BLACKBIRD FOR TRAINING

Financial Modelling and Petroleum Project Economics Course

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Financial Modelling and Petroleum Project Economics Course

Introduction:

Financial modelling and petroleum project economics is the practice of turning production forecasts, costs, prices and fiscal terms into cash flow models that show whether an oil or gas project creates value. This 2-week course is for petroleum economists, financial and investment analysts, planning and commercial staff, petroleum and reservoir engineers and finance managers, and its final deliverable is a reviewed project economics model with a risked investment recommendation. It is taught at intermediate to advanced practitioner level through a modelling build, using the Petroleum Resources Management System SPE-PRMS, the industry framework for classifying reserves and resources.

Course Objectives:

- Define the building blocks of a petroleum project cash flow model, from production profile and prices to CAPEX, OPEX and fiscal deductions
- Distinguish concessionary royalty and tax systems from production sharing and service contracts, and model how each changes contractor and government take
- Apply discounted cash flow measures such as NPV, IRR, MIRR, payback and profitability index to rank petroleum investments
- Compare deterministic sensitivity and scenario analysis with probabilistic Monte Carlo simulation and decision trees when quantifying project risk
- Interpret financing structures, portfolio metrics and model outputs to present an investment case to partners and committees
- Justify an investment recommendation from a documented model that has passed a structured review against recognised modelling standards

Target Audience:

- Petroleum economists and planning staff who prepare project evaluations, deciding which fiscal, price and cost assumptions a model should carry
- Financial and investment analysts who assess oil and gas opportunities, choosing which return measures and risk results support a recommendation
- Petroleum and reservoir engineers who supply production and reserves forecasts, judging how volume uncertainty should flow into project value
- Commercial and business development staff who evaluate licences, farm-ins and contract terms, deciding which fiscal offer or deal structure to pursue
- Finance and budgeting staff who review capital requests, judging whether a model is reliable enough to fund the project

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Course Outline:

Day 1: Foundations: Petroleum Value Chain, Project Life Cycle and Cash Flow Logic

- Upstream vs Downstream Project Economics: Where Revenue, Cost and Risk Arise
- Petroleum Project Life Cycle: Exploration, Appraisal, Development, Production and Decommissioning Stages
- Time Value of Money: Discounting, Compounding and Mid-Year Cash Flow Conventions
- Nominal vs Real Cash Flows: Handling Inflation and Cost Escalation in Models
- Net Cash Flow Structure: Revenue Less Royalty, OPEX, CAPEX and Taxes

Day 2: Fiscal Regimes Compared: Concessions, Production Sharing and Service Contracts

- Concessionary Royalty and Tax Systems: Royalty, Ring-Fencing and Corporate Income Tax
- Production Sharing Contracts: Cost Recovery Limits, Cost Oil and Profit Oil
- Risk Service vs Technical Service Contracts: Fee Per Barrel and Remuneration Terms
- Government Take vs Contractor Take: Measuring Fiscal Burden Across Regimes
- Signature Bonuses, State Participation and Carried Interest: Effects on Project Value

Day 3: Applying Investment Appraisal Measures to Petroleum Cash Flows

- Net Present Value and Discount Rate Selection: WACC and Hurdle Rates
- IRR vs MIRR: Multiple Rates of Return and Reinvestment Assumptions Explained
- Payback, Discounted Payback and Maximum Exposure: Measuring Capital at Risk
- Profitability Index and Unit Technical Cost: Ranking Projects Under Capital Constraints
- Breakeven Oil Price Analysis: Goal Seek Applied to Project Cash Flows

Day 4: Model Inputs, Tools and Data: Production, Prices, Costs and Excel Structure

- Exponential vs Hyperbolic Decline Curves: Building Production Profiles for Forecasts
- SPE-PRMS Reserves Classification: Proved, Probable and Possible Volumes in Models
- Oil and Gas Price Forecasting: Forward Curves, Price Decks and Differentials
- CAPEX and OPEX Estimating: Fixed, Variable and Abandonment Cost Profiles
- Excel Model Architecture: Inputs, Calculations and Outputs Sheets With Named Ranges

Day 5: Case Study: Guided Week-One Build of a Field Development Cash Flow Model

- Case Field Data Pack: Reviewing Production, Cost and Price Assumptions
- Case Cash Flow Build: Linking Production Profile to Revenue and Costs
- Case Fiscal Layer: Applying a Production Sharing Contract to Field Cash Flows
- Concession vs Production Sharing Results: Comparing NPV and Government Take
- Week-One Findings Memo: Base Case Economics and Key Value Drivers

Day 6: Advanced Topics: Incremental Economics, Gas Projects and Project Finance

- Incremental vs Full-Cycle Economics: Evaluating Infill Wells and Enhanced Recovery
- Gas Project Economics: Take-or-Pay Contracts, Gas Pricing and LNG Netbacks
- Project Finance Structuring: Debt Sizing, Debt Service Cover Ratio and Sculpting
- Corporate vs Project-Level Returns: Equity IRR, Gearing and Tax Shields
- Farm-In and Farm-Out Valuation: Carry Arrangements and Working Interest Economics

Day 7: Risk and Uncertainty: Sensitivity, Monte Carlo Simulation and Decision Trees

- Sensitivity Analysis and Tornado Charts: Ranking Drivers of Project Value
- Deterministic Scenarios vs Probabilistic Analysis: Low, Base and High Cases
- Monte Carlo Simulation: Input Distributions, Correlation and P10, P50, P90 Outputs
- Decision Trees and Expected Monetary Value: Exploration Chance of Success
- Value of Information and Real Options: Appraisal Wells, Deferral and Abandonment

Day 8: Stakeholders and Communication: Portfolio Choices, Partners and Investment Committees

- Portfolio Optimisation: Efficient Frontier, Capital Rationing and Project Ranking
- Operator vs Non-Operator Perspectives: Joint Operating Agreement Cash Calls and Votes
- Host Government Negotiation Economics: Testing Fiscal Term Proposals Before Bidding
- Investment Committee Paper: Structuring the Economic Case and Risk Summary
- Model Output Visualisation: Dashboards, Spider Diagrams and Cumulative Cash Charts

Day 9: Measurement and Model Quality: Review, Benchmarking and Post-Investment Analysis

- FAST Modelling Standard: Flexible, Appropriate, Structured and Transparent Model Design
- Model Audit vs Model Review: Error Checks, Flags and Formula Consistency
- Version Control and Assumptions Book: Documenting Inputs and Change Logs
- Economic Benchmarking: Finding and Development Costs, Lifting Costs and Recycle Ratio
- Post-Investment Review: Comparing Sanctioned Economics With Actual Project Performance

Day 10: Modelling Build Capstone: Reviewed Project Economics Model and Investment Recommendation

- Own-Project Inputs: Production Profile, Cost Estimates and Fiscal Terms Assembled
- Integrated Model Build: Cash Flow, Fiscal Layer and Financing Linked Together
- Risked Economics Run: Monte Carlo Outputs and Expected Monetary Value Results
- Base Case vs Risked Case: Peer Review of Each Delegate Model
- Project Economics Model and Investment Recommendation: Presenting the Final Deliverable

Skills You Will Gain:

- Petroleum Cash Flow Modelling
- Fiscal Regime Modelling
- Decline Curve Forecasting
- Monte Carlo Risk Simulation
- Decision Tree Analysis
- Project Finance Debt Sculpting
- Portfolio Optimisation
- Financial Model Auditing

Why Attend This Course:

- From calculating NPV on a single deterministic spreadsheet to presenting P10, P50 and P90 value ranges from a Monte Carlo simulation
- From treating fiscal terms as one flat tax rate to modelling royalty, cost recovery, profit oil and government take regime by regime
- From inheriting models with hidden links and hard-coded numbers to building and reviewing models with checks, flags and an assumptions book
- From discussing a project in general terms to delivering a reviewed project economics model with a risked investment recommendation

Conclusion:

Petroleum project economics answers one question with numbers: whether the cash a field returns, after the host government's share, justifies the capital and risk it demands. Delegates leave able to separate concessionary from contractual fiscal systems, deterministic from probabilistic views of value, and project returns from equity returns once debt is introduced. The second week adds material a shorter course leaves out, including project finance, portfolio choice, Monte Carlo simulation and formal model review. The course suits analysts, economists, engineers and finance staff who already work with spreadsheets and now need to build, test and defend decision-ready models.

Frequently Asked Questions FAQ:

What do delegates need before the Financial Modelling and Petroleum Project Economics Course?

Delegates need working Excel skills, including formulas, cell references and charts, and a basic grasp of oil and gas operations. No prior economics training is assumed, though familiarity with discounting or project budgets helps. A laptop with Excel and, where possible, anonymised data from a known project are useful.

How does this financial modelling and petroleum project economics course differ from a shorter introductory course?

It goes well beyond a short introductory course on spreadsheets and appraisal measures. Over two weeks it adds fiscal regime modelling, project finance, portfolio choice, Monte Carlo simulation, decision trees and formal model review, and ends with each delegate building a complete, reviewed model.

What is government take in petroleum project economics?

Government take is the share of a project's pre-tax net cash flow that goes to the host government through royalties, taxes, profit oil, bonuses and state participation. Analysts use it to compare fiscal regimes and to test how attractive a contract is to investors.

What do delegates take back to work from the financial modelling and petroleum project economics course?

Delegates take back a reviewed project economics model built in Excel, with production, cost, price and fiscal layers, risk outputs and an investment recommendation, plus a model review checklist they can apply to future evaluations.