

# Advanced Oil & Gas Project Economics, Risk & Decision Analysis

## INTRODUCTION

- The petroleum industry is one of the most important, highly capital intensive and risky business. Global exploration and production spending in 2013 was \$644 billion, up 7% from \$604 billion the year before. In 2014, the exploration budgets reached \$654 billion but this fell to \$521 billion in 2015 and in the following year, 2016, there was a further decline of 27%. This year's global exploration and production spending is expected to increase 7%.
- The upstream sector's profit margins are under real pressure from many factors such as higher costs of developing new reserves, less oil and gas found per foot of exploration drilling, rising inflation, global oversupply and price volatility. Competition for investments, for acreage / concessions, aging of existing reservoirs, the oil and gas revolution all contribute business risk and uncertainty.
- Petroleum industry projects are by their very nature risky, the challenge however is in assessing, managing, and mitigating this risk proactively. The three biggest planning challenges are predicting costs, assessing profitability, and risk management. All these tasks occur in the early stages of capital planning and failure to adequately evaluate these elements can lead to heavy losses.

This training course will highlight:

- Identification of the stages required in the risk analysis process, i.e., preparing, modeling, and running risk analysis
- Development of the risk model, assessing probabilities to various variables, risk analysis, and explore the impact of uncertain variables
- Enable the participants to create reports such as, tornadoes diagrams, scatter plots and cumulative probability functions, using excel
- Application of decision trees and Monte Carlo-based simulations to generate profitability indicators
- Enable the participants to develop probabilistic cashflow reports along with probabilistic profitability indicators for decision-making

## OBJECTIVES

The primary objectives of this training course are to:

- Learn how to handle uncertainty in petroleum projects
- Understand different economic terms used in the oil & gas industry
- Understand the expected value concept and learn its impact on decision tree analysis
- Learn expected theory concepts and attitudes towards risk, risk eversion and risk premium
- Acquire spreadsheet skills including simulation software @RISK
- Carry out cashflow analysis, for petroleum related project and use common economic indicators to evaluate between competing alternatives
- Carry out a comprehensive economic study evaluating petroleum related projects using risk and sensitivity analysis by means of spreadsheets

## TRAINING METHODOLOGY

- This Advanced Oil & Gas Project Economics, Risk & Decision Analysis training course will incorporate a mix of learning methods, including but not limited to, high quality power point slides, short videos and active class participation.
- An in-depth knowledge of quantitative risk analysis techniques and hands-on problem solving skills will be developed during this training course . Participants will use PC's to solve a variety of problems better enabling them to utilize the taught material. Furthermore, this Oil & Gas Technology training course will enable the training course delegates to reach an optimum decision in capital spending.
- This Advanced Oil & Gas Project Economics, Risk & Decision Analysis training course approach will be facilitated using Microsoft Excel add on @Risk module and will further assist in promoting discussions among the participants.

## ORGANISATIONAL IMPACT

By sending delegates on this training course, your organization will benefit by:

- Learning how to apply economic valuation and risk assessment processes and techniques within the global oil and gas industry
- Help the participants to identify and analyze the risk involved in a petroleum related project
- Assist the participants to apply the decision-making procedures to justify the petroleum projects in terms of profitability
- Participants learn the decision analysis process and foundation concepts so they can actively participate in multi-discipline evaluation teams
- Monte Carlo simulation is discussed and experienced in detail in hands-on exercises
- Adding value to the oil and gas company's active projects, through the use of case studies
- Help participants to recognize and identify the influencing parameters for oil and gas field developments

## PERSONAL IMPACT

By attending this training course, you will:

- Learn how to describe the elements of the decision analysis process and grasp how construct a project cashflow model incorporating sensitivity analysis
- Evaluate investment and design alternatives with decision tree analysis
- Gain the operational decision making techniques using @Risk
- Gain valuable knowledge in identifying the important uncertainties in petroleum projects
- Enhance your awareness of the influential parameters in an oil and gas field development projects

## WHO SHOULD ATTEND?

- This Advanced Oil & Gas Project Economics, Risk & Decision Analysis training course is designed to provide technical and practical approaches to executing a petroleum related project in the upstream sector.

This training course is suitable to a wide range of professionals but will greatly benefit:

- Planning Managers
- Oil & Gas Engineers
- Project Managers
- Analysts
- Commercial Managers
- Economists
- Government Officials
- Geologists
- Business Advisors
- Asset Managers
- E&P Managers
- Product Managers
- Project Management Professionals

## Course Outline

### Development Economics

- A Brief History of Energy Usage
- Principles of Development Economics
- Understanding of Economic Terms

## Uncertainty in Investments

- Handling Uncertainty in Capital Projects
- Understanding Probability Concepts
- The Expected Value Concept: Features and Pitfalls
- Expected Monetary Value (EMV)
- Expected Profitability Index (EPI)
- Expected Opportunity Loss (EOL)

## Risks and Uncertainties

- Risk & Uncertainty
- Risk Aversion and Risk Premium
- Exploration Project Threats and Opportunities
- Economic Decision Criteria
- Decision Tree Analysis
- Probability Distribution
- Monte Carlo Simulation

## Setting-up Spreadsheet Calculations Using Excel

- Spreadsheet Calculations
- CashFlow Analysis
- Sensitivity Analysis Calculations
- Tornado Diagrams
- Introduction to Monte Carlo Simulations using @Risk
- Setting-up an Oil Field Project

## Practical Use of the @Risk add-on: Oil Field Development Model

- Developing an Integrated Economic Model of an Oil Field Development
- Developing and using an @Risk Model Analysis
- Project Sensitivity Analysis utilizing data from @Risk Model
- Training Course Final Review and Close