Economic Analysis of Snohvit Expansion Project

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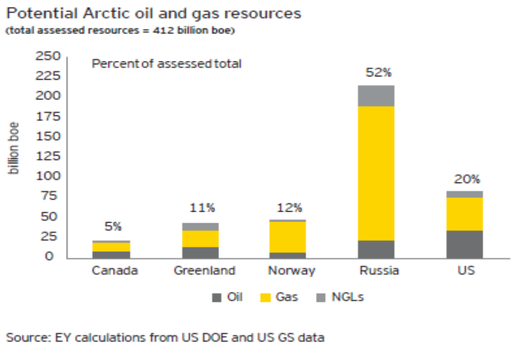
Background

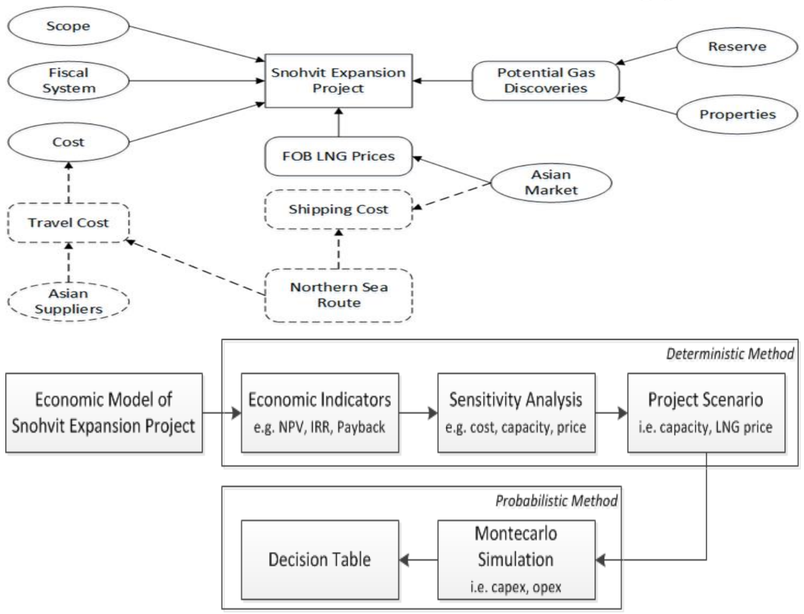
1) Potential arctic oil and gas resources



Source: EY calculations from US DOE and US GS data

2) Norway dependency to oil and gas revenue
3) Snohvit LNG as a key milestone in the Barents Sea, Arctic
4) Northern sea route (NSR) to access attractive Asia market

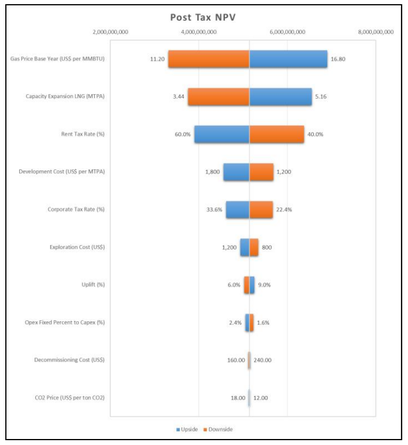
Framework and Methodology

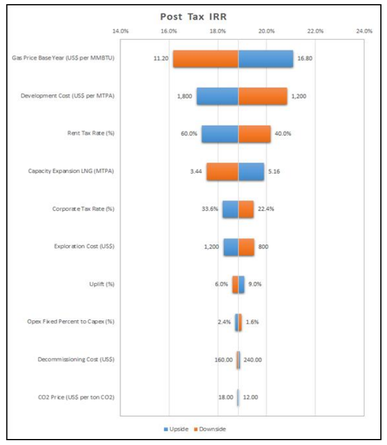


Result and Analysis

Summary Output	
Post Tax Net Present Value (USD)	5,144,345,284
Post Tax Internal Rate of Return	18.8%
NPV Capex (USD)	5,367,209,719
Post Tax NPV Capex Ratio	0.96
Approximate Payback (years)	7

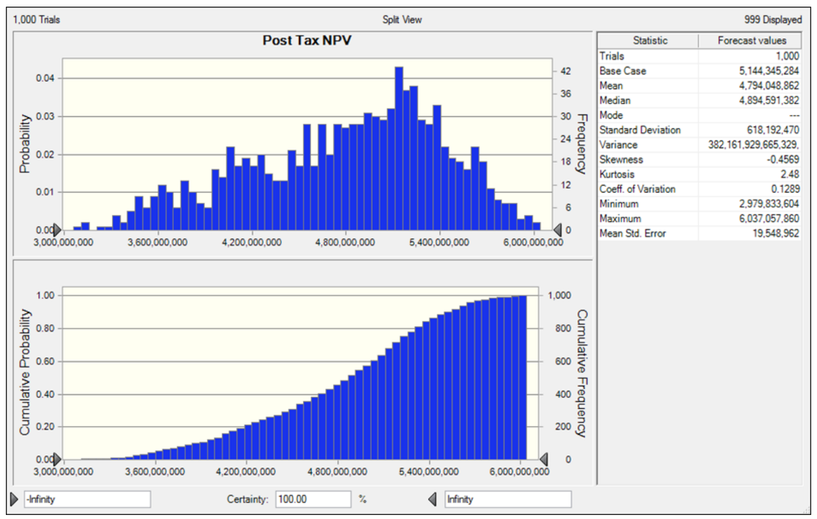
Deterministic





Probabilistic

Uncertain input variables: Development Cost
(Triangular Distribution)



Project Scenario

Variability of input variables in decision making process

	Gas Reserve (BCM)	Capacity LNG (MTPA)	LNG Price (US$/Mbtu)
1	53	1.3	10
		1.3	12
		1.3	14
		1.3	16
2	94	2.3	10
		2.3	12
		2.3	14
		2.3	16
3	135	3.3	10
		3.3	12
		3.3	14
		3.3	16
4	175	4.3	10
		4.3	12
		4.3	14
		4.3	16

Decision Table

	Capacity Expansion LNG (MTPA) (1.30)	Capacity Expansion LNG (MTPA) (2.30)	Capacity Expansion LNG (MTPA) (3.30)	Capacity Expansion LNG (MTPA) (4.30)
Gas Price Base Year (US$ per MBtu) (10.00)	-789,478,424	51,930,321	998,579,606	2,003,697,327
Gas Price Base Year (US$ per MBtu) (12.00)	-267,023,259	898,308,645	2,152,636,610	3,452,802,511
Gas Price Base Year (US$ per MBtu) (14.00)	211,017,655	1,679,198,724	3,217,252,467	4,794,048,862
Gas Price Base Year (US$ per MBtu) (16.00)	657,484,442	2,408,373,064	4,224,601,955	6,086,274,590

Ratio	Capacity Expansion LNG (MTPA) (1.30)	Capacity Expansion LNG (MTPA) (2.30)	Capacity Expansion LNG (MTPA) (3.30)	Capacity Expansion LNG (MTPA) (4.30)
Gas Price Base Year (US$ per MBtu) (10.00)	-0.28	0.04	0.24	0.37
Gas Price Base Year (US$ per MBtu) (12.00)	-0.08	0.27	0.47	0.62
Gas Price Base Year (US$ per MBtu) (14.00)	0.11	0.47	0.69	0.85
Gas Price Base Year (US$ per MBtu) (16.00)	0.29	0.67	0.90	1.07

Scenario	Gas Reserve / LNG Capacity	Gas Price (@ 0.3 Ratio)	Development Cost	Unit Cost
1	53 BCM / 1.3 MTPA	16 US$/Million Btu	3.1 Billion US$	2,389 US$ / TPA
2	94 BCM / 2.3 MTPA	14 US$/Million Btu	4.6 Billion US$	2,013 US$ / TPA
3	135 BCM / 3.3 MTPA	12 US$/Million Btu	6.0 Billion US$	1,807 US$ / TPA
4	175 BCM / 4.3 MTPA	10 US$/Million Btu	7.2 Billion US$	1,669 US$ / TPA

Scenario	Gas Reserve / LNG Capacity	Development Cost	Unit Cost (Mean)	Unit Cost (US$ / TPA)	
				Minimum	Maximum
1	53 BCM / 1.3 MTPA	3.1 Billion US$	2,389 US$ / TPA	1,473	3,545
2	94 BCM / 2.3 MTPA	4.6 Billion US$	2,013 US$ / TPA	1,241	2,987
3	135 BCM / 3.3 MTPA	6.0 Billion US$	1,807 US$ / TPA	1,114	2,680
4	175 BCM / 4.3 MTPA	7.2 Billion US$	1,669 US$ / TPA	1,029	2,476

Conclusion

1) Gas price, development cost and capacity are the most influential variables of the economics
2) The less reserve discovered, the less capacity can be built, and the more gas price required
3) Northeast Asia countries can be viewed as LNG market and technology suppliers for the project

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