

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

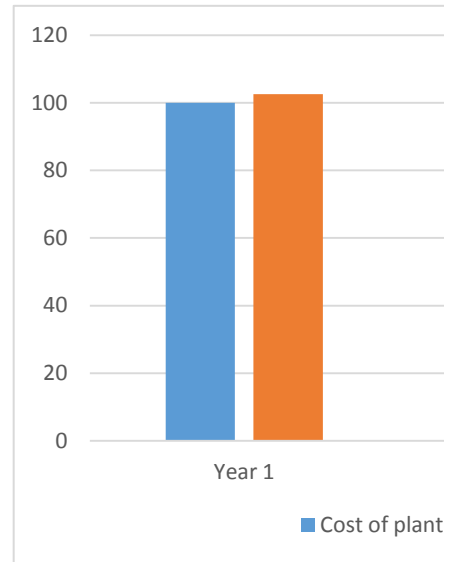
	Year 1	Year 2	Year 3	Year 4	Year 5
Real	100	100	100	100	100
Nominal	102.5	105.1	107.7	110.4	113.1
Inflation	2.5%	2.5%	2.5%	2.5%	2.5%
Capex US\$2020	500				
Nominal	539				

Oil Price

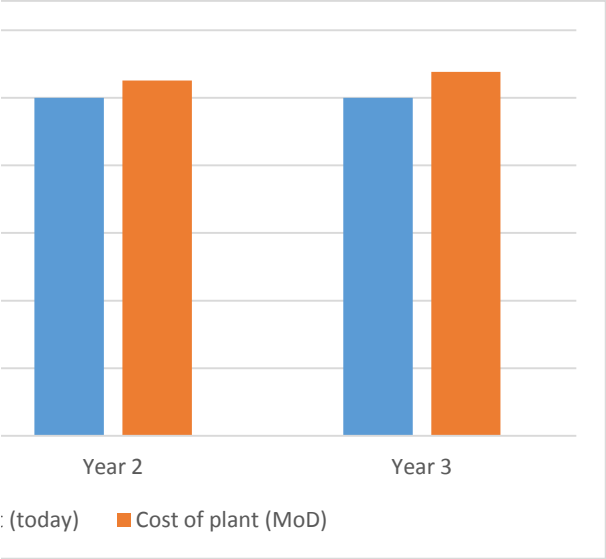
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Real	30	30	30	30	30	30	30
Nominal	30.6	31.21	31.84	32.47	33.12	33.78	34.46
Inflation	2%	2%	2%	2%	2%	2%	2%

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	1.75%	
Corporate Interest Rate	5.75%	
Equity market return	10.53%	
Company Beta	2.83	
Corporate Tax Rate	20%	
Debt:Equity Split	Debt 50%	Equity 50%
Cost of Debt	4.60%	
Cost of Equity	26.60%	
WACC	15.60%	

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%

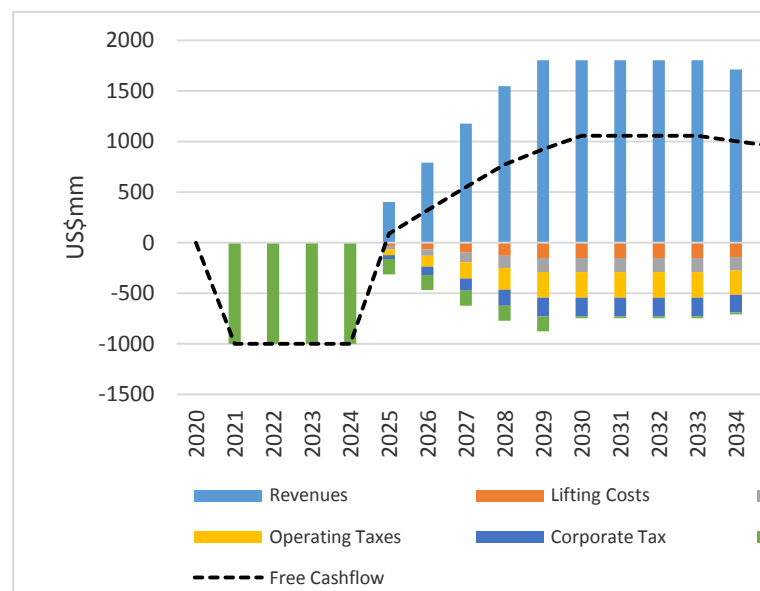
	2021	2022	2022	2023	2024	2025
Revenues	0	0	0	0	0	403
Operating Costs	0	0	0	0	0	-35
Transport Costs	0	0	0	0	0	-33
Operating Taxes	0	0	0	0	0	-55
EBITDA (Pre-tax Cashflow)	0	0	0	0	0	279
Depreciation <i>Straight Line (0) or Unit of Prod (1)</i>	0 1	0	0	0	0	-78
EBIT (Pre Tax Profit)	0	0	0	0	0	201
Tax on EBIT <i>Corporate Tax Rate</i>	0 20%	0	0	0	0	-40
Post tax cashflow	0	0	0	0	0	239
CAPEX	0	-1000	-1000	-1000	-1000	-150
Free Cashflow (FCF)	0	-1000	-1000	-1000	-1000	89
Cumulative FCF	0	-1000	-2000	-3000	-4000	-3911
Discount Rate	15.6%					
Discount Factor	1.00	1.16	1.34	1.54	1.79	2.06
Discounted Cashflow (DCF)	0	-865	-748	-647	-560	43
Cumulative discounted cashflow	0	-865	-1613	-2261	-2821	-2778
NPV (\$mm)	-510					
IRR (%)	13.2%					
Payback (years)	11	When does cumulative cashflow turn positive				
Discounted payback (years)	13					
Excel Calculation	-\$510					
Breakeven Oil Price	\$50.00	<i>After Goal Seek Function in Data:What If</i>				

Alternative NPV (terminal value)

FCF for 10 years	0	-1000	-1000	-1000	-1000	89
Terminal Value						
Implied FCF	0	-1000	-1000	-1000	-1000	89
Implied DCF	0	-865	-748	-647	-560	43
NPV	84					
Plus Cash	0					
Less Debt	0					
Total NPV	84					
IRR	16%					

EBITDA Multiple 7

	2020	2021	2022	2023	2024	2025
Revenues	0	0	0	0	0	403
Lifting Costs	0	0	0	0	0	-35
Transport	0	0	0	0	0	-33
Operating Taxes	0	0	0	0	0	-55
Corporate Tax	0	0	0	0	0	-40
Capex	0	-1000	-1000	-1000	-1000	-150
Free Cashflow	0	-1000	-1000	-1000	-1000	89



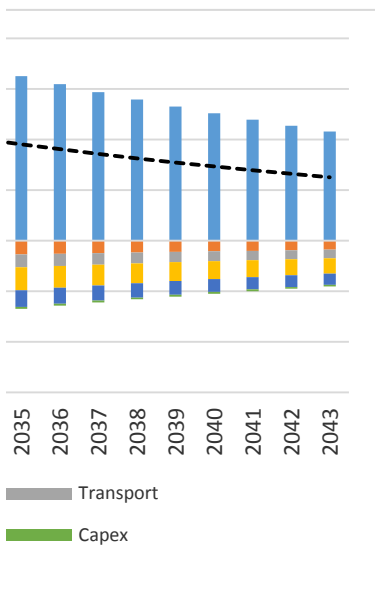
Base
High
Upside
Low
Downside

Results
NPV -510 US\$mm
IRR 13% %

2026	2027	2028	2029	2030	2031	2032	2033	2034
789	1175	1545	1803	1803	1803	1803	1803	1712
-68	-100	-130	-152	-152	-152	-152	-152	-144
-63	-93	-120	-140	-140	-140	-140	-140	-133
-109	-164	-216	-252	-252	-252	-252	-252	-240
549	819	1079	1259	1259	1259	1259	1259	1196
-151	-223	-289	-337	-337	-337	-337	-337	-321
398	596	790	921	921	921	921	921	875
-80	-119	-158	-184	-184	-184	-184	-184	-175
469	700	921	1074	1074	1074	1074	1074	1021
-150	-150	-150	-150	-18	-18	-18	-18	-18
319	550	771	924	1056	1056	1056	1056	1003
-3591	-3042	-2271	-1347	-290	766	1822	2879	3881
2.39	2.76	3.19	3.69	4.26	4.93	5.69	6.58	7.61
134	199	242	251	248	214	186	160	132
-2644	-2444	-2203	-1952	-1704	-1490	-1304	-1144	-1012

319	550	771	924	1056	
					8810
319	550	771	924	1056	8810
134	199	242	251	248	1789

2026	2027	2028	2029	2030	2031	2032	2033	2034
789	1175	1545	1803	1803	1803	1803	1803	1712
-68	-100	-130	-152	-152	-152	-152	-152	-144
-63	-93	-120	-140	-140	-140	-140	-140	-133
-109	-164	-216	-252	-252	-252	-252	-252	-240
-80	-119	-158	-184	-184	-184	-184	-184	-175
-150	-150	-150	-150	-18	-18	-18	-18	-18
319	550	771	924	1056	1056	1056	1056	1003



2035	2036	2037	2038	2039	2040	2041	2042	2043
1627	1545	1468	1395	1325	1259	1196	1136	1079
-137	-130	-124	-117	-111	-106	-101	-96	-91
-126	-120	-114	-108	-103	-98	-93	-88	-84
-228	-216	-205	-195	-185	-176	-167	-159	-151
1136	1079	1025	974	925	879	835	793	754
-304	-289	-275	-261	-248	-236	-224	-213	-202
831	790	750	713	677	643	611	581	552
-166	-158	-150	-143	-135	-129	-122	-116	-110
970	921	875	831	790	750	713	677	643
-18	-18	-18	-18	-18	-18	-18	-18	-18
952	903	857	813	772	732	695	659	625
4833	5736	6593	7406	8178	8910	9605	10264	10889
8.80	10.17	11.75	13.59	15.71	18.16	20.99	24.26	28.05
108	89	73	60	49	40	33	27	22
-904	-815	-742	-682	-633	-593	-560	-532	-510

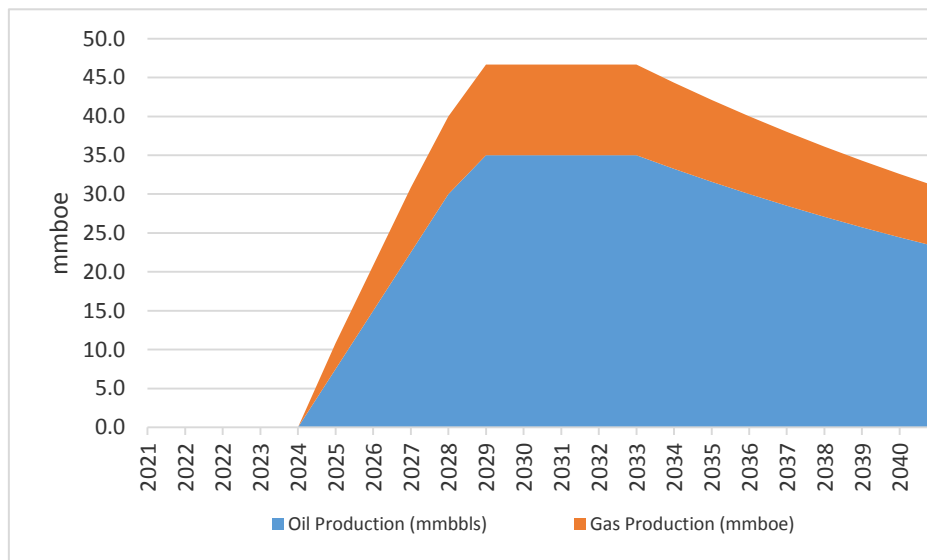
2035	2036	2037	2038	2039	2040	2041	2042	2043
1627	1545	1468	1395	1325	1259	1196	1136	1079
-137	-130	-124	-117	-111	-106	-101	-96	-91
-126	-120	-114	-108	-103	-98	-93	-88	-84
-228	-216	-205	-195	-185	-176	-167	-159	-151
-166	-158	-150	-143	-135	-129	-122	-116	-110
-18	-18	-18	-18	-18	-18	-18	-18	-18
952	903	857	813	772	732	695	659	625

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

1000

5 years
after first
capex

70

5

5

5%

mmcfd

167

667

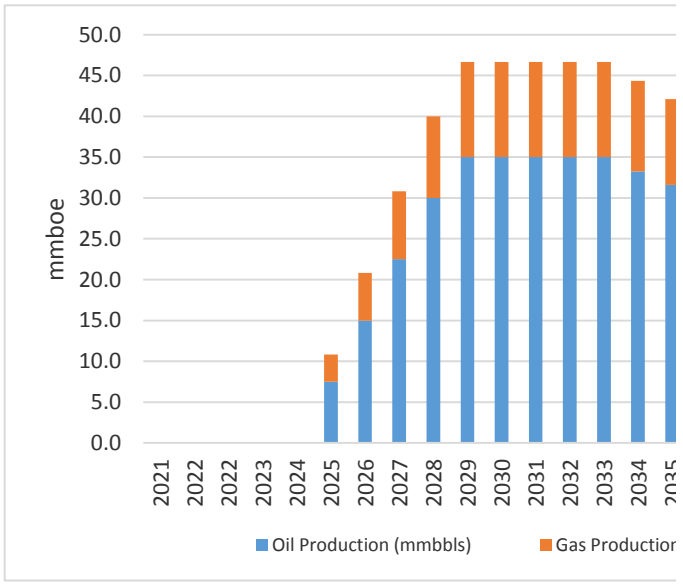
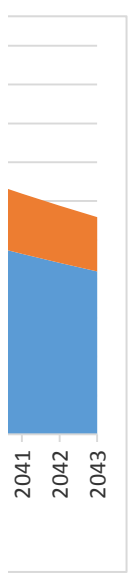
192

Total
mmboe

Peak Oil

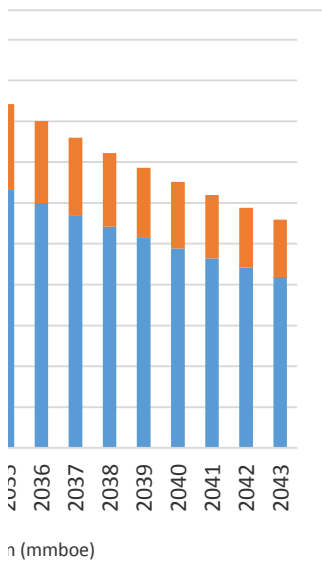
2026	2027	2028	2029	2030	2031	2032	2033	2034
15.00	22.50	30.00	35.00	35.00	35.00	35.00	35.00	33.25
41096	61644	82192	95890	95890	95890	95890	95890	91096
35.00	50.00	60.00	70.00	70.00	70.00	70.00	70.00	66.50

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%

Oil and Gas Price Comparison

Oil	Barrel					
Gas	mcf		<i>thousand cubic feet</i>			
1 barrel =		6 mcf		<i>energy equivalent basis</i>		
Oil Price	10	20	30	40	50	60
Gas Price (equivalent)	1.67	3.33	5.00	6.67	8.33	10.00
Slope	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%

Competitive gas price

Oil Price	50	50	50	50	50	50
Slope	16.7%	15%	14%	13%	12%	11%
Gas Price	8.34	7.50	7.00	6.50	6.00	5.50
Discount	0%	-10%	-16%	-22%	-28%	-34%

25.0	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	28.8
32.5	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	21.3
17.5	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	3.3
3.7	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	4.2
2.8	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	2.3

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

70	80
11.67	13.33
16.7%	16.7%

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	7.50	
Total capex	5000	
% before first oil	80%	4000
% first oil to peak	15%	750
Maintenance capex	5%	250

	First Capex				First Oil	
	2021	2022	2022	2023	2024	2025
US\$mm	0	1000	1000	1000	1000	150
Before first oil	4000					
First oil to peak	750					
Maintenance	252					
Total	5002					

Sensitivities

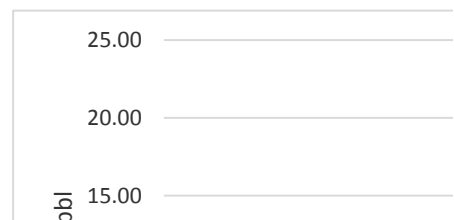
2	0	1150	1150	1150	1150	173
3	0	1300	1300	1300	1300	195
4	0	850	850	850	850	128
5	0	700	700	700	700	105
15%						
30%						
-15%						
-30%						

Field Comparisons

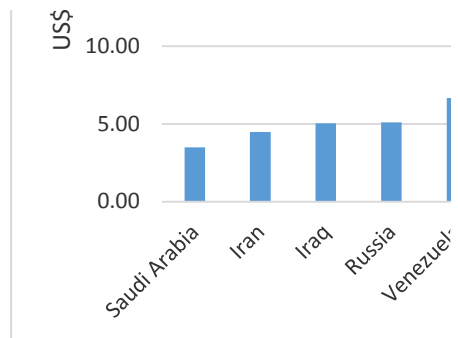
	Cost /bbl	Capex	Reserves	Peak Prod	Peak Prod
	US\$/bbl	US\$mm	mmbbls	kbpd	mmbbls
Kashagan (Kazakhstan)	10.46	136000	13000	1500	547.5
ACG (Azerbaijan)	4.00	20000	5000	620	226.3
Thunderhorse (Gulf of Mexico)	5.00	5000	1000	250	91.25
Novy Port (Russia onshore)	3.25	4500	1385	161	58.64
Ghawar (Saudi)	3.50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

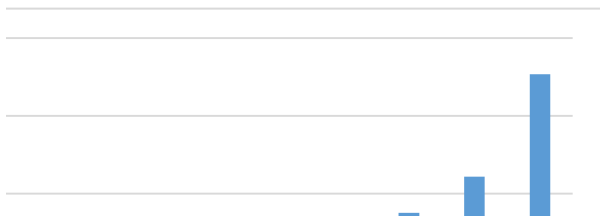
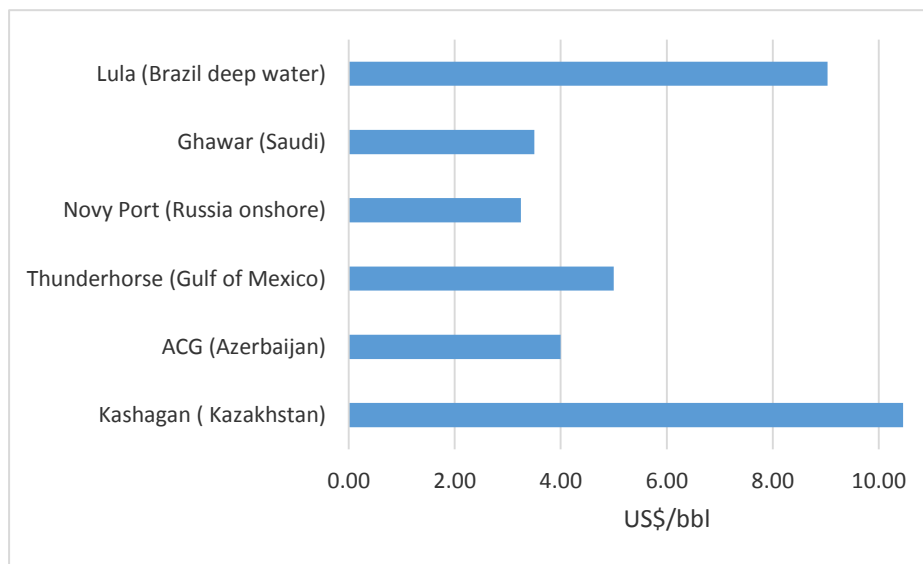


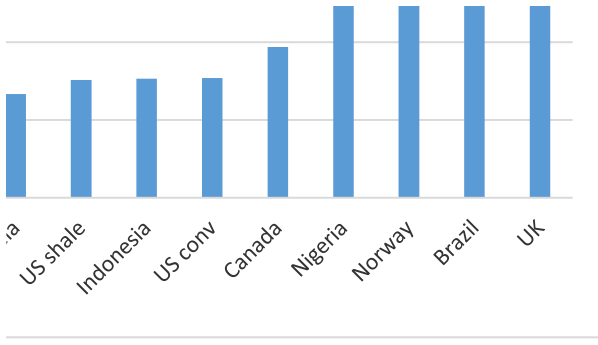
	Peak Oil								
	2026	2027	2028	2029	2030	2031	2032	2033	2034
	150	150	150	150	18	18	18	18	18

173	173	173	173	21	21	21	21	21
195	195	195	195	23	23	23	23	23
128	128	128	128	15	15	15	15	15
105	105	105	105	13	13	13	13	13

Capex/
peak bbl
US\$/bbl

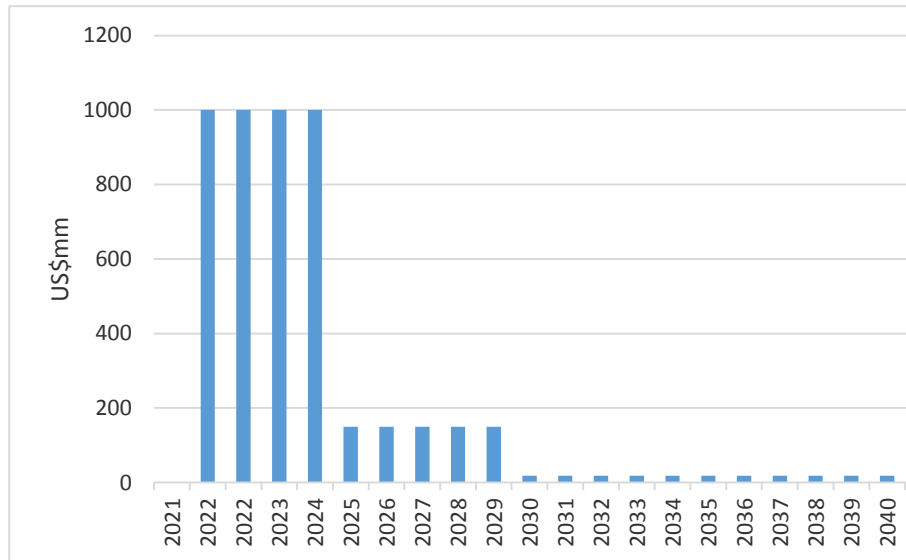
248
88
55
77
136
411





2035	2036	2037	2038	2039	2040	2041	2042	2043
18	18	18	18	18	18	18	18	18

21	21	21	21	21	21	21	21	21
23	23	23	23	23	23	23	23	23
15	15	15	15	15	15	15	15	15
13	13	13	13	13	13	13	13	13





Operating Costs

Lifting Costs 3.25 US\$/boe real
 Total for model 2248 US\$mm

	2021	2022	2022	2023	2024	2025	2026
US\$mm	0.0	0.0	0.0	0.0	0.0	35.2	67.7
Total	2248						

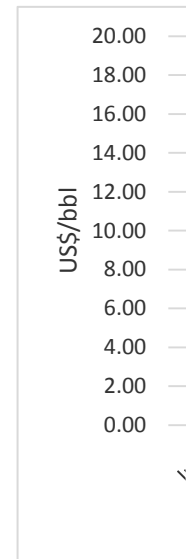
Base Case and Sensitivities

1	3.25
2	15%
3	30%
4	-15%
5	-30%

Global Comparisons

	Lifting US\$/bbl		Transport US\$/bbl
Iran	1.94	Saudi Arabi	2.49
Iraq	2.16	Iran	2.67
Russia	2.98	Iraq	2.47
Saudi Arabia	3.00	Russia	2.69
Norway	4.24	Indonesia	3.63
US conv	5.15	US conv	3.11
US shale	5.85	Norway	3.12
Indonesia	6.87	US shale	3.52
Venezuela	7.94	Canada	2.92
Nigeria	8.81	Venezuela	2.54
Brazil	9.45	Nigeria	2.97
Canada	11.56	Brazil	2.80
UK	17.36	UK	4.30

Lifting Costs



Company examples

Rosneft	3.10
Lukoil	4.26
BP	6.90
Chesapeake	2.92

Transport Costs

Oil 3.00 US\$/bbl
 Gas 0.50 US\$/mcf

	2021	2022	2022	2023	2024	2025	2026
Oil (US\$mm)	0.0	0.0	0.0	0.0	0.0	22.5	45.0
Gas (US\$mm)	0.0	0.0	0.0	0.0	0.0	10.0	17.5

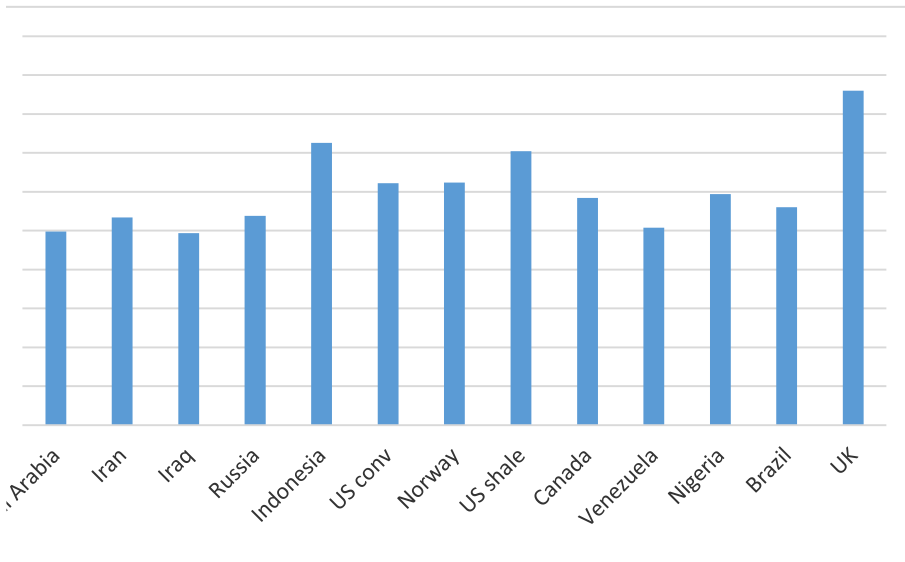
Total (US\$mm)	0.0	0.0	0.0	0.0	0.0	32.5	62.5
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Base Case and Sensitivities

1	3.00
2	15%
3	30%
4	-15%
5	-30%

92.5 120.0 140.0 140.0 140.0 140.0 140.0 133.0

2035	2036	2037	2038	2039	2040	2041	2042
136.9	130.0	123.5	117.4	111.5	105.9	100.6	95.6



2035	2036	2037	2038	2039	2040	2041	2042
94.8	90.0	85.5	81.2	77.2	73.3	69.7	66.2
31.6	30.0	28.5	27.1	25.7	24.4	23.2	22.1

126.4

120.0

114.0

108.3

102.9

97.8

92.9

88.2

2043

90.8

2043

62.9

21.0

Operating Taxes

Oil Tax

Export Tax Sliding of export barrels
Royalty 1.0% of oil revenues
Other taxes 0.5% 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	45.0
Royalty	0.0	0.0	0.0	0.0	0.0	3.4
Other	0.0	0.0	0.0	0.0	0.0	2.0
Total	0	0	0	0	0	50.4

Export Tax

Cut-off point 20 US\$/bbl
Tax 25% above cut-off point

Export Tax (\$/bbl) 7.5 7.5 7.5 7.5 7.5 7.5

Gas Tax

Export Tax 20% export revenues
Royalty 0.25 US\$/mcf

	2021	2022	2022	2023	2024	2025
Export Tax	0	0	0	0	0	0
Royalty	0	0	0	0	0	5
Total	0	0	0	0	0	5

Total Operating Taxes 0 0 0 0 0 55

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	5000
Years of Production	19
Annual Depreciation (US\$mm)	263

	2021	2022	2022	2023	2024	2025
Depreciation	0	0	0	0	0	263
<i>Production</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>
Total	5000					

Unit of Production

Total Reserves	667
Total Produced	692
Total Capex	5000
Depreciation per barrel	7.23

	2021	2022	2022	2023	2024	2025
Depreciation	0	0	0	0	0	78
Total	5000					

2026	2027	2028	2029	2030	2031	2032	2033	2034
263	263	263	263	263	263	263	263	263
1	1	1	1	1	1	1	1	1

2026	2027	2028	2029	2030	2031	2032	2033	2034
151	223	289	337	337	337	337	337	321

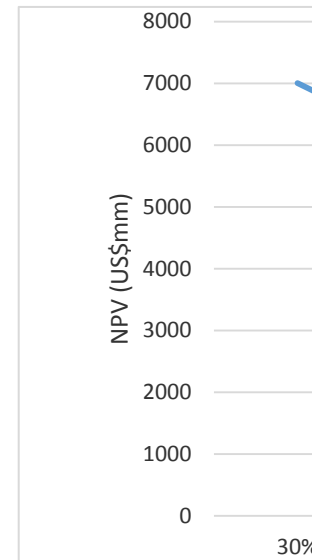
2035	2036	2037	2038	2039	2040	2041	2042	2043
263	263	263	263	263	263	263	263	263
1	1	1	1	1	1	1	1	1

2035	2036	2037	2038	2039	2040	2041	2042	2043
304	289	275	261	248	236	224	213	202

Sensitivities

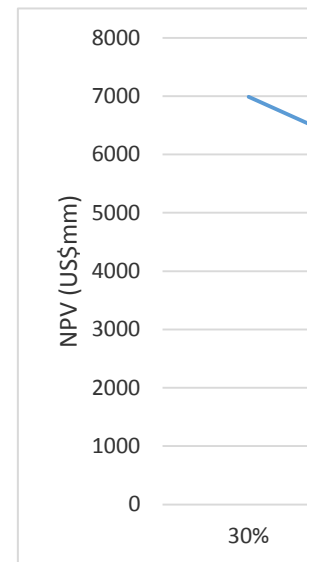
Oil Price

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



Production

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



Capex

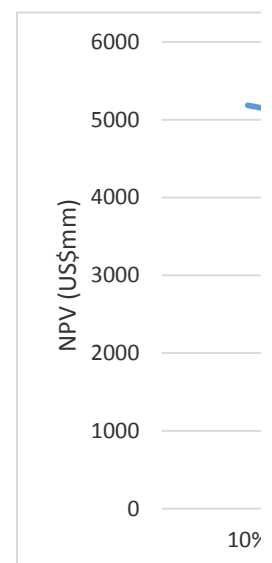
	NPV
30%	2855
15%	3602
0%	4349
-15%	5095
-30%	5842

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

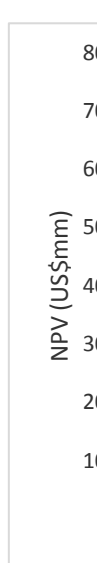
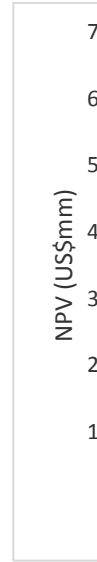
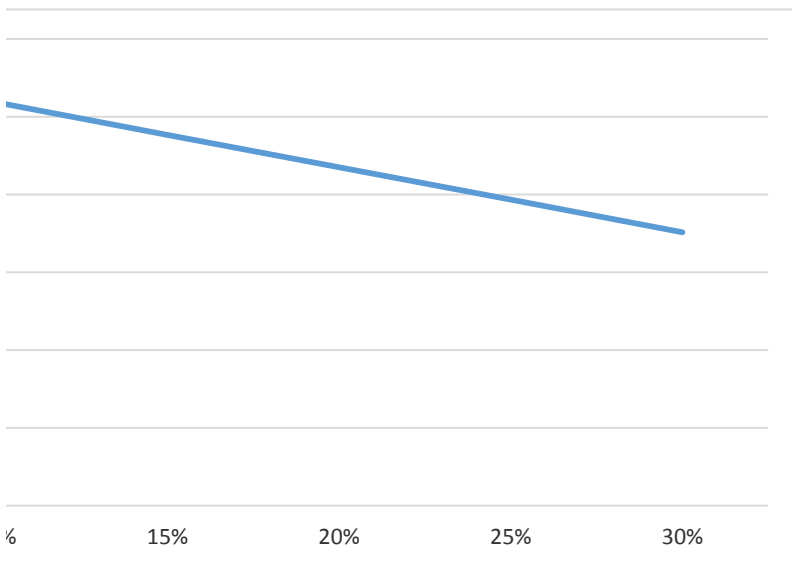
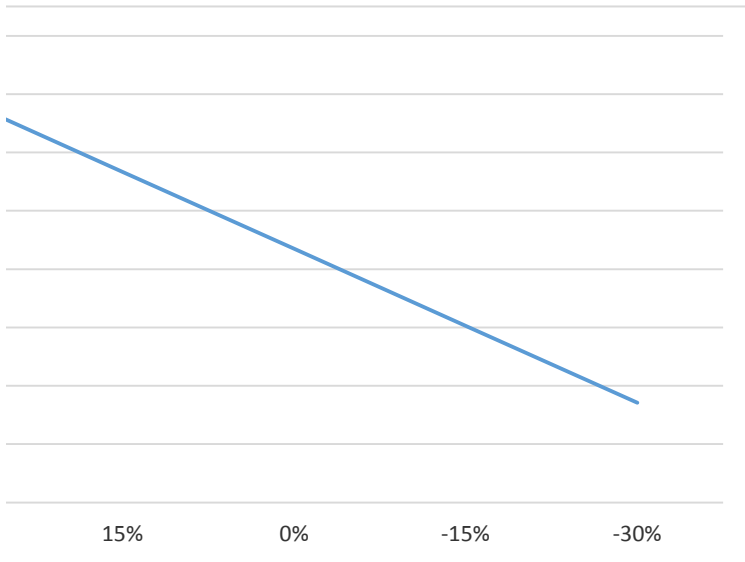
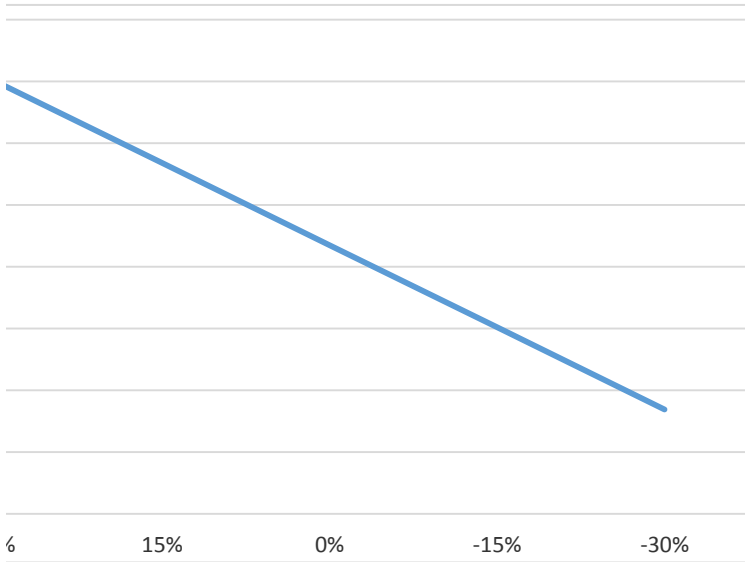


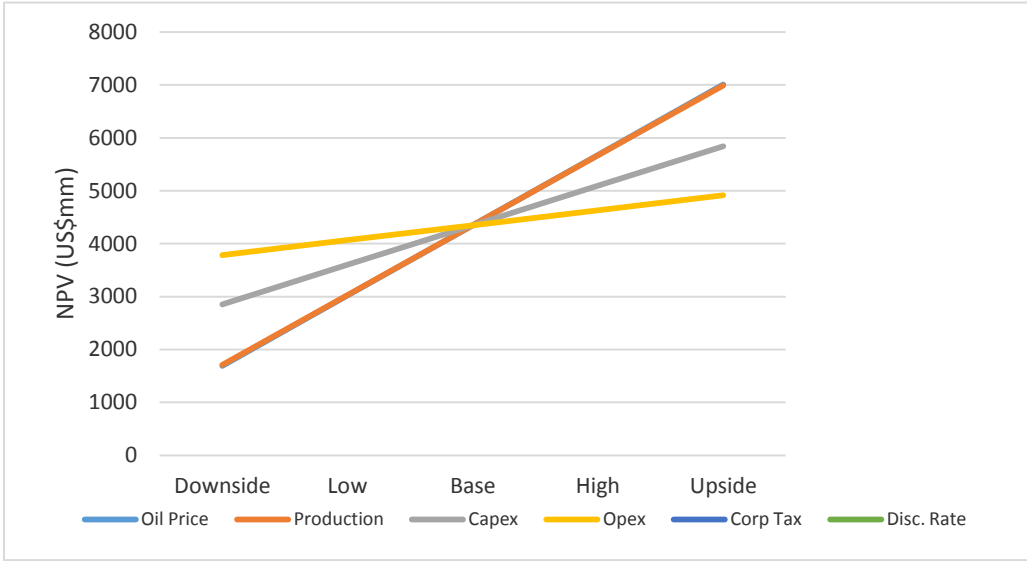
Discount Rate

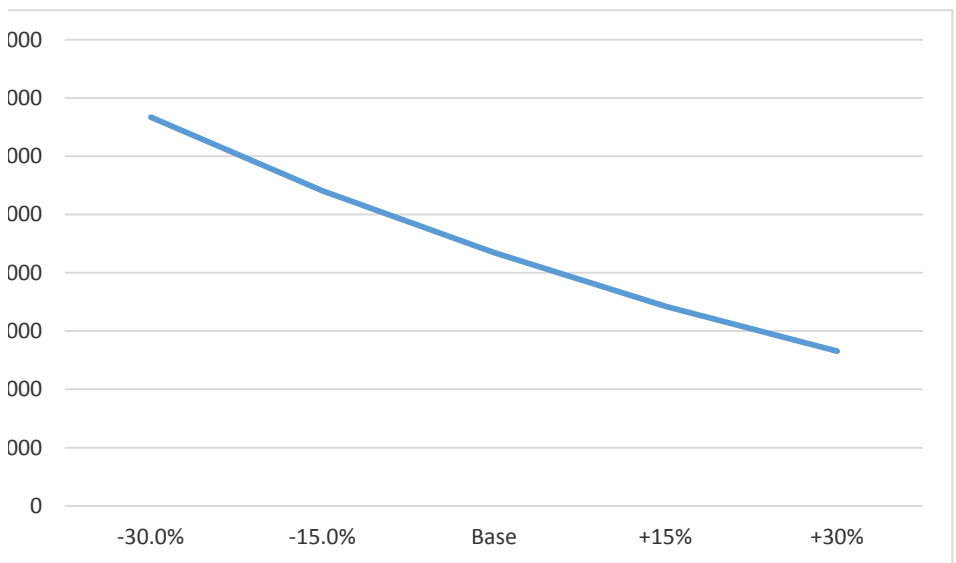
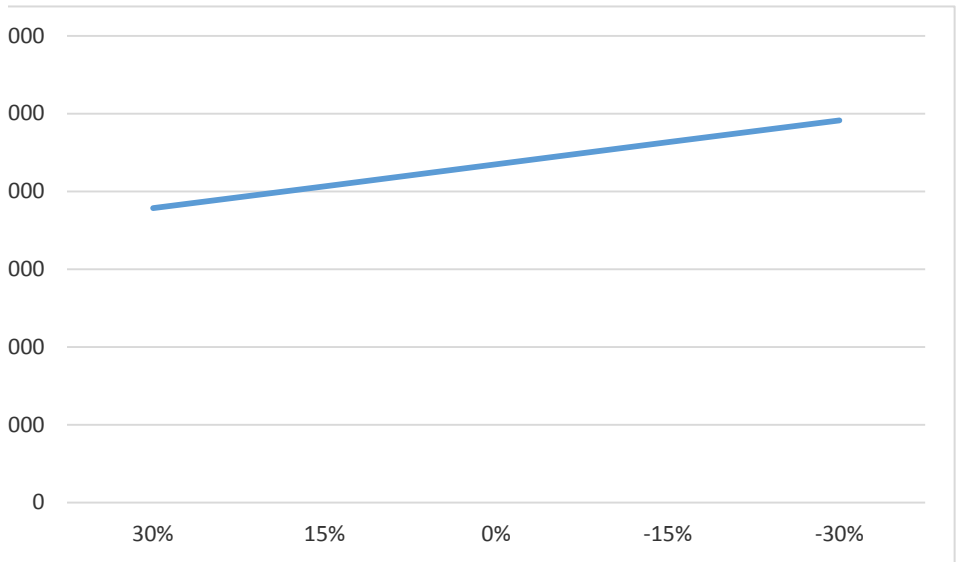
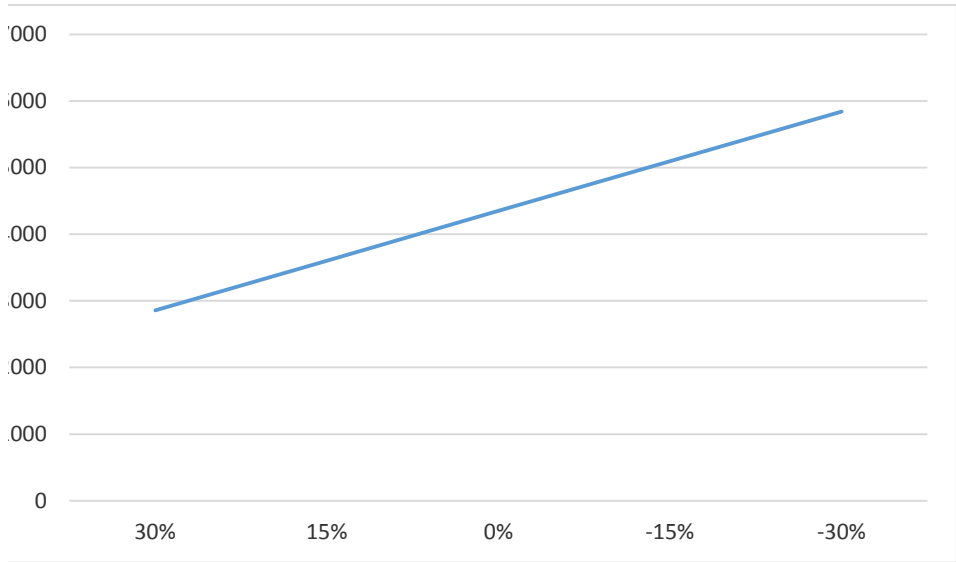
	NPV
-30.0%	6668
-15.0%	5406
Base	4349
+15%	3427
+30%	2654

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	-510
Dry Hole	-90.0
Successful Well	-61
EMV	-151

PSA Regime

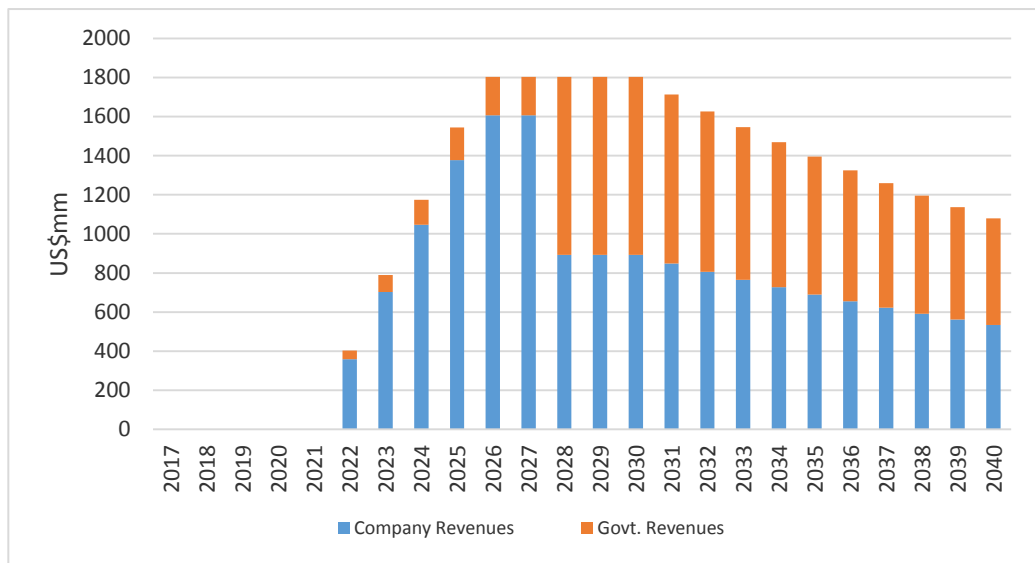
	2020	2021	2022	2023	2024	2025
Company Revenues	0	0	0	0	0	359
Operating Costs	0	0	0	0	0	-35
Transport Costs	0	0	0	0	0	-33
Operating Taxes	0	0	0	0	0	0
EBITDA	0	0	0	0	0	291
Depreciation	0	0	0	0	0	-78.3185
EBIT	0	0	0	0	0	213
Tax on EBIT <i>Corporate Tax Rate</i>	0 20%	0	0	0	0	-42.5201
Post tax cashflow	0	0	0	0	0	248
CAPEX	0	-1000	-1000	-1000	-1000	-150
Free Cashflow (FCF)	0	-1000	-1000	-1000	-1000	98
Cumulative FCF	0	-1000	-2000	-3000	-4000	-3902
Discount Rate	10%					
Discount Factor	1.10	1.21	1.33	1.46	1.61	1.77
Discounted Cashflow (DCF)	0	-826	-751	-683	-621	56
NPV (\$mm)	-145					
IRR (%)	9%					

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	0	0	0	0	0	398
	1%					
Cost Oil						
80% of Revenues	0	0	0	0	0	319

Accumulated Cost Oil	0	0	0	0	319	
Annual Costs	-1000	-1000	-1000	-1000	-218	
Accumulated Costs	-1000	-2000	-3000	-4000	-4218	
Payback	-1000	-2000	-3000	-4000	-3899	
	0	0	0	0	0	
Cost Oil to Company	0	0	0	0	319	
Profit Oil	0	0	0	0	80	
Profit Oil						
Company	0	0	0	0	40	
Govt	0	0	0	0	40	
Total Company Revenues	0	0	0	0	359	
	2017	2018	2019	2020	2021	2022
Company Revenues	0	0	0	0	0	359
Govt. Revenues	0	0	0	0	0	44

943	1874	3098	4525	5953	7380	8808	10236	11592
-280	-343	-400	-442	-310	-310	-310	-310	-295
-4498	-4841	-5241	-5682	-5992	-6302	-6611	-6921	-7216
-3554	-2967	-2143	-1157	-39	1079	2197	3315	4376
0	0	0	0	0	1	1	1	1
625	931	1224	1428	1428	0	0	0	0
156	233	306	357	357	1784	1784	1784	1695
78	116	153	178	178	892	892	892	848
78	116	153	178	178	892	892	892	848
703	1047	1377	1606	1606	892	892	892	848
2023	2024	2025	2026	2027	2028	2029	2030	2031
703	1047	1377	1606	1606	892	892	892	848
86	128	168	196	196	910	910	910	865



2035	2036	2037	2038	2039	2040	2041	2042	2043
805	765	727	690	656	623	592	562	534
-137	-130	-124	-117	-111	-106	-101	-96	-91
-126	-120	-114	-108	-103	-98	-93	-88	-84
0	0	0	0	0	0	0	0	0
542	515	489	465	441	419	398	379	360
-304	-289	-275	-261	-248	-236	-224	-213	-202
238	226	214	204	193	184	175	166	158
-48	-45	-43	-41	-39	-37	-35	-33	-32
495	470	446	424	403	383	364	345	328
-18	-18	-18	-18	-18	-18	-18	-18	-18
477	452	428	406	385	365	346	327	310
2462	2914	3342	3748	4133	4498	4843	5171	5481
4.59	5.05	5.56	6.12	6.73	7.40	8.14	8.95	9.85
104	89	77	66	57	49	42	37	31

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
-281	-268	-256	-244	-232	-222	-211	-202	-193
-7497	-7765	-8021	-8265	-8497	-8719	-8930	-9132	-9325
5383	6339	7246	8107	8924	9699	10435	11133	11795
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