenario planning
- Sensitivity Analysis Tools
  - Simulation process
  - Tornado diagram
  - Defining the variables - PERT

## Unit 5: Decision Trees, EMV, Risk Responses, and ROI

- Decision Tree Analysis
  - Developing decision trees
  - Solving decision trees
- Risk Responses
  - Developing risk responses
  - Evaluating response relevance
- ROI Analysis
  - Understanding ROI
  - Identifying ROI
  - Evaluating and presenting your project options