

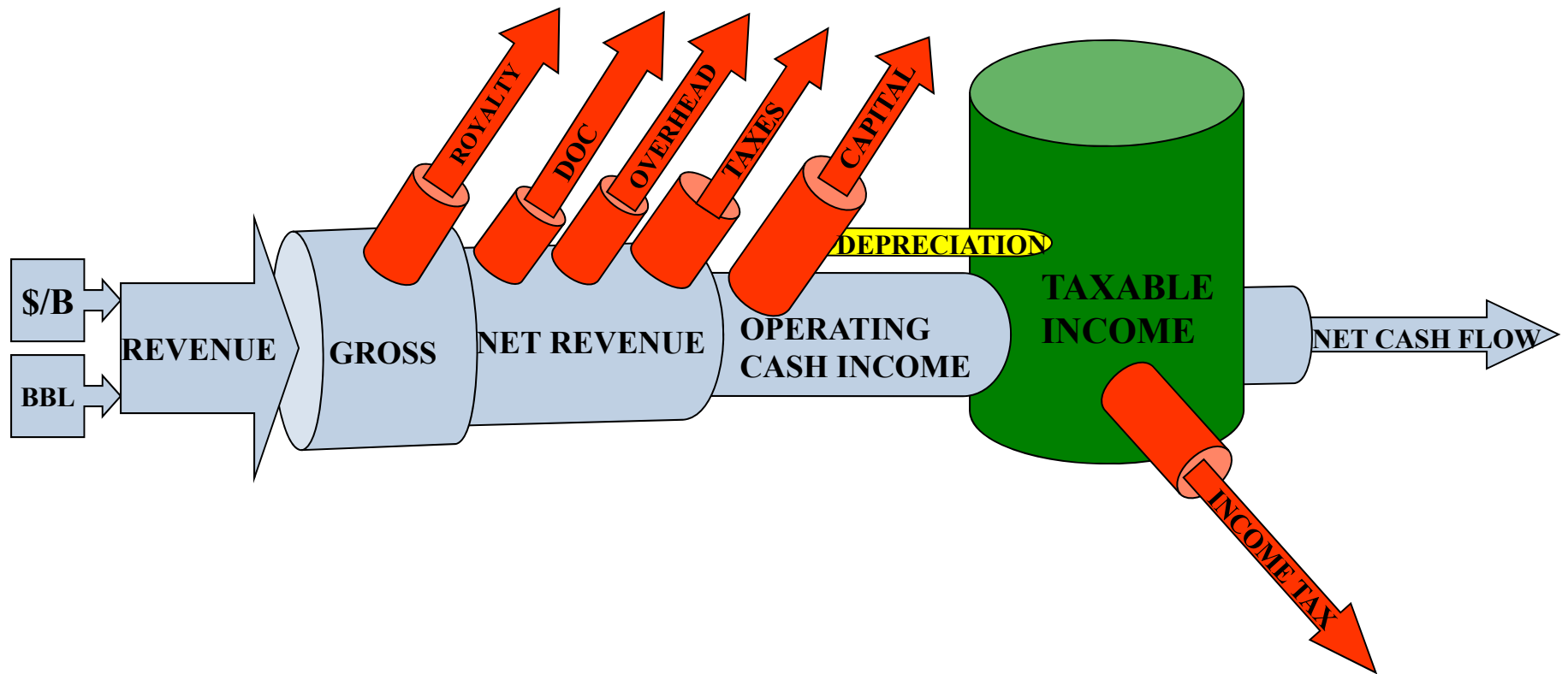


Gas-To-Liquid (GTL)

- **Can produce designer products**
 - Free of aromatics
 - Sulfur free diesel
 - Free of heavy metals (Ni & V)
- **Current requirements: 10-12 MSCF/Bbl liquids**
- **Ship products as conventional liquids**
- **No long term commitments**
 - Enable production of stranded gas reserves
 - Advancements in microtechnology
 - Small scale plant -10 MMCFD \approx \$150 MM
 - Small plants are more efficient
 - 10 mmcf (1,000 bbl syncrude)



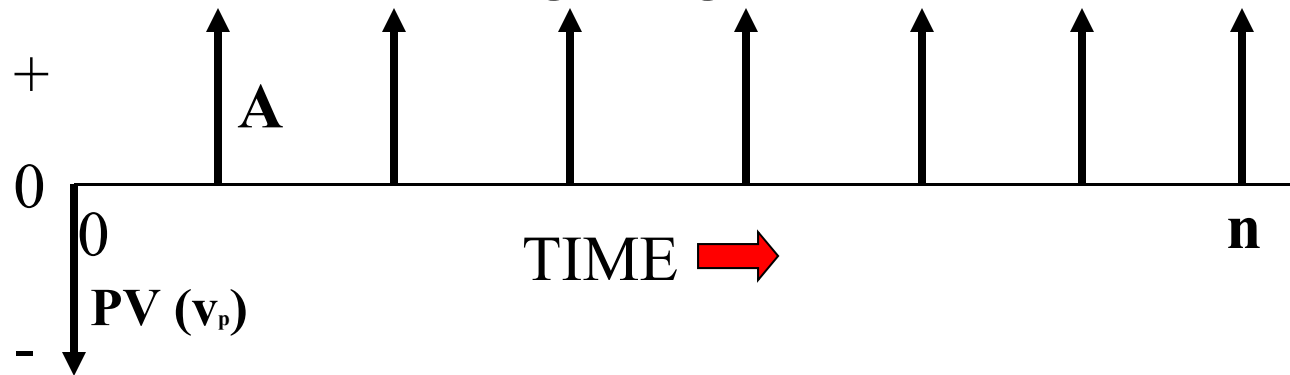
Cash Flow





Annuity (P. 157 & 158)

Investing or paying equal amounts in each period.
Convenient method of spreading values over time like depreciation, but recognizing the time value of money.



$$PVIFA_{i,n} = \sum_{N=1}^n [(1+i)^{-N}] = [1 - (1+i)^{-n}] / i \quad \text{6 6 6} \quad (5.8)$$

This is the formula for a geometric series whose sum is the simple formula shown

$$v_p = A(PVIFA_{i,n}) = (A/i)[1 - (1+i)^{-n}] \quad \text{6 6 6 6 6} \quad (5.9)$$

Average annual capital cost :

$$A = v_p / (PVIFA_{i,n}) = (v_p * i) / [1 - (1+i)^{-n}] \quad \text{5 5 5} \quad (5.9a)$$

Fiscal regimes

Table 2. Main Differences between Concessionary Systems and Production Sharing Contracts

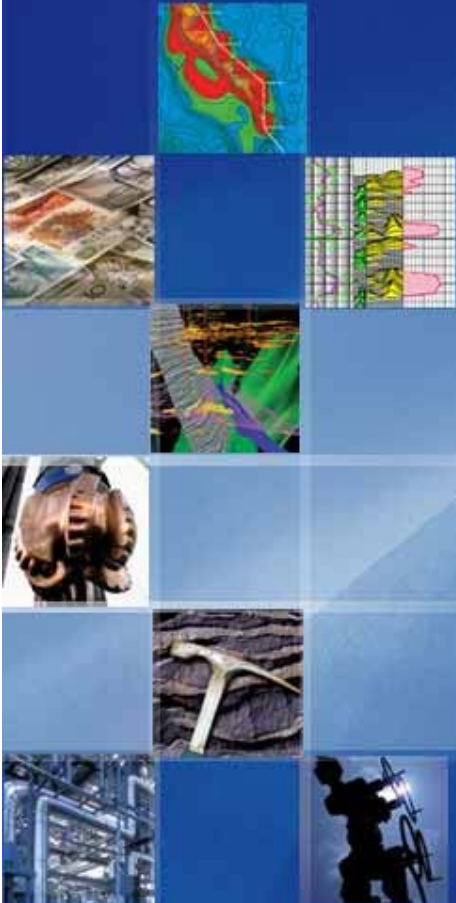
	Concessionary Systems	Production Sharing Contracts
Ownership of nation's mineral resources	Held by sovereign state	Held by sovereign state
Title transfer point	At the wellhead	At the export point
Company entitlement	Gross production less royalty	Cost oil/gas + profit oil/gas
Entitlement percentage	Typically 90%	Typically 50–60%
Ownership of facilities	Held by company	Held by the state
Management and control	Typically less government control	More direct government control and participation
Government participation (carried working interest)	Less likely	More likely
Ring fencing	Less likely	More likely

Source: Johnston (1994b).

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Petroleum Economics Software





Software Features

- Discounted Cash Flow analysis
- Decline curve / production rate analysis
- Worldwide fiscal regimes
- Use of different currencies
- Inflation / escalation
- Reporting

- Schlumberger Merak PEEP
 - Integration with Decision Tool Kit
- Haliburton ARIES
 - Integration with Decision Tools Suite
 - North America focus, with flexibility to add other fiscal regimes

- **Aucerna Petroleum Economics**
 - Enersight (3esi) acquired Palantir, after Palantir acquired PetroVR
 - Built-in fiscal regime library for over 100 regimes
 - Integrates with planning, portfolio, and asset development software solutions
 - Portfolio analysis, Monte Carlo



Software

- **Petroscope (Wood Mackenzie)**
 - Excel based
 - 80 fiscal regimes
- **OGRE Systems R3 Economics**
 - Links to excel, Crystal Ball, @Risk, PrecisionTree
- **MOSAIC (Entero)**
 - North America focus, plus 15 other countries
- **PowerTools (IHS)**
 - US focus
 - Material balance analysis



Software

- PHDWin (TRC Consultants)
 - Decline analysis and economic analysis
 - Some decision analysis
- PetroCalc (Mica)
 - NM, CA, AK, UT, OK, MI, WV