

Time Value of Money

	0				
Money	0				
	2022	2023	2024	2025	2026
US\$ in wallet					
US\$ in bank					
Inflation					
Interest Rate					
Cumulative Interest Rate					
Cost of printer ink	0				
	2022	2023	2024	2025	2026
US\$ flat					
US\$ inflation					
US\$					
Amount of printer ink					
	2022	2023	2024	2025	2026
US\$ no inflation					
US after inflation					
US\$ after inflation with interest					

Real versus Nominal

Costs	At Dec 31				
	2018	2019	2020	2021	2022
US\$ Nominal	1	1	1.00	1.00	1.00
Inflation Rate	0%	0%	0%	0%	0%
Multiplier		1	1.00	1.00	1.00

Money available

100

Chocolate Bars

Money Invested

	100.0				
Chocolate Bars	100.0	0.0	0.0	0.0	0.0

US\$ Real (2018)

Money Available

Cost of Choc Bar

2027 2028 2029 2030 2031 2032

2027 2028 2029 2030 2031 2032

2027 2028 2029 2030 2031 2032

2023 2024 2025 2026 2027 2028
1.00 1.00 1.00 1.00 1.00 1.00

0% 0% 0% 0% 0% 0%
1.00 1.00 1.00 1.00 1.00 1.00

0.0 0.0 0.0 0.0 0.0 0.0

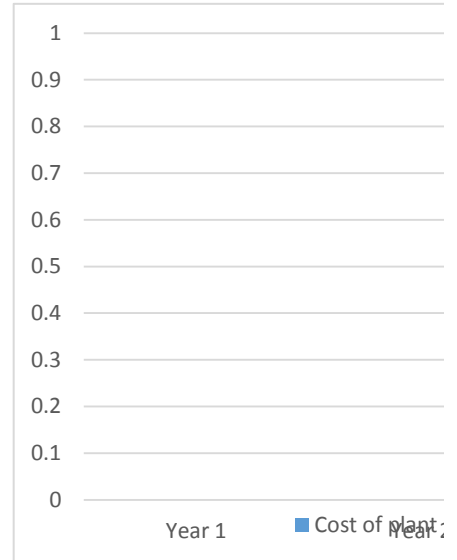
Real and Nominal

	Year 1	Year 2	Year 3	Year 4	Year 5
Real					
Nominal					
Inflation					
Capex					
US\$2020					
Nominal					

Oil Price	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Real							
Nominal							
Inflation							

Cost of plant (today)
Cost of plant (MoD)

Year 8 Year 9 Year 10



Year 1	Year 2	Year 3	Total
0	0	0	0
0	0	0	0



Example Discounted Cashflow

Example 1

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Cashflow	-10	-10	-10	20	20	20	20
Discount Factor	1.08	1.16	1.24	1.34	1.44	1.54	1.66
Discounted Cashflow	-9.3	-8.7	-8.0	15.0	13.9	13.0	12.1
NPV (Net Present Value)	59.3						
Discount Rate	7.5%						
Excel Calculation	59.3						
IRR	41.3%						

Example 2

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Capital Cost	-200	-200	-200				
Revenue				100	100	100	100
Operating Cost				-20	-20	-20	-20
Net Cashflow	-200	-200	-200	80	80	80	80
Discount Factor	1.08	1.16	1.24	1.34	1.44	1.54	1.66
Discounted Cashflow	-186.0	-173.1	-161.0	59.9	55.7	51.8	48.2
NPV	87.4						
Discount Rate	7.5%						
IRR	9.57%						
IRR	9.57%	<i>Internal Rate of Return</i>					
Excel Calculation	87.4						

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Cumulative Cashflow	-200	-400	-600	-520	-440	-360	-280
Disc Cum Cashflow	-186.0	-359.1	-520.1	-460.2	-404.5	-352.6	-304.4
Payback period	11						
Discounted payback period	16						

Year 8	Year 9	Year 10
20	20	20
1.78	1.92	2.06
11.2	10.4	9.7

Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
100	100	100	100	100	100	100	100	100
-20	-20	-20	-20	-20	-20	-20	-20	-20
80	80	80	80	80	80	80	80	80
1.78	1.92	2.06	2.22	2.38	2.56	2.75	2.96	3.18
44.9	41.7	38.8	36.1	33.6	31.2	29.1	27.0	25.2

Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
-200	-120	-40	40	120	200	280	360	440
-259.6	-217.8	-179.0	-142.9	-109.3	-78.1	-49.0	-22.0	3.2

Year 17	Year 18	Year 19	Year 20
100	100	100	100
-20	-20	-20	-20
80	80	80	80
3.42	3.68	3.95	4.25
23.4	21.8	20.2	18.8

Year 17	Year 18	Year 19	Year 20
520	600	680	760
26.6	48.3	68.6	87.4

WACC Calculation

Risk Free Rate 0.00%

Corporate Interest Rate 0.00%

Equity market return 0.00%

Company Beta 0

Corporate Tax Rate 0%

	Debt	Equity
Debt:Equity Split	100%	0%

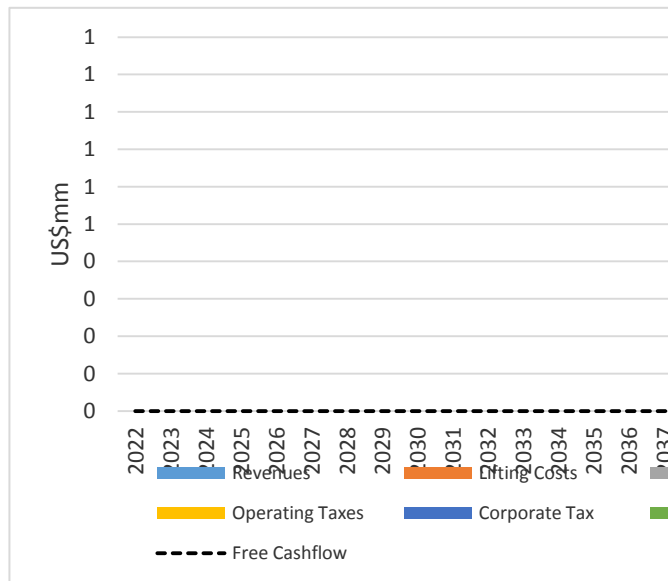
Cost of Debt 0.00%

Cost of Equity 0.00%

WACC 0.00%

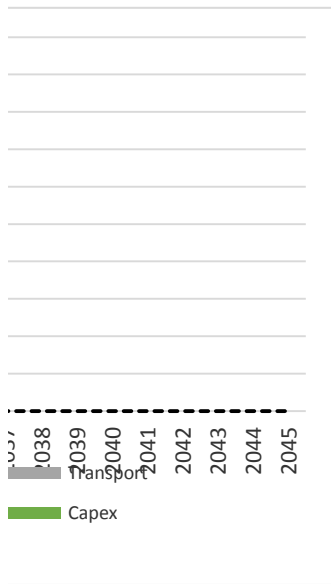
Terminal Value						
Implied FCF	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Implied DCF	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
NPV	#DIV/0!					
Plus Cash	0					
Less Debt	0					
Total NPV	#DIV/0!					
IRR	#####					
<i>EBITDA Multiple</i>	7					

	2022	2023	2024	2025	2026	2027
Revenues	0	0	0	0	0	0
Lifting Costs	0	0	0	0	0	0
Transport	0	0	0	0	0	0
Operating Taxes	0	0	0	0	0	0
Corporate Tax	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Capex	0	0	0	0	0	0
Free Cashflow	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



					0
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0

2028	2029	2030	2031	2032	2033	2034	2035	2036
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0
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2037	2038	2039	2040	2041	2042	2043	2044	2045
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

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1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

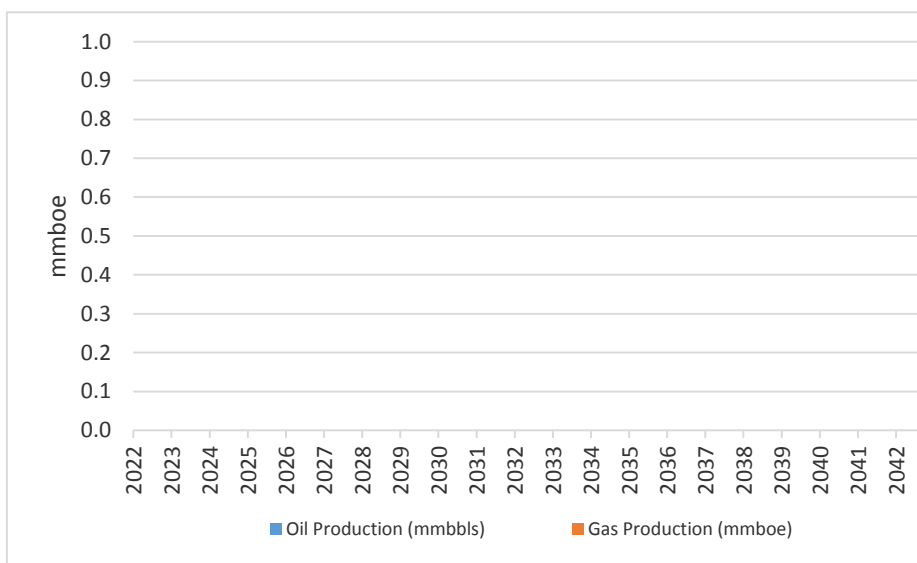
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Production

	Oil		
	mmbbls	kbpd	
Resources	0		
Recovery Factor	0%		
Reserves	0		
Start date	5 years		Peak as %
	after first		Reserves
	capex		
Peak Production (mmbbls)	0	0	7%
Time to Peak (yrs)	0		
Length of Peak (yrs)	0		
Decline rate (%)	0%		

		<i>First capex</i>				1st year
	2022	2023	2024	2025	2026	2027
Oil production	0.00	0.00	0.00	0.00	0.00	0.00
Total oil produced to 2040	0.0					
Barrels per day		0	0	0	0	0
Gas Production	0.00	0.00	0.00	0.00	0.00	0.00
Total gas produced to 2040	0.0					

	2022	2023	2024	2025	2026	2027
Oil Production (mmbbls)	0.0	0.0	0.0	0.0	0.0	0.0
Gas Production (mmboe)	0.0	0.0	0.0	0.0	0.0	0.0
Total (mmboe)	0.0	0.0	0.0	0.0	0.0	0.0



Production Scenarios

Total Produced

Oil Production Scenarios

1	0.00
2	0.00
3	0.00
4	0.00
5	0.00

Gas Production Scenarios

1	0.00
2	0.00
3	0.00
4	0.00
5	0.00

Gas
Bcf

mmcf

Total
mmboe

0
5 years
after first
capex

0
0
0
0%

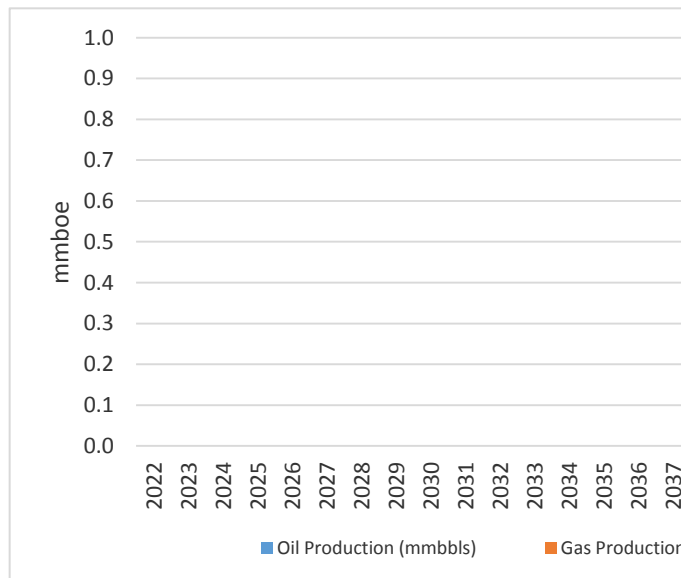
0

0

Peak Oil

2028	2029	2030	2031	2032	2033	2034	2035	2036
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0	0	0	0	0	0	0	0
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2028	2029	2030	2031	2032	2033	2034	2035	2036
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



Domestic Oil Price

Base Case	32.5	32.5	32.5	32.5	32.5	32.5
Scenario 2	37.4	37.4	37.4	37.4	37.4	37.4
Scenario 3	42.3	42.3	42.3	42.3	42.3	42.3
Scenario 4	27.6	27.6	27.6	27.6	27.6	27.6
Scenario 5	22.8	22.8	22.8	22.8	22.8	22.8

Domestic Gas Price

Base Case	4.2	4.2	4.2	4.2	4.2	4.2
Scenario 2	4.9	4.9	4.9	4.9	4.9	4.9
Scenario 3	5.5	5.5	5.5	5.5	5.5	5.5
Scenario 4	3.6	3.6	3.6	3.6	3.6	3.6
Scenario 5	3.0	3.0	3.0	3.0	3.0	3.0

Export Gas Price

Base Case	8.5	8.5	8.5	8.5	8.5	8.5
Scenario 2	9.7	9.7	9.7	9.7	9.7	9.7
Scenario 3	11.0	11.0	11.0	11.0	11.0	11.0
Scenario 4	7.2	7.2	7.2	7.2	7.2	7.2
Scenario 5	5.9	5.9	5.9	5.9	5.9	5.9

Slope 13%

32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5
37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4
42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3
27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6
22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8

4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9

2045

0.0

0.0

0.0

33

65

0

0

0

0.0

4.2

8.5

0

0

0

0

0

0

0.0

0.0 15%

0.0 30%

0.0 -15%

0.0 -30%

0.0

0.0 15%

0.0 30%

0.0 -15%

0.0 -30%

65.0

74.8

84.5

55.3

45.5

32.5
37.4
42.3
27.6
22.8

4.2
4.9
5.5
3.6
3.0

8.5
9.7
11.0
7.2
5.9

Capital Expenditure

Reserves	0	
Capex per bbl	0.00	
Total capex	0	
% before first oil	100%	0
% first oil to peak	0%	0
Maintenance capex	0%	0

	First Capex			First Oil		
	2022	2023	2024	2025	2026	2027
US\$mm	0	0	0	0	0	0
Before first oil	0					
First oil to peak	0					
Maintenance	0					
Total	0					

Sensitivities

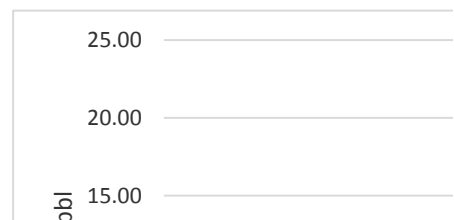
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
15%						
30%						
-15%						
-30%						

Field Comparisons

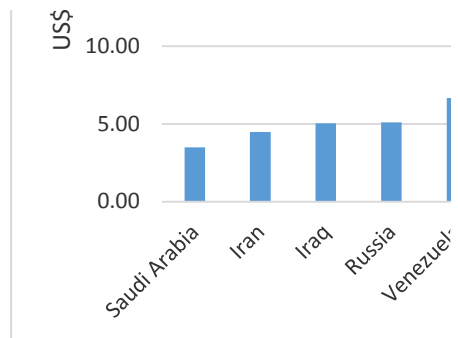
	Cost /bbl	Capex	Reserves	Peak Prod	Peak Prod
	US\$/bbl	US\$mm	mmbbls	kbpd	mmbbls
Kashagan (Kazakhstan)	10.46	136000	13000	1500	547.5
ACG (Azerbaijan)	4.00	20000	5000	620	226.3
Thunderhorse (Gulf of Mexico)	5.00	5000	1000	250	91.25
Novy Port (Russia onshore)	3.25	4500	1385	161	58.64
Ghawar (Saudi)	3.50	248500	71000	5000	1825
Lula (Brazil deep water)	9.04	75000	8300	500	182.5

Global Comparisons

	Capex US\$/bbl
Saudi Arabia	3.50
Iran	4.48
Iraq	5.03
Russia	5.10
Venezuela	6.66



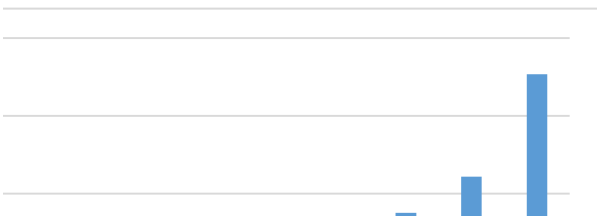
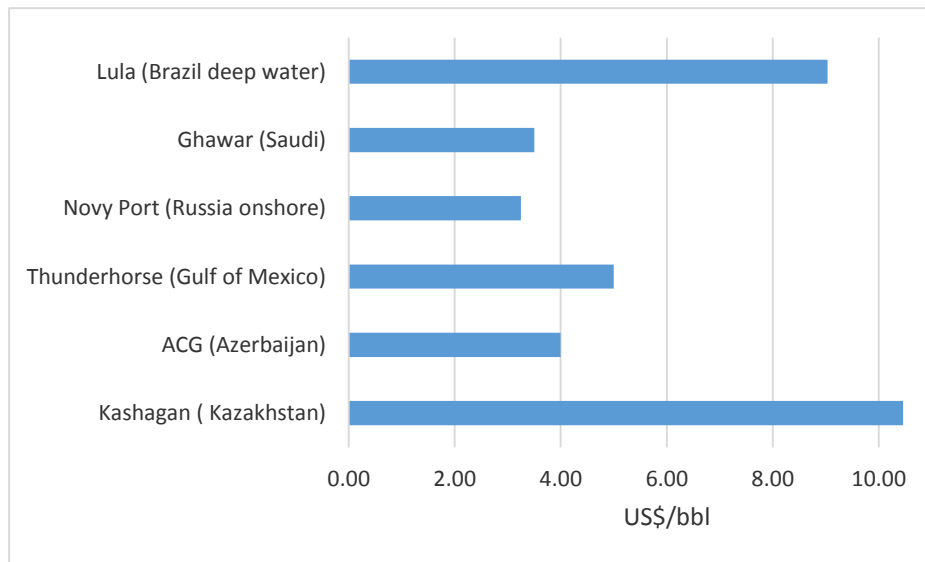
US shale	7.56
Indonesia	7.65
US conv	7.70
Canada	9.69
Nigeria	13.10
Norway	13.76
Brazil	16.09
UK	22.67

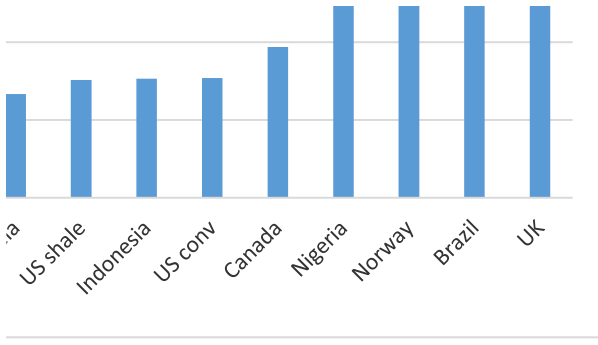


2028 2029 2030 2031 Peak Oil 2032 2033 2034 2035 2036

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

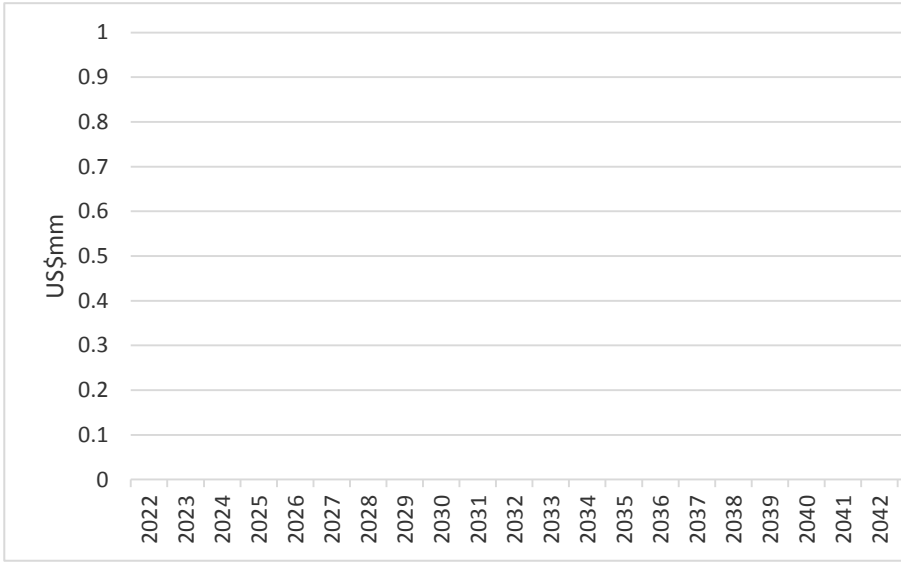
Capex/
peak bbl
US\$/bbl
248
88
55
77
136
411





2037 2038 2039 2040 2041 2042 2043 2044 2045

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0



2043
2044
2045

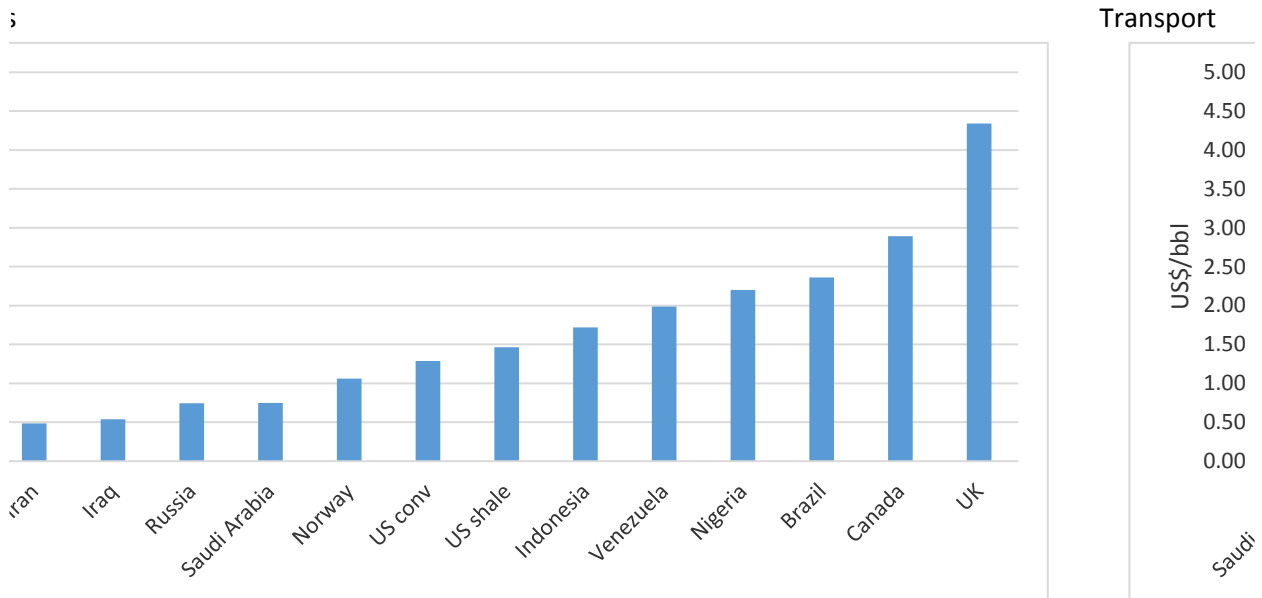


Total (US\$mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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Base Case and Sensitivities

1	0.00
2	15%
3	30%
4	-15%
5	-30%

2027 **2028** **2029** **2030** **2031** **2032** **2033** **2034**
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0



2029 **2030** **2031** **2032** **2033** **2034** **2035** **2036**
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

2035

0.0

2036

0.0

2037

0.0

2038

0.0

2039

0.0

2040

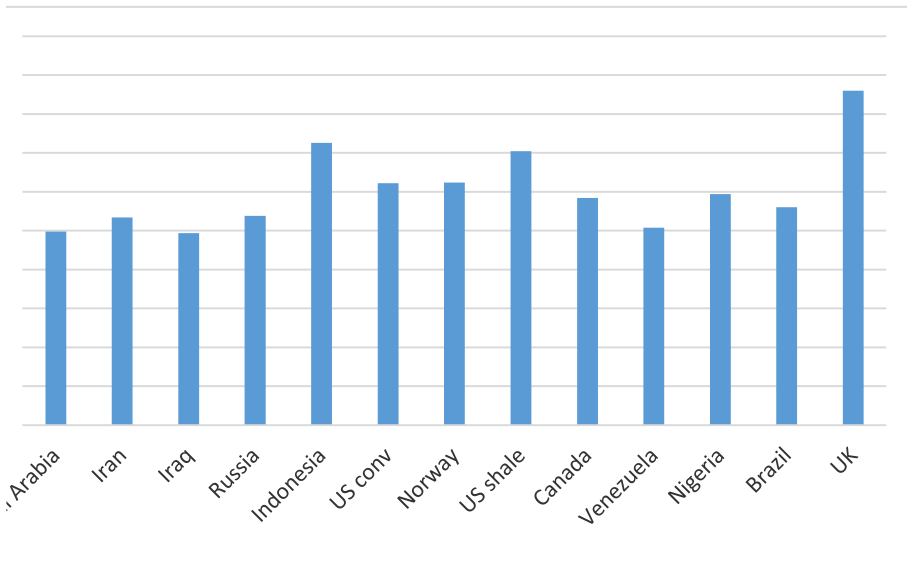
0.0

2041

0.0

2042

0.0



2037

0.0

0.0

2038

0.0

0.0

2039

0.0

0.0

2040

0.0

0.0

2041

0.0

0.0

2042

0.0

0.0

2043

0.0

0.0

2044

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

2043

0.0

2045

0.0

0.0

0.0

Operating Taxes

Oil Tax

Export Tax	Sliding	of export barrels
Royalty	0.0%	of oil revenues
Other taxes	0.0%	of total revenues

Export Oil Price	65	65	65	65	65	65
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	2020	2021	2022	2023	2024	2025
Export Tax	0.0	0.0	0.0	0.0	0.0	0.0
Royalty	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0
Total	0	0	0	0	0	0.0

Export Tax

Cut-off point	0	US\$/bbl
Tax	0%	above cut-off point

Export Tax (\$/bbl)	0	0	0	0	0	0
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Gas Tax

Export Tax	0%	export revenues
Royalty	0	US\$/mcf

	2022	2023	2024	2025	2026	2027
Export Tax	0	0	0	0	0	0
Royalty	0	0	0	0	0	0
Total	0	0	0	0	0	0

Total Operating Taxes	0	0	0	0	0	0
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Total US\$/boe

Gross Taxes

US\$/bbl

Saudi Arabia	0
Iran	0
Iraq	0.91
Russia	8.44
Indonesia	1.55
US conv	5.03
Norway	0.19
US shale	6.42
Canada	2.48
Venezuela	10.48
Nigeria	4.11

Brazil
UK

6.66
0

Depreciation

Straight Line

Total Capex	0
Years of Production	0
Annual Depreciation (US\$mm)	#DIV/0!

	2022	2023	2024	2025	2026	2027
Depreciation	0	0	0	0	0	0
<i>Production</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Total	0					

Unit of Production

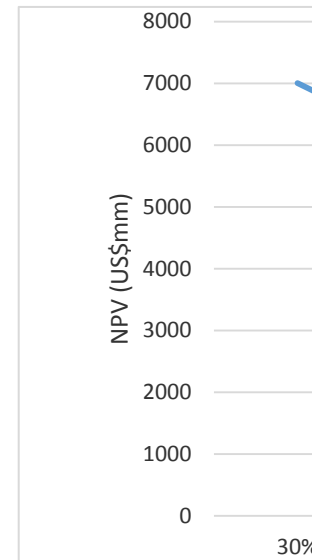
Total Reserves	0
Total Produced	0
Total Capex	0
Depreciation per barrel	#DIV/0!

	2022	2023	2024	2025	2026	2027
Depreciation	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Total	#DIV/0!					

Sensitivities

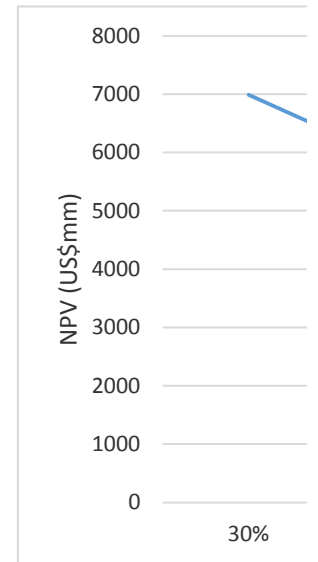
Oil Price

	NPV
30%	7005
15%	5677
0%	4348
-15%	3020
-30%	1692



Production

	NPV
30%	6988
15%	5668
0%	4349
-15%	3029
-30%	1709



Capex

	NPV
30%	2855
15%	3602
0%	4349
-15%	5095
-30%	5842

Opex

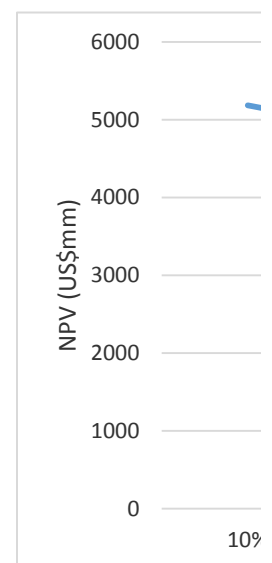
	NPV
30%	3783
15%	4066
0%	4349
-15%	4632
-30%	4914

Corporate Tax Rate

	NPV
10%	5184
15%	4766
20%	4349
25%	3931
30%	3513

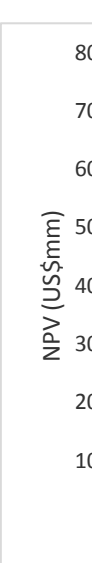
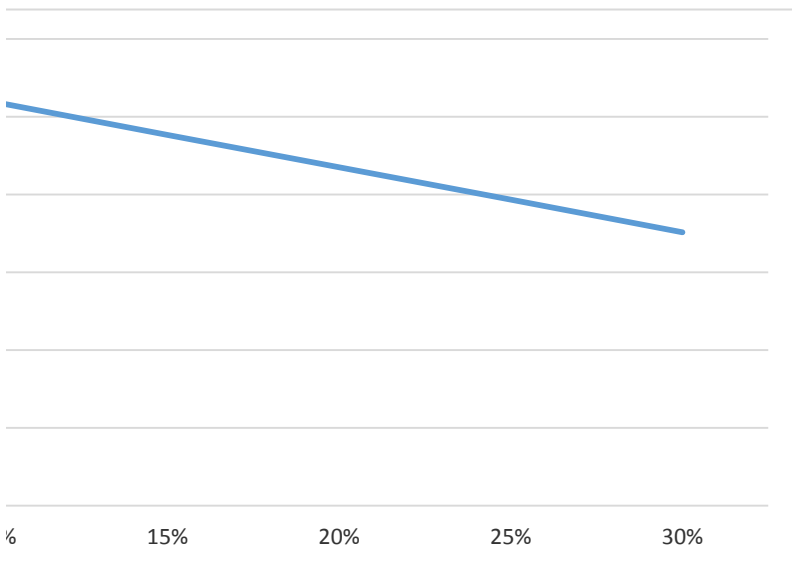
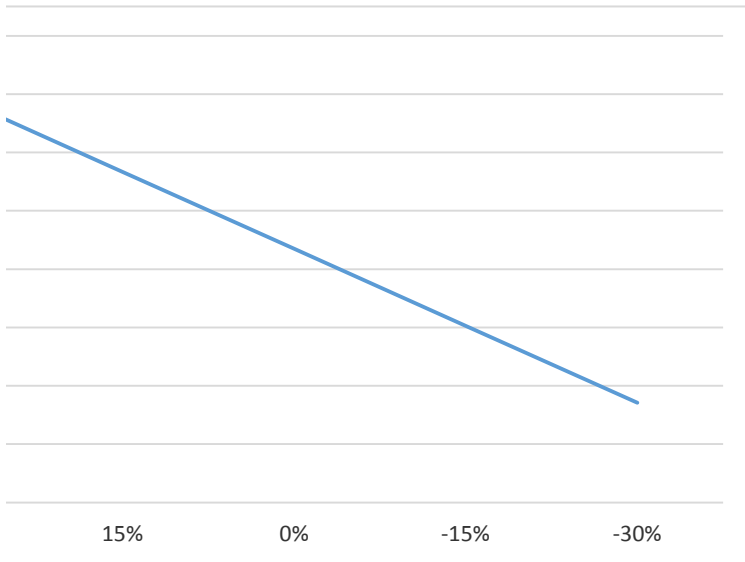
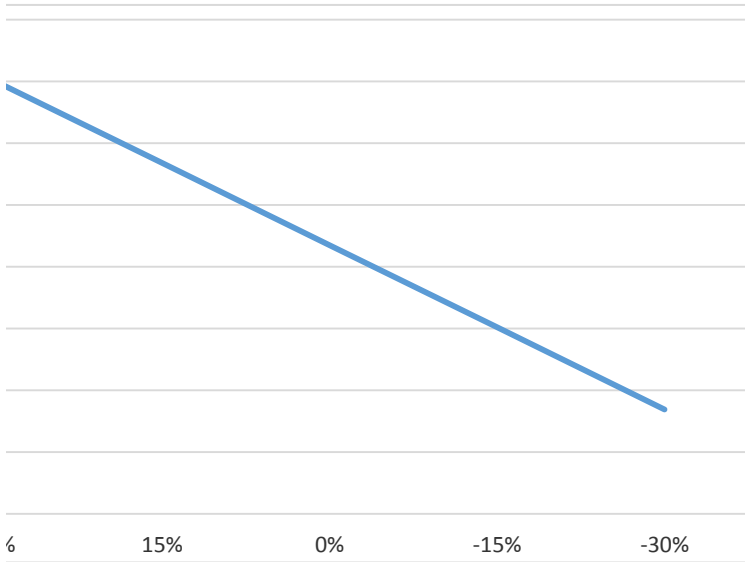
Discount Rate

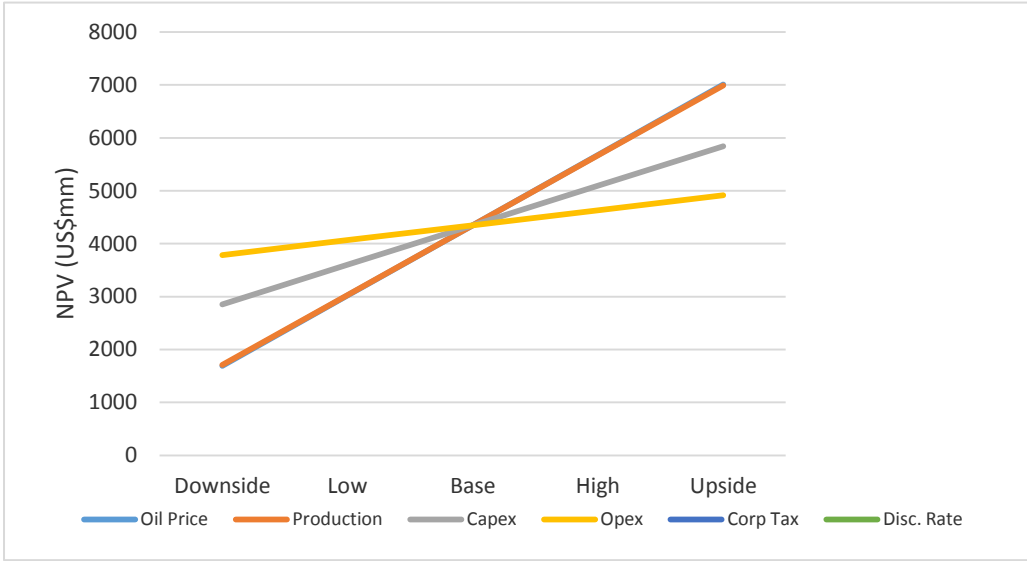
	NPV
-30.0%	6668
-15.0%	5406
Base	4349
+15%	3427
+30%	2654

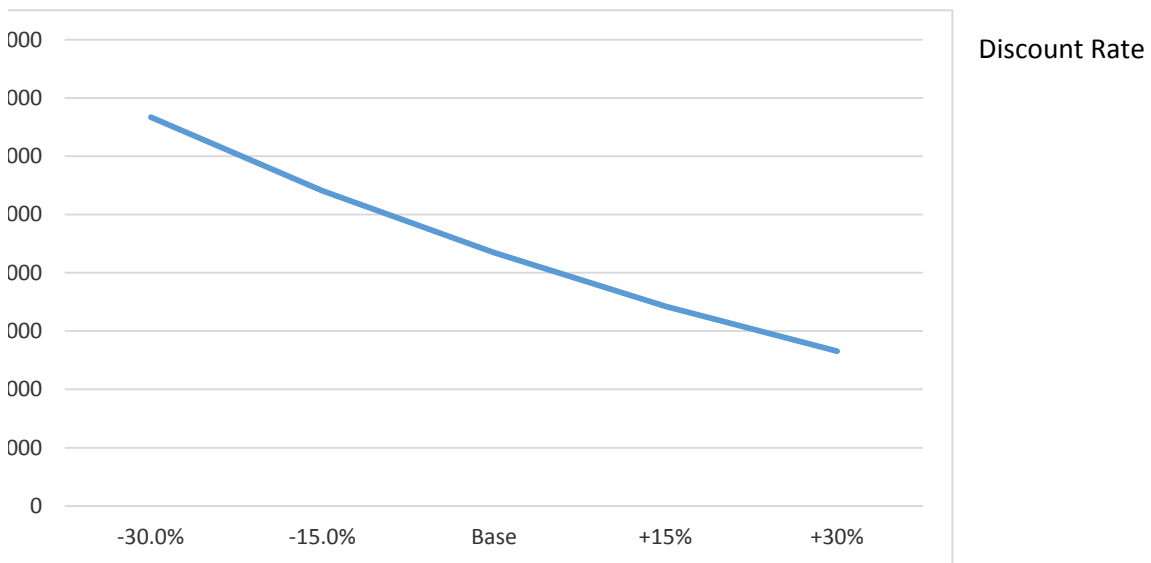
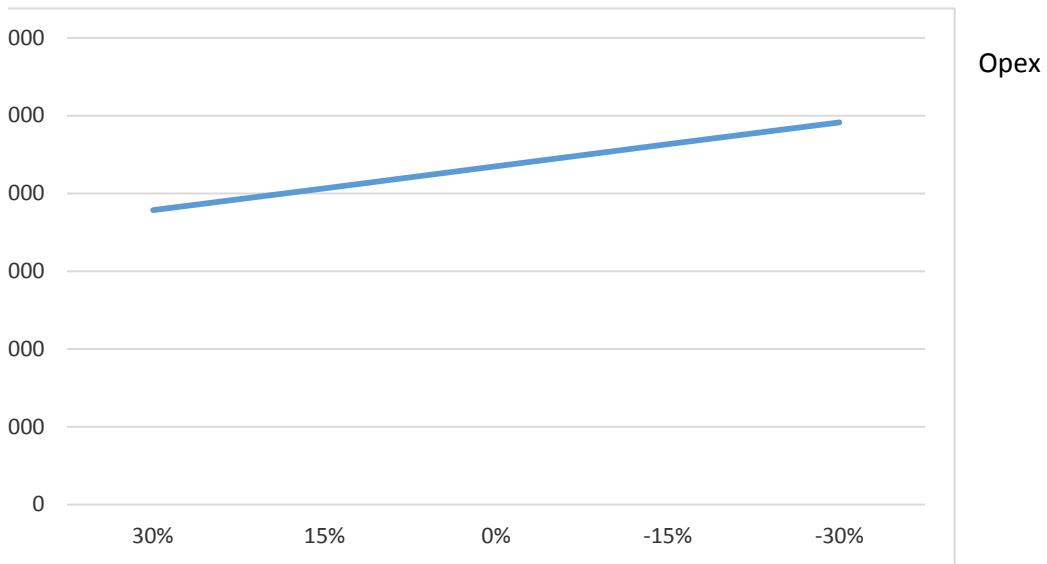
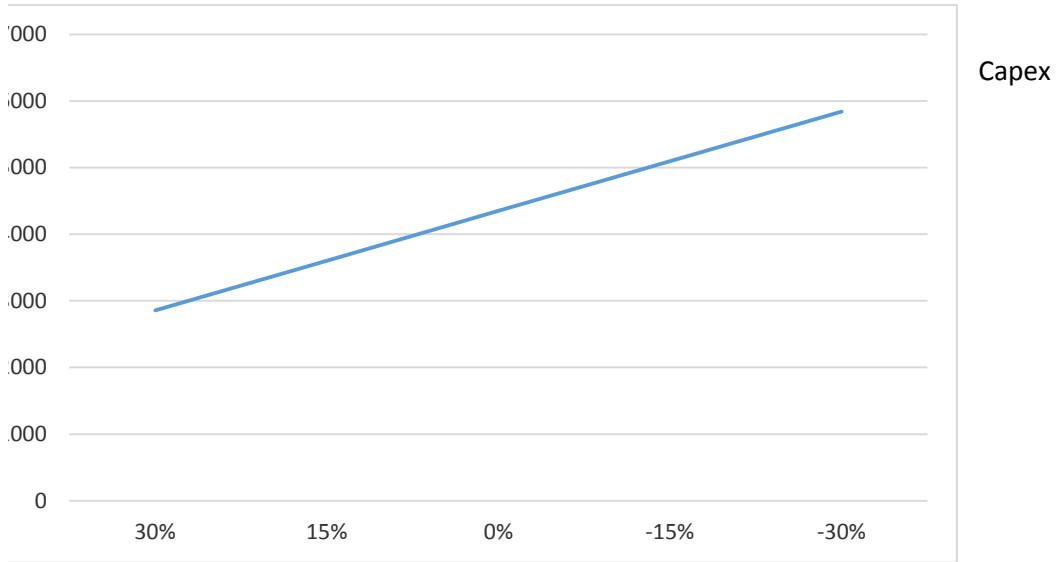


Summary

	Oil Price	Production Capex	Opex	Corp Tax	Disc. Rate
Downside	1692	1709	2855	3783	
Low	3020	3029	3602	4066	
Base	4348	4349	4349	4349	
High	5677	5668	5095	4632	
Upside	7005	6988	5842	4914	







Exploration Well Analysis

Chance of Success	10%
Cost of Well	100 US\$mm
NPV of Success	#DIV/0!
Dry Hole	-90.0
Successful Well	#DIV/0!
EMV	#DIV/0!

PSA Regime

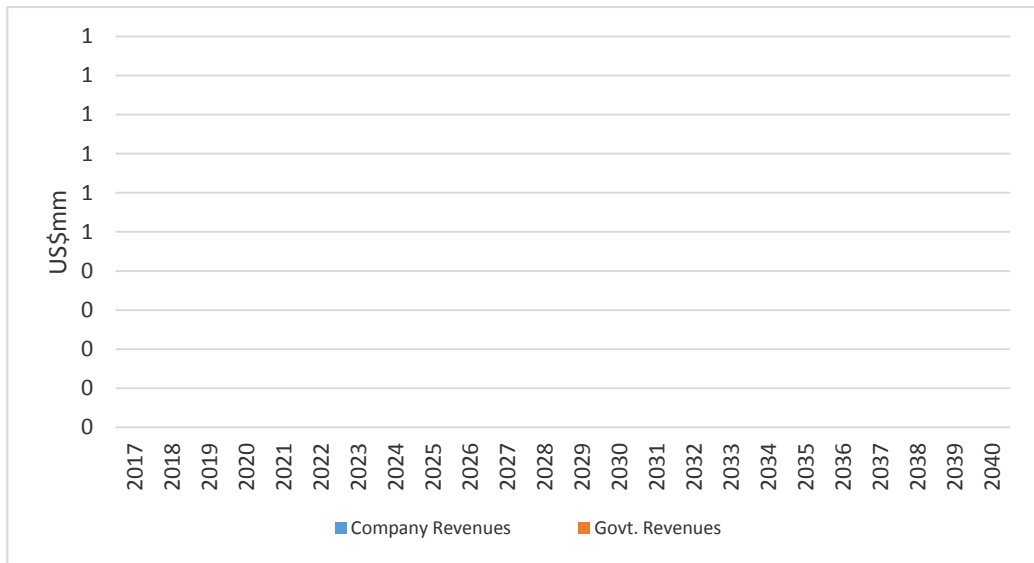
	2020	2021	2022	2023	2024	2025
Company Revenues	0	0	0	0	0	0
Operating Costs	0	0	0	0	0	0
Transport Costs	0	0	0	0	0	0
Operating Taxes	0	0	0	0	0	0
EBITDA	0	0	0	0	0	0
Depreciation	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
EBIT	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Tax on EBIT <i>Corporate Tax Rate</i>	#DIV/0! 20%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Post tax cashflow	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
CAPEX	0	0	0	0	0	0
Free Cashflow (FCF)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Cumulative FCF	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Discount Rate	10%					
Discount Factor	1.10	1.21	1.33	1.46	1.61	1.77
Discounted Cashflow (DCF)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
NPV (\$mm)	#DIV/0!					
IRR (%)	#####					

Revenue Calculation

	Company	Govt				
Cost Oil	80%					
Profit Oil	50%	50%				
	2017	2018	2019	2020	2021	2022
Total Revenues	0	0	0	0	0	0
Govt Royalty	0	0	0	0	0	0
Taxable Revenues	1%	0	0	0	0	0
Cost Oil						
80% of Revenues	0	0	0	0	0	0

Accumulated Cost Oil	0	0	0	0	0	0
Annual Costs	0	0	0	0	0	0
Accumulated Costs	0	0	0	0	0	0
Payback	0	0	0	0	0	0
Cost Oil to Company	0	0	0	0	0	0
Profit Oil	0	0	0	0	0	0
Profit Oil						
Company	0	0	0	0	0	0
Govt	0	0	0	0	0	0
Total Company Revenues	0	0	0	0	0	0
	2017	2018	2019	2020	2021	2022
Company Revenues	0	0	0	0	0	0
Govt. Revenues	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
2023	2024	2025	2026	2027	2028	2029	2030	2031
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0



Questions

Real and Nominal

	2018	2019	2020	2021	2022	2023
Q1	100	102.5	105.1	107.7	110.4	113.1

Q2

	2018	2019	2020	2021	2022	2023
Real	60	60	60	60	60	60
Nominal	60	61.20	62.42	63.67	64.95	66.24

Inflation 2%

Real +1% 60 60.60 61.21 61.82 62.44 63.06

NPV and DCF

Q1

	2018	2019	2020	2021	2022	2023	2024	2025
US\$m	100	100	100	100	100	100	100	100
Discount factor	1.10	1.21	1.33	1.46	1.61	1.77	1.95	2.14
Discount Rate	10%							
DCF	91	83	75	68	62	56	51	47
NPV	614							
NPV Excel	614							

Q2

	2018	2019	2020	2021	2022	2023	2024	2025
Capex	-187.5	-187.5	-187.5	-187.5	-187.5			
Cashflow						100	150	200
Net Cashflow	-188	-188	-188	-188	-188	100	150	200
Discount Factor	1.1	1.21	1.33	1.46	1.61	1.77	1.95	2.14
Discount Rate	10%							
DCF	-170	-155	-141	-128	-116	56	77	93
NPV	381							
NPV Excel	381							
IRR	16%							
Cost Inflation	1.25							

2026	2027
100	100
2.36	2.59
42	39

2026	2027	2028	2029	2030	2031	2032	2033	2034
250	300	300	300	300	300	300	270	243
250	300	300	300	300	300	300	270	243
2.36	2.59	2.85	3.14	3.45	3.80	4.18	4.59	5.05
106	116	105	96	87	79	72	59	48

2035	2036	2037
219	197	177
219	197	177
5.56	6.12	6.73
39	32	26