Gas production economics

Part of Field Development Planning and Production Performance Monitoring based on NPV and EUR.

$\mathrm{NPV} = -\mathrm{I}_0 + \sum_{i=1}^{n} \frac{\mathrm{FCF}_i}{(1+r)^i}$	$\mathrm{PI} = \frac{1}{\mathrm{I}_0} \cdot \sum_{i=1}^{n} \frac{\mathrm{FCF}_i}{(1+r)^i}$
FCF = (Sales COGS OPEX Interest) · (1 IncomeTaxRate) + CAPEX	COGS = $m_F \cdot C_F + m_F \cdot C_F + q_O \cdot C_O + q_G \cdot C_G + q_W \cdot C_W + q_G \cdot C_G + q_W \cdot C_W$
Sales = $q_1 \cdot \mathrm{Price}_{income}$	Price_{income} = $\mathrm{Tax}_{mining} \cdot \mathrm{Price}_{market}$

where

FCF_i	Free Cash Flow for i-th year	q_O	surface oil volumetric production
$Sales_i$		q_G	surface gas volumetric production
$COGS_i$		q_W	surface water volumetric production
		q_G	surface gas volumetric injection
$OPEX_i$		q_W	surface water volumetric injection
$CAPEX_i$		C_O	production oil processing/transportation cost
$Interest_i$		C_G	production gas processing/transportation cost
IncomeTaxRate		C_W	productio nwater processing /transportation cost
Tax_{mining}		C_G	injection gas processing/transportation cost
$Price_{market}$		C_W	injection water processing/transportation cost
$Price_{income}$		m_F	fluid production lift cost
q_1		m_F	fluid injection lift cost
		C_F	$\cdot g \cdot H \cdot C_E$
		C_F	$\cdot g \cdot H \cdot C_E$
		H	TVD of the hydrocarbon pay
		C_E	electricity cost per energy unit
		g	Standard gravity constant (= 9.80665 m/s^2)

			fluid production efficiency (frac)
			fluid injection efficiency (frac)

The link between the above FCF algorithm and the general principals of P&L is given below:

FCF = OCF + CAPEX
OCF = Net Income = EBT · (1 IncomeTaxRate)
EBT = EBIT Interest
EBIT = Sales COGS OPEX

See also

Petroleum Industry / Upstream / Production / Field Development Plan

[Petroleum Asset NPV][Petroleum Asset PI]

[Statement of Income (P&L)]

[Netback]

Reference

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