WARREN BUSINESS CONSULTING

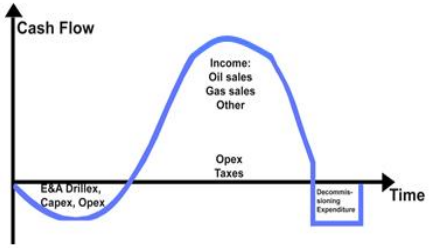
Petroleum Economics

Petroleum Economics is a vital decision making tool. It helps us to make the best decisions according to **value, allocation of resources** and contribution to company **cash flow**. We use **Payback, Net Present Value , Internal Rate of Return and Profitability Index** to judge the best projects to pursue.

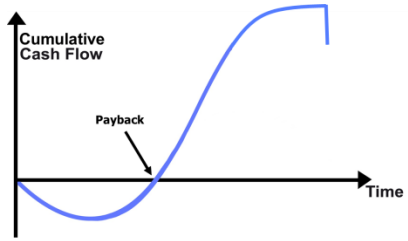
Cash Flow Tips

- Build the model to address the decision
- Understand source data – speak to functional specialists
- Do reality checks – apply a business overview to data
- Keep the model as simple as possible relative to the decision
- Link dependencies (e.g. if capex changes, opex probably does too)
- Most models do not build in all variables (e.g. politics). Decide which to leave out.

1. Project Cash Flow



2. Payback



3. Time Value of Money

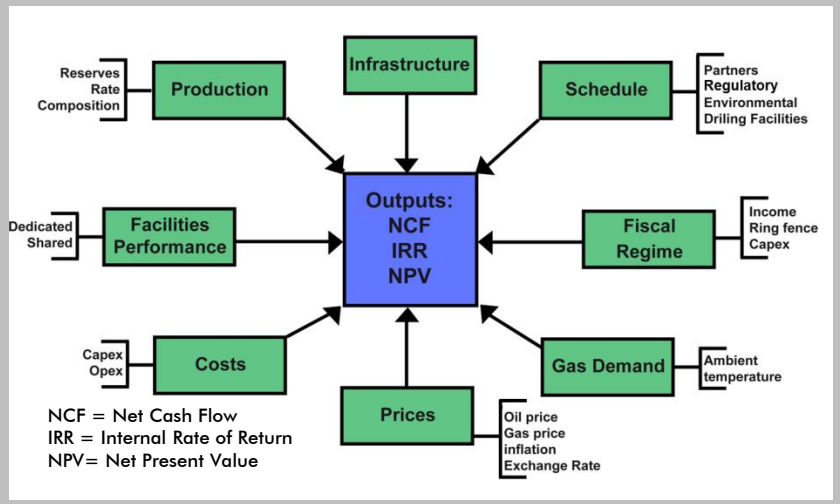
- People value money today more than in the future: risk, opportunity cost, forgo consumption
- Discount cash flow using discount rates
- Weighted Average Cost of Capital (WACC)
- Typical discount rates:
  - NOCs 2%
  - Supermajor 6-8%
  - Typical E&P 10%
  - Nigeria Deepwater 10-12%
  - Higher risk exploration 15%
  - Nigeria Delta: 15%
  - Kurdistan: research note 25%, 2013

4. Net Present Value

$$NPV = \Sigma FV_n/(1+i)^n$$

- NPV = net present value.
- FV_n = value of future net cash flow in period n.
- i = discount rate chosen (equivalent to the weighted average cost of capital).
- n = number of periods between the present and future time.

Generating the Cash Flow Model



NCF = Net Cash Flow
IRR = Internal Rate of Return
NPV= Net Present Value

5. Internal Rate of Return (IRR)

6. Profitability Index

$$PI = (NPV/-NPCe)$$

- PI = Profitability index
- NPV = Net Present Value
- NPCe = Net Present Cost Exposure, i.e. the present value all negative NCF for the project

7. Real vs. MOD

Data can be presented on a "real" or "money-of-the-day" (MOD) basis:

- MOD: revenues/costs include future inflation
- Real: inflation removed back to a base year
- Inflation: systemic price rises
- Escalation: changes to project specific costs/ prices
- Apply escalation then inflation to project
- Has a functional specialist already escalated?

8. Understand Different Tax Systems

A significant part of petroleum economics is understanding the tax (fiscal) system your project is operating under. Differences in these will affect your project metrics, here is a checklist:

- Treatment of expenditures, allowances, depreciation
- Cost limits/caps on capital allowances
- Disallowed costs (e.g. signature bonuses)
- Timing of approval of costs
- Decommissioning provisions
- Definition of petroleum and its value
- Domestic market obligations
- NOC participation, including carried interests

9. Apply Business Context

It is important to link petroleum economics to the business context, e.g.:

- Calculate maximum cash exposure of project
- Assess the requirement for finance and use indicators accordingly
- Select which indicators are relevant, apply weightings
- Assess the impact of project on financials (reported earnings)
- Roll up projects to see impact at corporate level
- Do <u>not</u> select projects on economic metrics alone – hi-grade 3 (say) and apply business overview

"It is better to be approximately right than precisely wrong."

John M. Keynes

Related Guides:

- Risk and Uncertainty
- Portfolio Optimisation
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Contact Us

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