

Time Value of Money

Money

	2019	2020	2021	2022	2023
US\$ in wallet	500	500	500	500	500
US\$ in bank	500	525	551	579	608
Inflation		4%	4%	4%	4%
Interest Rate		5%	5%	5%	5%
Cumulative Interest Rate		1.05	1.10	1.16	1.22

Cost of printer ink

	2019	2020	2021	2022	2023
US\$ flat	5	5	5	5	5
US\$ inflation		5.20	5.41	5.62	5.85
US\$					

Amount of printer ink

	2019	2020	2021	2022	2023
US\$ no inflation	100.0	100.0	100.0	100.0	100.0
US after inflation	#DIV/0!	96.2	92.5	88.9	85.5
US\$ after inflation with interest	#DIV/0!	101.0	101.9	102.9	103.9

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

Chocolate Bars	100.0				
Chocolate Bars	100.0	0.0	0.0	0.0	0.0

US\$ Real (2018)

Money Available

Cost of Choc Bar

2024	2025	2026	2027	2028	2029
500	500	500	500	500	
638	670	704	739	776	
4%	4%	4%	4%	4%	4%
5%	5%	5%	5%	5%	5%
1.28	1.34	1.41	1.48	1.55	1.63

2024	2025	2026	2027	2028	2029
5	5	5	5	5	
6.08	6.33	6.58	6.84		

2024	2025	2026	2027	2028	2029
100.0	100.0	100.0	100.0		
82.2	79.0	76.0	73.1		
104.9	105.9	106.9	108.0		

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
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Real and Nominal

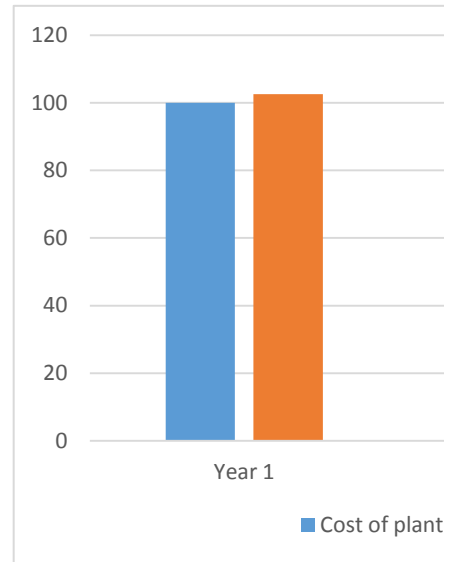
	Year 1	Year 2	Year 3	Year 4	Year 5
Real	100	100	100	100	100
Nominal	102.5	105.1	107.7	110.4	113.1
Inflation	2.5%	2.5%	2.5%	2.5%	2.5%
Capex					
US\$2020	500				
Nominal	539				

Oil Price

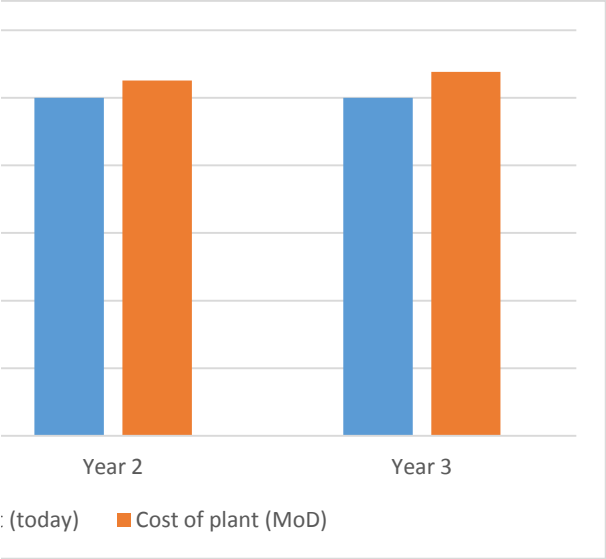
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Real	30	30	30	30	30	30	30
Nominal	30.6	31.21	31.84	32.47	33.12	33.78	34.46
Inflation	2%	2%	2%	2%	2%	2%	2%

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

Year 8	Year 9	Year 10
30	30	30
35.15	35.85	36.57
2%	2%	2%



Year 1	Year 2	Year 3	Total
100	100	100	300
103	105	108	315



Example Discounted Cashflow

Example 1

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Cashflow						
Discount Factor						
Discounted Cashflow						
NPV (Net Present Value)						
Discount Rate						
Excel Calculation						
IRR	#NUM!					

Example 2

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Capital Cost	-200	-200	-200			
Revenue				100	100	100
Operating Cost				-20	-20	-20
Net Cashflow	-200	-200	-200	80	80	80
Discount Factor	1.08	1.16	1.24	1.34	1.44	1.54
Discounted Cashflow	-186.0	-173.1	-161.0	59.9	55.7	51.8
NPV	87.4					
Discount Rate	7.5%					
IRR	9.6%					

IRR

Internal Rate of Return

Excel Calculation

87.4

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

Year 7 Year 8 Year 9 Year 10

Year 7 Year 8 Year 9 Year 10 Year 11 Year 12 Year 13 Year 14 Year 15

100	100	100	100	100	100	100	100	100	100
-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
80	80	80	80	80	80	80	80	80	
1.66	1.78	1.92	2.06	2.22	2.38	2.56	2.75	2.96	
48.2	44.9	41.7	38.8	36.1	33.6	31.2	29.1	27.0	

Year 7 Year 8 Year 9 Year 10 Year 11 Year 12 Year 13 Year 14 Year 15

-280	-200	-120	-40	40	120	200	280	360
-304.4	-259.6	-217.8	-179.0	-142.9	-109.3	-78.1	-49.0	-22.0

Year 16	Year 17	Year 18	Year 19	Year 20
100	100	100	100	100
-20	-20	-20	-20	-20
80	80	80	80	80
3.18	3.42	3.68	3.95	4.25
25.2	23.4	21.8	20.2	18.8

Year 16	Year 17	Year 18	Year 19	Year 20
440	520	600	680	760
3.2	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	0%	100%

Cost of Debt 0.00%

Cost of Equity 0.00%

WACC 0.00%

An Example Conventional Oil Field

Sensitivities		1	0%
Oil Price	1	2	15%
Production	1	3	30%
Operating Costs & Transport	1	4	-15%
Capex	1	5	-30%

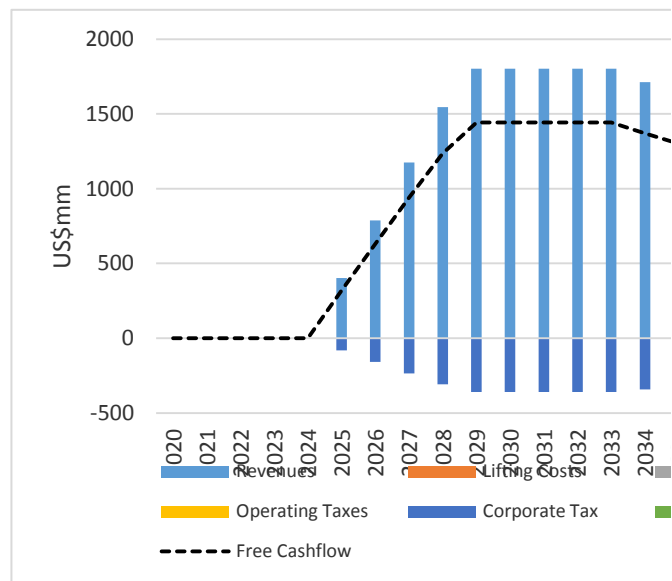
	2021	2022	2022	2023	2024	2025
Revenues	0	0	0	0	0	403
Operating Costs	0	0	0	0	0	0
Transport Costs	0	0	0	0	0	0
Operating Taxes	0	0	0	0	0	0
EBITDA (Pre-tax Cashflow)	0	0	0	0	0	403
Depreciation <i>Straight Line (0) or Unit of Prod (1)</i>	0 1	0	0	0	0	0
EBIT (Post Tax Profit)	0	0	0	0	0	403
Tax on EBIT <i>Corporate Tax Rate</i>	0 20%	0	0	0	0	-81
Post tax cashflow	0	0	0	0	0	322
CAPEX	0	0	0	0	0	0
Free Cashflow (FCF)	0	0	0	0	0	322
Cumulative FCF	0	0	0	0	0	322
Discount Rate	0.0%					
Discount Factor	1.00	1.00	1.00	1.00	1.00	1.00
Discounted Cashflow (DCF)	0	0	0	0	0	322
NPV (\$mm)	21333					
IRR (%)	#NUM!					
Payback (years)	11	When does cumulative cashflow turn positive				
Excel Calculation	\$21,333					

Breakeven Oil Price \$50.00 *After Goal Seek Function in Data:What If*

Alternative NPV (terminal value)						
FCF for 10 years	0	0	0	0	0	322

Terminal Value						
Implied FCF	0	0	0	0	0	322
Implied DCF	0	0	0	0	0	322
NPV	18631					
Plus Cash	0					
Less Debt	0					
Total NPV	18631					
IRR	#NUM!					
<i>EBITDA Multiple</i>	7					

	2020	2021	2022	2023	2024	2025
Revenues	0	0	0	0	0	403
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	0	0	0	0	0	-81
Capex	0	0	0	0	0	0
Free Cashflow	0	0	0	0	0	322



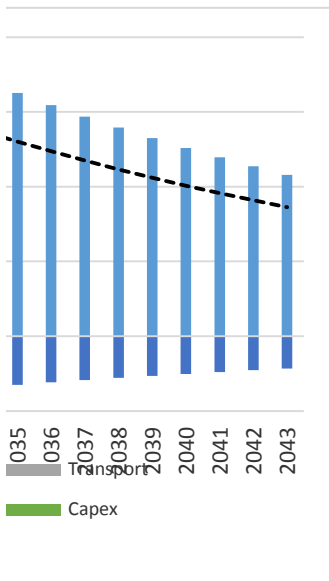
Base
High
Upside
Low
Downside

Results
NPV 21333 US\$mm
IRR #NUM! %

2026	2027	2028	2029	2030	2031	2032	2033	2034
789	1175	1545	1803	1803	1803	1803	1803	1712
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
789	1175	1545	1803	1803	1803	1803	1803	1712
0	0	0	0	0	0	0	0	0
789	1175	1545	1803	1803	1803	1803	1803	1712
-158	-235	-309	-361	-361	-361	-361	-361	-342
631	940	1236	1442	1442	1442	1442	1442	1370
0	0	0	0	0	0	0	0	0
631	940	1236	1442	1442	1442	1442	1442	1370
953	1893	3129	4571	6013	7455	8897	10339	11709
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
631	940	1236	1442	1442	1442	1442	1442	1370
631	940	1236	1442	1442				

					12618
631	940	1236	1442	1442	12618
631	940	1236	1442	1442	12618

2026	2027	2028	2029	2030	2031	2032	2033	2034
789	1175	1545	1803	1803	1803	1803	1803	1712
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
-158	-235	-309	-361	-361	-361	-361	-361	-342
0	0	0	0	0	0	0	0	0
631	940	1236	1442	1442	1442	1442	1442	1370



2035	2036	2037	2038	2039	2040	2041	2042	2043
1627	1545	1468	1395	1325	1259	1196	1136	1079
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
1627	1545	1468	1395	1325	1259	1196	1136	1079
0	0	0	0	0	0	0	0	0
1627	1545	1468	1395	1325	1259	1196	1136	1079
-325	-309	-294	-279	-265	-252	-239	-227	-216
1301	1236	1175	1116	1060	1007	957	909	863
0	0	0	0	0	0	0	0	0
1301	1236	1175	1116	1060	1007	957	909	863
13010	14247	15421	16537	17597	18604	19561	20469	21333
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1301	1236	1175	1116	1060	1007	957	909	863

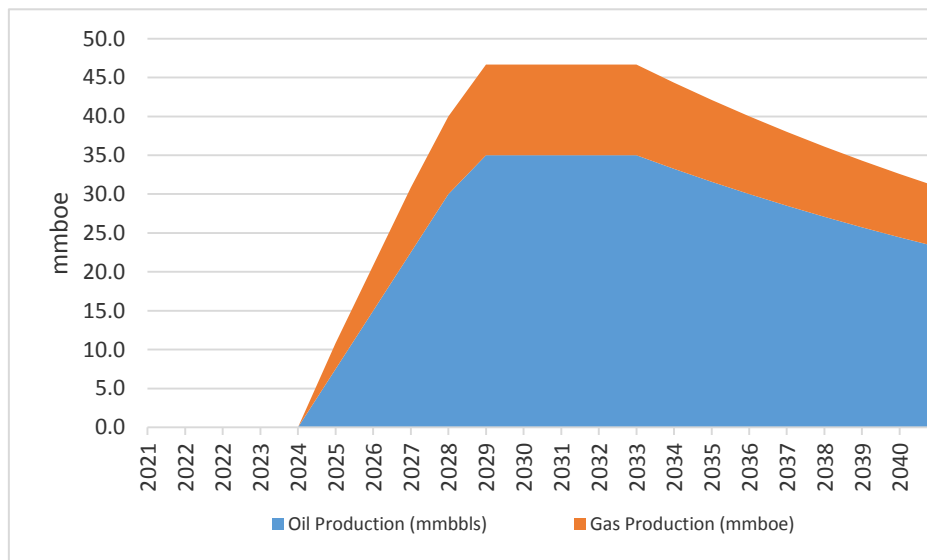
2035	2036	2037	2038	2039	2040	2041	2042	2043
1627	1545	1468	1395	1325	1259	1196	1136	1079
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
-325	-309	-294	-279	-265	-252	-239	-227	-216
0	0	0	0	0	0	0	0	0
1301	1236	1175	1116	1060	1007	957	909	863

Production

	Oil		
	mmbbls	kbpd	
Resources	0		
Recovery Factor	0%		
Reserves	500		
Start date	5 years		Peak as %
	after first		Reserves
	capex		
Peak Production (mmbbls)	35	96	7%
Time to Peak (yrs)	5		
Length of Peak (yrs)	5		
Decline rate (%)	5%		

	<i>First capex</i>					1st year
	2021	2022	2022	2023	2024	2025
Oil production	0.00	0.00	0.00	0.00	0.00	7.50
Total oil produced to 2040	516.8					
Barrels per day		0	0	0	0	20548
Gas Production	0.00	0.00	0.00	0.00	0.00	20.00
Total gas produced to 2040	1048.7					

	2021	2022	2022	2023	2024	2025
Oil Production (mmbbls)	0.0	0.0	0.0	0.0	0.0	7.5
Gas Production (mmboe)	0.0	0.0	0.0	0.0	0.0	3.3
Total (mmboe)	0.0	0.0	0.0	0.0	0.0	10.8



Production Scenarios

Total Produced

Oil Production Scenarios

1	516.84
2	594.37
3	671.89
4	439.31
5	361.79

Gas Production Scenarios

1	1048.68
2	1205.98
3	1363.28
4	891.38
5	734.08

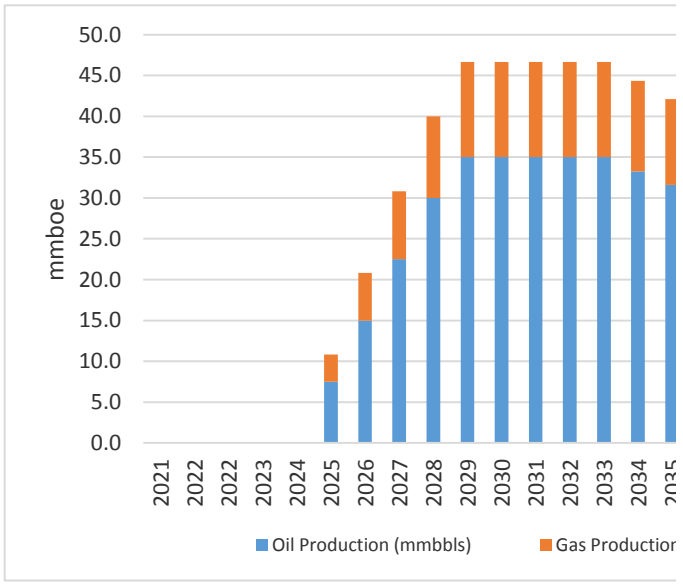
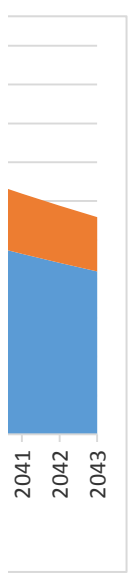
Gas
 Bcf mmcfD **Total**
 mmboe

 167 667
 5 years
 after first
 capex
 192
 5
 5
 5%

Peak Oil

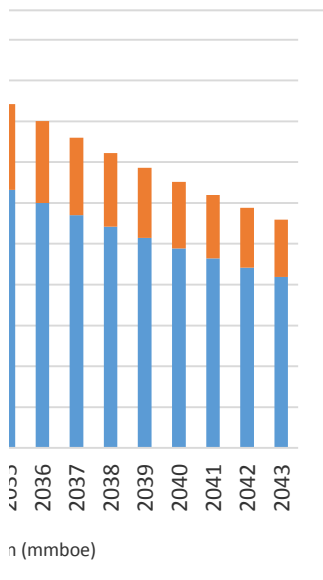
2026	2027	2028	2029	2030	2031	2032	2033	2034
15.00	22.50	30.00	35.00	35.00	35.00	35.00	35.00	33.25
41096	61644	82192	95890	95890	95890	95890	95890	91096
35.00	50.00	60.00	70.00	70.00	70.00	70.00	70.00	66.50

2026	2027	2028	2029	2030	2031	2032	2033	2034
15.0	22.5	30.0	35.0	35.0	35.0	35.0	35.0	33.3
5.8	8.3	10.0	11.7	11.7	11.7	11.7	11.7	11.1
20.8	30.8	40.0	46.7	46.7	46.7	46.7	46.7	44.3



2035	2036	2037	2038	2039	2040	2041	2042	2043
31.59	30.01	28.51	27.08	25.73	24.44	23.22	22.06	20.96
86541	82214	78103	74198	70488	66964	63616	60435	57413
63.18	60.02	57.02	54.16	51.46	48.88	46.44	44.12	41.91

2035	2036	2037	2038	2039	2040	2041	2042	2043
31.6	30.0	28.5	27.1	25.7	24.4	23.2	22.1	21.0
10.5	10.0	9.5	9.0	8.6	8.1	7.7	7.4	7.0
42.1	40.0	38.0	36.1	34.3	32.6	31.0	29.4	27.9



Domestic Oil Price

Base Case	25.0	25.0	25.0	25.0	25.0	25.0
Scenario 2	28.8	28.8	28.8	28.8	28.8	28.8
Scenario 3	32.5	32.5	32.5	32.5	32.5	32.5
Scenario 4	21.3	21.3	21.3	21.3	21.3	21.3
Scenario 5	17.5	17.5	17.5	17.5	17.5	17.5

Domestic Gas Price

Base Case	3.3	3.3	3.3	3.3	3.3	3.3
Scenario 2	3.7	3.7	3.7	3.7	3.7	3.7
Scenario 3	4.2	4.2	4.2	4.2	4.2	4.2
Scenario 4	2.8	2.8	2.8	2.8	2.8	2.8
Scenario 5	2.3	2.3	2.3	2.3	2.3	2.3

Export Gas Price

Base Case	6.5	6.5	6.5	6.5	6.5	6.5
Scenario 2	7.5	7.5	7.5	7.5	7.5	7.5
Scenario 3	8.5	8.5	8.5	8.5	8.5	8.5
Scenario 4	5.5	5.5	5.5	5.5	5.5	5.5
Scenario 5	4.6	4.6	4.6	4.6	4.6	4.6

Slope 13%

25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5
21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3
17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5

3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3

6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6

2043

21.0

4.2

16.8

25

50

105

838

943

41.9

3.3

6.5

42

0

136

0

136

1079

21.0

24.1 15%

27.2 30%

17.8 -15%

14.7 -30%

41.9

48.2 15%

54.5 30%

35.6 -15%

29.3 -30%

50.0

57.5

65.0

42.5

35.0

25.0
28.8
32.5
21.3
17.5

3.3
3.7
4.2
2.8
2.3

6.5
7.5
8.5
5.5
4.6

Capital Expenditure

Reserves	667	
Capex per bbl	0.00	
Total capex	0	
% before first oil	80%	0
% first oil to peak	15%	0
Maintenance capex	5%	0

	First Capex			First Oil		
	2021	2022	2022	2023	2024	2025
US\$mm	0	0	0	0	0	0
Before first oil	0					
First oil to peak	0					
Maintenance	0					
Total	0					

Sensitivities

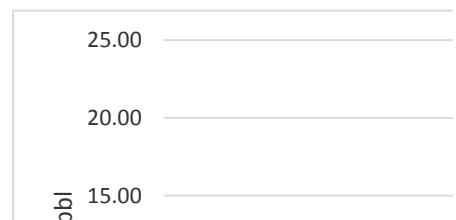
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
15%						
30%						
-15%						
-30%						

Field Comparisons

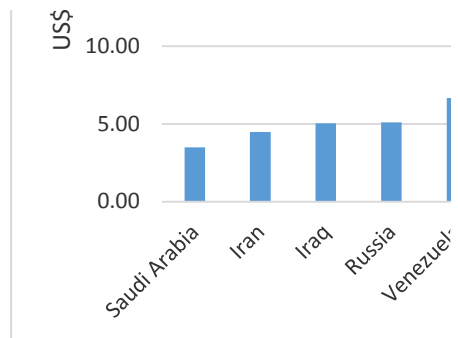
	Cost /bbl	Capex	Reserves	Peak Prod	Peak Prod
	US\$/bbl	US\$mm	mmbbls	kbpd	mmbbls
Kashagan (Kazakhstan)	10.46	136000	13000	1500	547.5
ACG (Azerbaijan)	4.00	20000	5000	620	226.3
Thunderhorse (Gulf of Mexico)	5.00	5000	1000	250	91.25
Novy Port (Russia onshore)	3.25	4500	1385	161	58.64
Ghawar (Saudi)	3.50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



Peak Oil

2026	2027	2028	2029	2030	2031	2032	2033	2034
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

Capex/
peak bbl
US\$/bbl

248

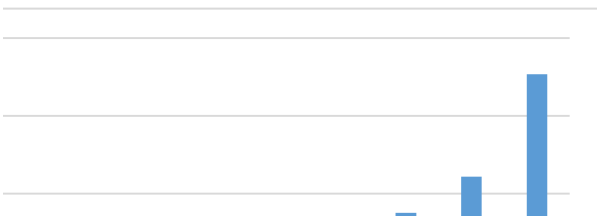
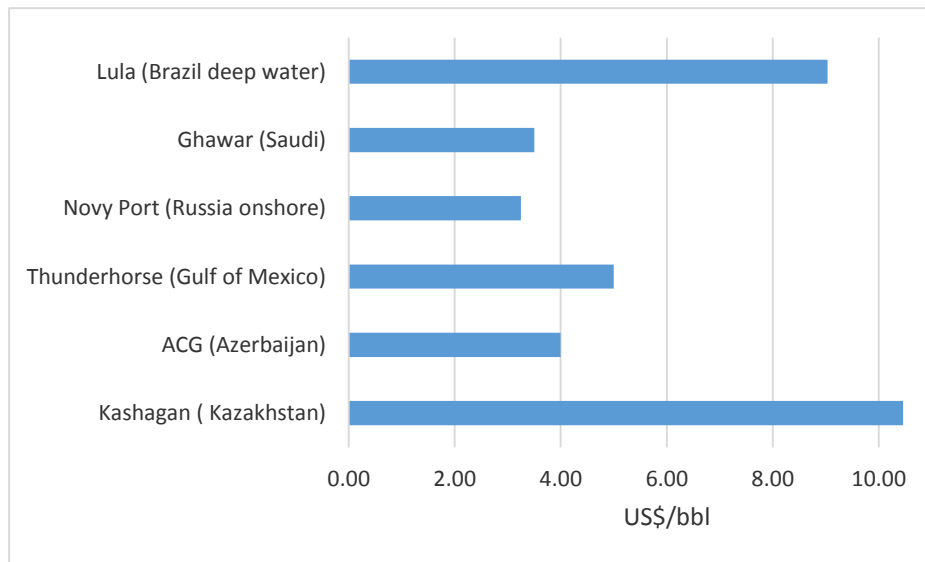
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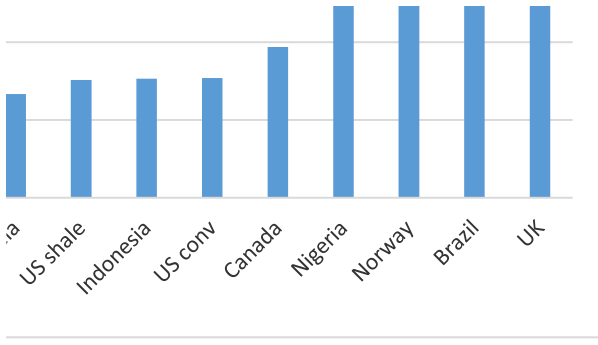
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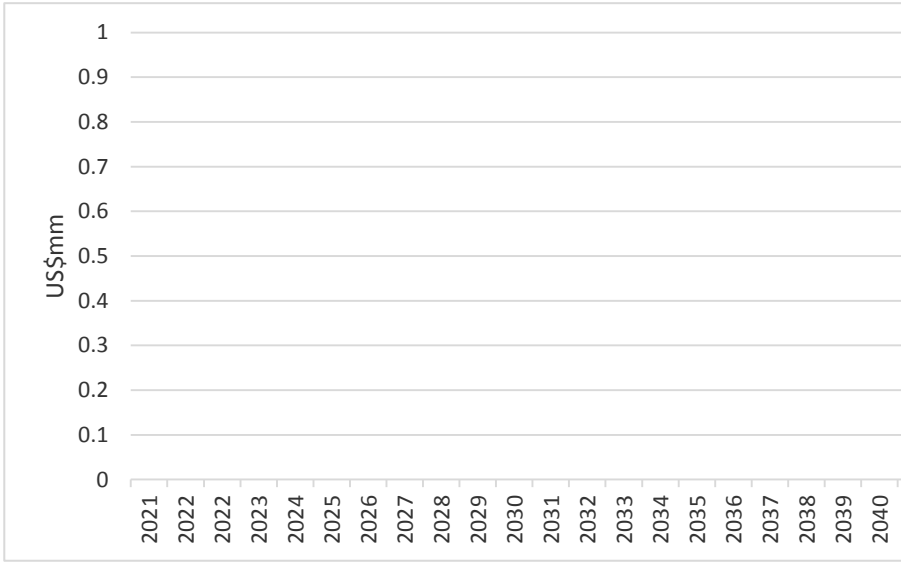
411





2035	2036	2037	2038	2039	2040	2041	2042	2043
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



2041
2042
2043



Total (US\$mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
----------------	-----	-----	-----	-----	-----	-----	-----

Base Case and Sensitivities

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

0.0

0.0

0.0

0.0

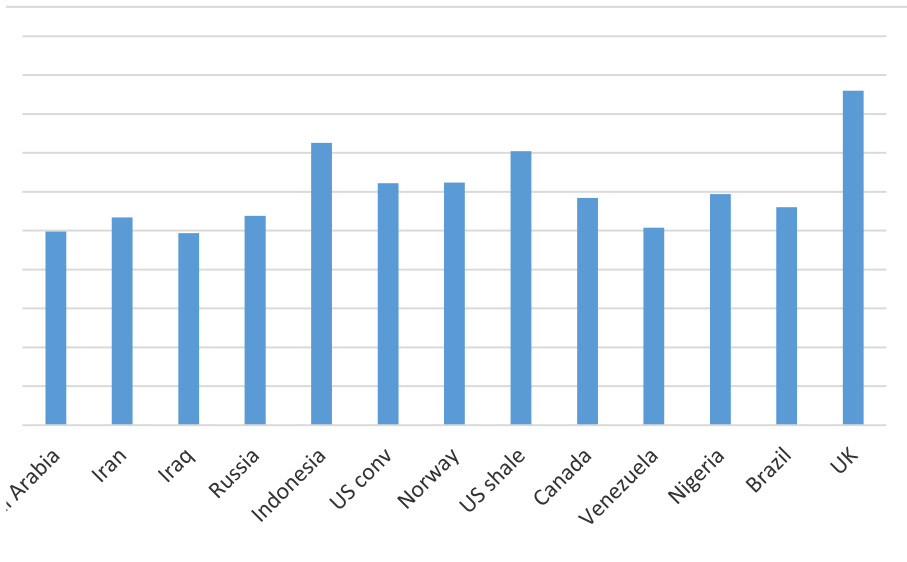
0.0

0.0

0.0

0.0

2035 2036 2037 2038 2039 2040 2041 2042
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0



2035 2036 2037 2038 2039 2040 2041 2042
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

2043

0.0

2043

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 50 50 50 50 50 50

	2021	2022	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

Gas Tax

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

	2021	2022	2022	2023	2024	2025
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

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	19
Annual Depreciation (US\$mm)	0

	2021	2022	2022	2023	2024	2025
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>1</i>
Total	0					

Unit of Production

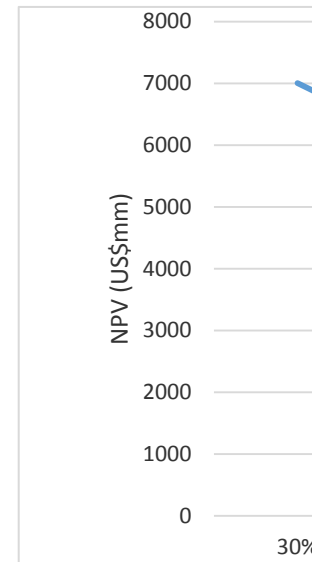
Total Reserves	667
Total Produced	692
Total Capex	0
Depreciation per barrel	0.00

	2021	2022	2022	2023	2024	2025
Depreciation	0	0	0	0	0	0
Total	0					

Sensitivities

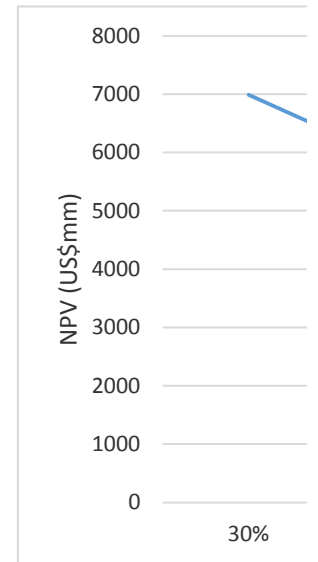
Oil Price

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



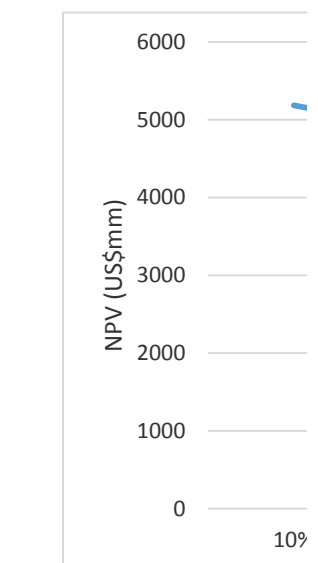
Production

	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

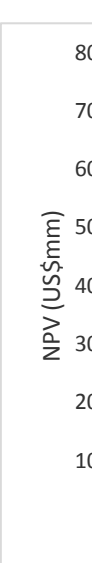
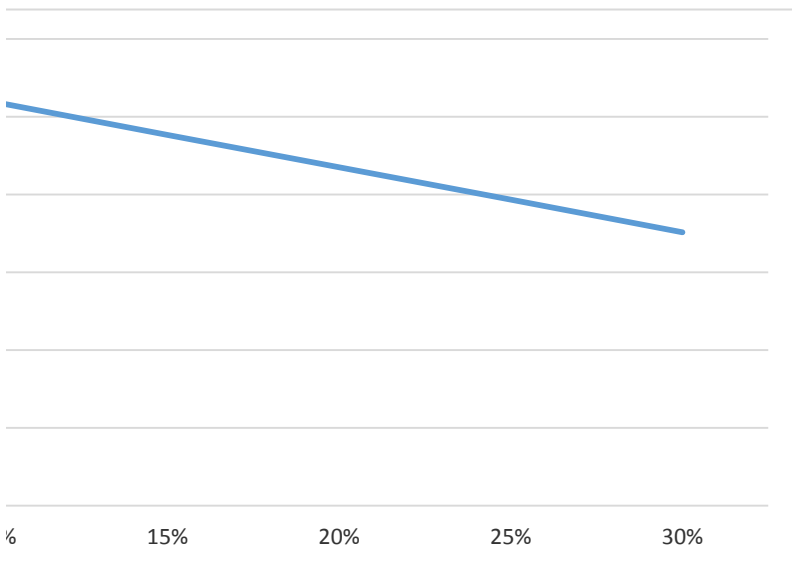
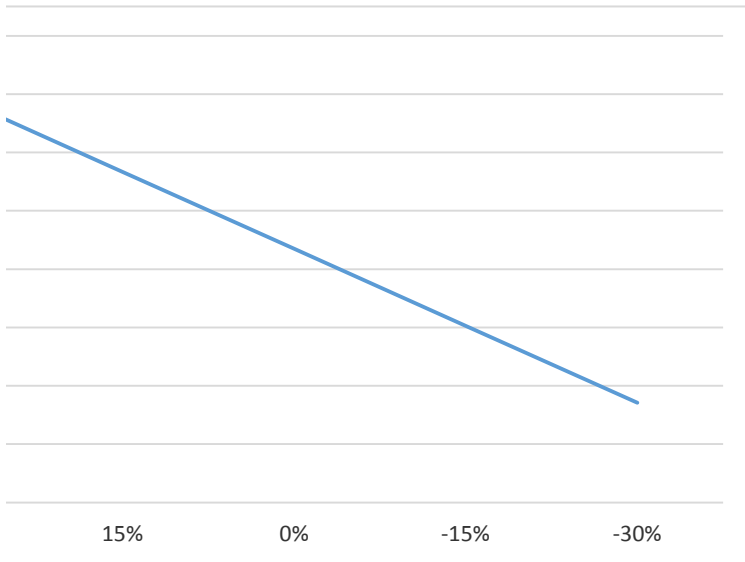
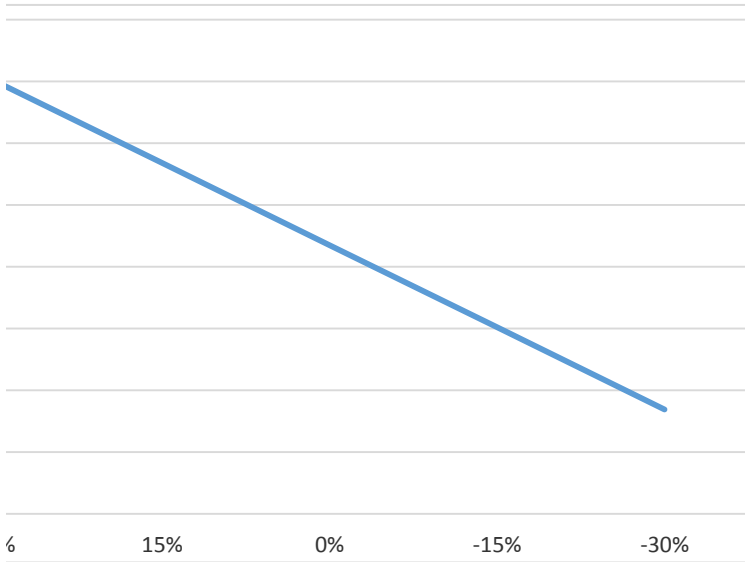
	NPV
10%	5184
15%	4766
20%	4349
25%	3931
30%	3513

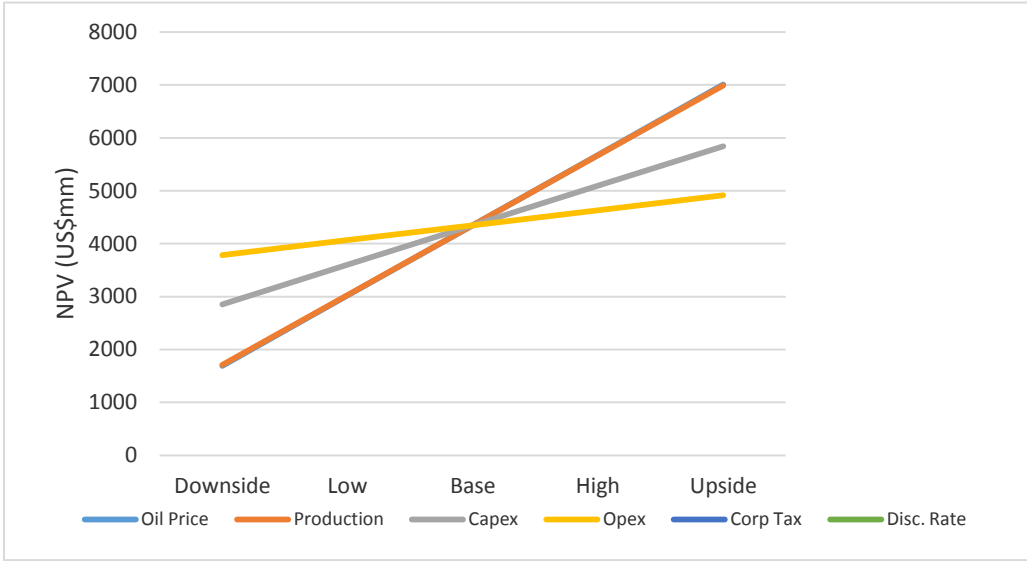
Discount Rate

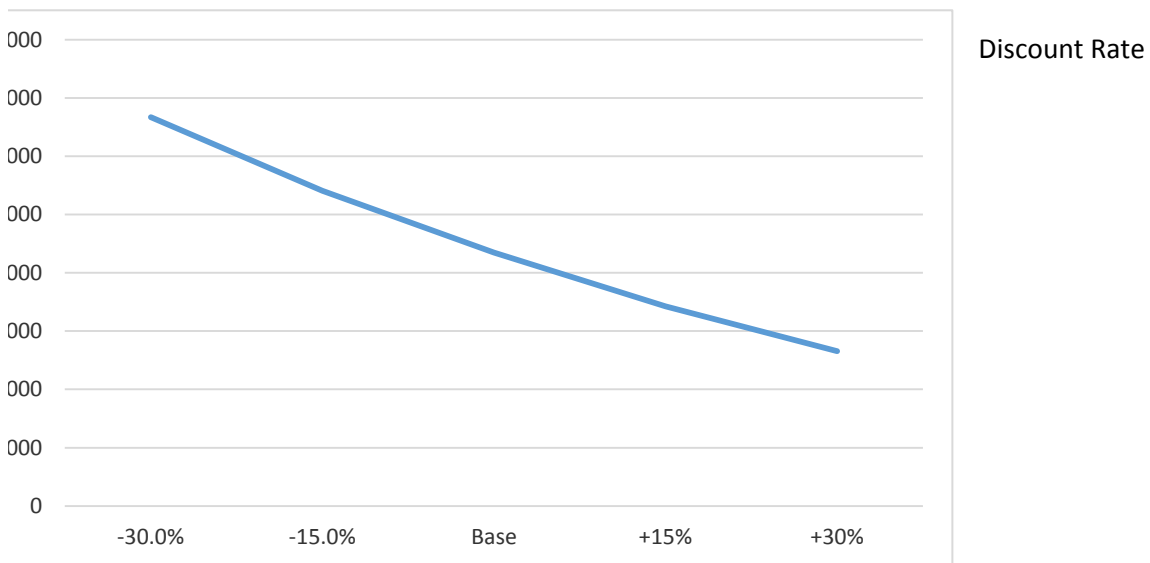
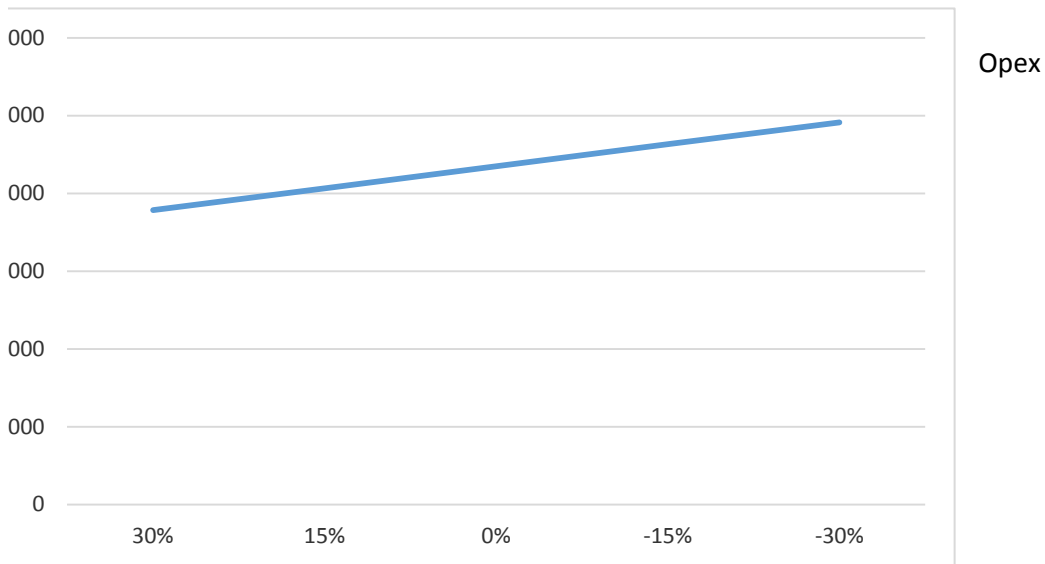
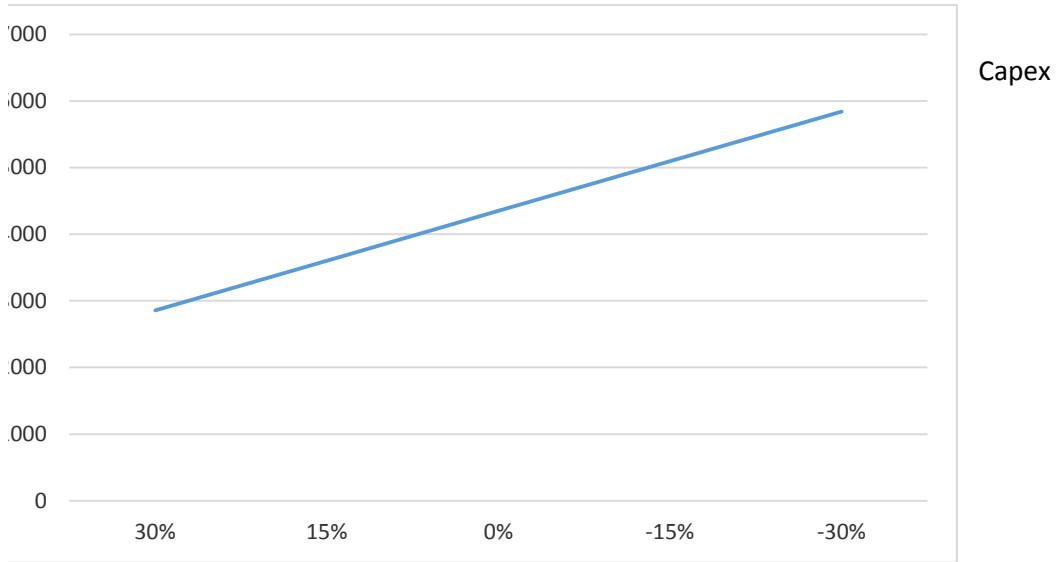
	NPV
-30.0%	6668
-15.0%	5406
Base	4349
+15%	3427
+30%	2654

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	21333
Dry Hole	-90.0
Successful Well	2123
EMV	2033

PSA Regime

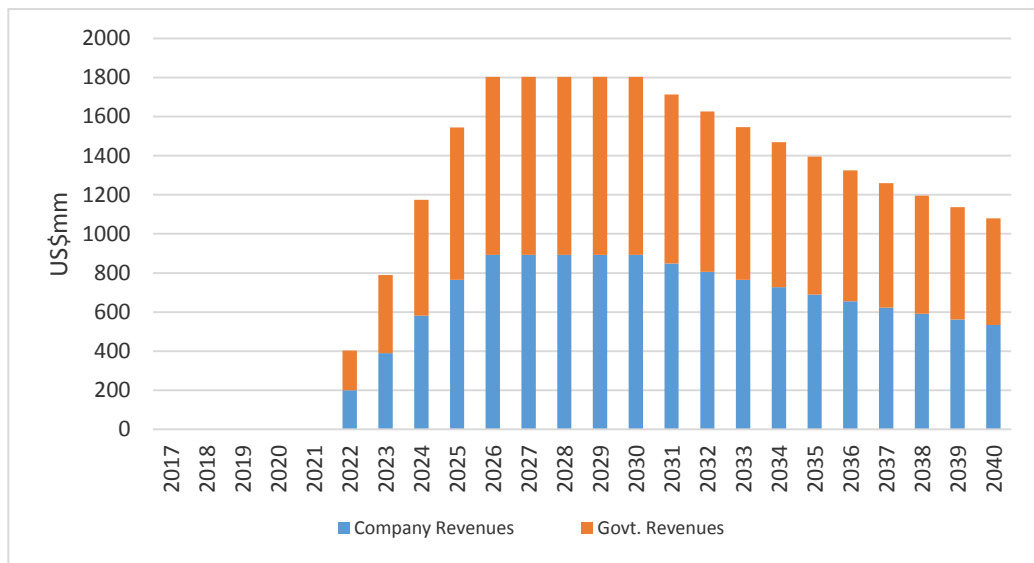
	2020	2021	2022	2023	2024	2025
Company Revenues	0	0	0	0	0	199
Operating Costs	0	0	0	0	0	0
Transport Costs	0	0	0	0	0	0
Operating Taxes	0	0	0	0	0	0
EBITDA	0	0	0	0	0	199
Depreciation	0	0	0	0	0	0
EBIT	0	0	0	0	0	199
Tax on EBIT <i>Corporate Tax Rate</i>	0 20%	0	0	0	0	-39.8475
Post tax cashflow	0	0	0	0	0	159
CAPEX	0	0	0	0	0	0
Free Cashflow (FCF)	0	0	0	0	0	159
Cumulative FCF	0	0	0	0	0	159
Discount Rate	10%					
Discount Factor	1.10	1.21	1.33	1.46	1.61	1.77
Discounted Cashflow (DCF)	0	0	0	0	0	90
NPV (\$mm)	2790					
IRR (%)	#NUM!					

Revenue Calculation

	Company	Govt				
Cost Oil	80%					
Profit Oil	50%	50%				
	2017	2018	2019	2020	2021	2022
Total Revenues	0	0	0	0	0	403
Govt Royalty	0	0	0	0	0	4
Taxable Revenues	1%	0	0	0	0	398
Cost Oil						
80% of Revenues	0	0	0	0	0	319

Accumulated Cost Oil	0	0	0	0	319
Annual Costs	0	0	0	0	0
Accumulated Costs	0	0	0	0	0
Payback	0	0	0	0	319
	0	0	0	0	1
Cost Oil to Company	0	0	0	0	0
Profit Oil	0	0	0	0	0
					398
Profit Oil					
Company	0	0	0	0	0
Govt	0	0	0	0	0
					199
					199
Total Company Revenues	0	0	0	0	0
					199
	2017	2018	2019	2020	2021
Company Revenues	0	0	0	0	0
Govt. Revenues	0	0	0	0	0
					199
					203

943	1874	3098	4525	5953	7380	8808	10236	11592
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
943	1874	3098	4525	5953	7380	8808	10236	11592
1	1	1	1	1	1	1	1	1
0	0	0	0	0	0	0	0	0
781	1163	1530	1784	1784	1784	1784	1784	1695
390	582	765	892	892	892	892	892	848
390	582	765	892	892	892	892	892	848
390	582	765	892	892	892	892	892	848
2023	2024	2025	2026	2027	2028	2029	2030	2031
390	582	765	892	892	892	892	892	848
398	593	780	910	910	910	910	910	865



2035	2036	2037	2038	2039	2040	2041	2042	2043
805	765	727	690	656	623	592	562	534
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
805	765	727	690	656	623	592	562	534
0	0	0	0	0	0	0	0	0
805	765	727	690	656	623	592	562	534
-161	-153	-145	-138	-131	-125	-118	-112	-107
644	612	581	552	525	498	474	450	427
0	0	0	0	0	0	0	0	0
644	612	581	552	525	498	474	450	427
6440	7052	7633	8186	8710	9209	9683	10132	10560
4.59	5.05	5.56	6.12	6.73	7.40	8.14	8.95	9.85
140	121	105	90	78	67	58	50	43

2032	2033	2034	2035	2036	2037	2038	2039	2040
1627	1545	1468	1395	1325	1259	1196	1136	1079
16	15	15	14	13	13	12	11	11
1610	1530	1453	1381	1312	1246	1184	1125	1068
1288	1224	1163	1105	1049	997	947	900	855

12880	14104	15267	16372	17421	18418	19365	20265	21119
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
12880	14104	15267	16372	17421	18418	19365	20265	21119
1	1	1	1	1	1	1	1	1
0	0	0	0	0	0	0	0	0
1610	1530	1453	1381	1312	1246	1184	1125	1068
805	765	727	690	656	623	592	562	534
805	765	727	690	656	623	592	562	534
805	765	727	690	656	623	592	562	534
2032	2033	2034	2035	2036	2037	2038	2039	2040
805	765	727	690	656	623	592	562	534
822	780	741	704	669	636	604	574	545

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
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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