Implications of tariff and tax benefits for oil development in East Siberia

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Simplified field development model

\[ q(t) = m \cdot Q(t) \]

- \( q(t) \) - annual production;
- \( Q(t) \) - residual recoverable oil reserves;
- \( m = \text{const} \) - recovery rate

\[ \dot{Q}(t) = -q(t) \]

Capex

\[ K = K_F + k \cdot m \cdot Q(0) \]

Opex

\[ C(t) = c \cdot q(t) \]
Annual oil production on the field
(3 options of recovery rate)

\[ Q(0) = 200 \text{ mln t} \]
Discounted cumulative values

\[ NPV = \sum_{t=0}^{\infty} \frac{l}{(1+E)^t} \left[ R(t) - C(t) - Tax(t) - K(t) \right] \]

\[ DCT = \sum_{t=0}^{\infty} \frac{l}{(1+E)^t} Tax(t) \]

\[ DCC = \sum_{t=0}^{\infty} \frac{l}{(1+E)^t} K(t) \]

\[ CDOP = \sum_{t=0}^{\infty} \frac{l}{(1+E)^t} q(t) \]

\[ E = 10 \% \]
Field development performance vs. offtakes

Implication of Κφ

$ billion

recovery rate

IRR

NPV

f-criterion

DCC

DCT

IRR
Optimal recovery rate

\[ m_f = \sqrt{\frac{(p - c - h)E}{(1 + f)k}} - E \]

\( p \) – price;

\( c \) – relative Opex;

\( k \) – relative Capex per unit capacity;

\( h \) – tax rate (summary), $/t
Condition of investment \( \Delta DCC \) realization

\[ \Delta NPV > f \cdot \Delta DCC, \]

\( f \) – investment marginal performance;

\( f \)-criterion

\( \text{ЧДД}-f\cdot\text{ДК} \)
Field performance vs. tax rate

$\text{billion}$

Tax rate, $$/t$

recovery rate, IRR

NPV

f-criterion

DCC

DCT

IRR

recovery rate
Effect of reducing the tax rate on the amount of tax
A tax incentive consistency ratio

\[
k_{сл} = \frac{Eh}{2(p-c-h)m_f}
\]

\[
k_{сл} = 1 \text{ – maximum tax}
\]
Efficient field entry condition

\[ p > c + h + (1 + f) \left( \sqrt{Ek} + \sqrt{\frac{K\phi}{Q_0}} \right)^2 \]
Oil price relationship for tax rate

![Graph showing the relationship between oil price and tax rate. The graph includes curves labeled 'Optimum', 'Breaks for ESPO', 'No breaks', and 'Optimum, f=0'. The x-axis represents oil price in $/bbl, ranging from 15 to 145, and the y-axis represents tax rate in $/bbl, ranging from 0 to 120. The graph illustrates how different scenarios affect the relationship between oil price and tax rate.]
Line gradient for tax formula

Optimum

Breaks for ESPO

No breaks

Optimum, f=0

Price, $/bbl
Net Present Value (*NPV*)

![Graph showing Net Present Value (NPV) with various parameters and price axes.](image)
Discounted Cumulative Capex (*DCC*)

Graph showing various lines representing different scenarios for Discounted Cumulative Capex (DCC) with parameters such as $k=600$, $k=1000$, $Кф=800$, $Кф=0$, $с=40$, and $с=150$. The graph plots Price per ton ($/t$) against $\$ billion$. Each line corresponds to a different set of parameters, demonstrating how changes in these parameters affect the DCC. The legend indicates which line corresponds to which set of parameters, providing a visual representation of the implications of varying these factors.
NPV/DCC ratio

![Graph showing NPV/DCC ratio with various price scenarios and parameters.]
Internal Rate of Return (IRR)
Discounted cumulative taxes and transportation costs ($DCT$)
Optimum recovery rate
Optimum tax (plus tariff) rate

Price, $/bbl

- $/bbl
- f=0
- k=600
- k=1000
- Кф=0
- Basic
- Кф=800
- c=40
- c=150

20
Thank you for attention!