

Appendix G – FPSO Ship shaped G1 TECHNICAL REPORT

Tesla Date: 09.06.2015 Cost year: 2015 Currency: NOK Region: North Sea South

Topsides

Resume

Project name	Tesla
Location	th Sea South
Development	Stand Alone
Water Depth	115 m (MSL)
Reservoir De	2290 m (MSL)

Platform

Concept	FPSO
Number of ir	1
Living quarte	40 beds
Liquid capac	16000 Sm3/d

Cost

Capex facilities	11126 mill.NOK
Capex wells	2085 mill.NOK
Opex per year	557 mill.NOK
Lease costs	0 mill.NOK
Removal and abandonment	0 mill.NOK
Cost Reference Year	2015
Currency	NOK
Currency Factor	6,00 NOK/USD

Topsides Weight Summary (tonnes)

	LQ	WH/riser	Drilling	Utilities	Process	Other	percent	Weights
Equipment	49	39	0	582	409	248	20,26	1327
Electrical	15	16	0	123	32	0	2,85	186
HVAC	17	8	0	35	0	0	0,91	60
Instrument/telecom	8	39	0	53	72	0	2,63	172
Piping	6	157	0	185	323	15	10,47	685
Surface protection, fire proofi	6	16	0	24	15	0	0,92	60
Safety and loss prevention	6	39	0	21	30	0	1,47	96
Architectural	210	16	0	119	15	0	5,49	360
Structural steel/aluminium	524	456	0	1241	598	783	55,00	3601
Total dry weight	840	786	0	2382	1494	1046	100,00	6547
Variable loads	21	118	0	238	299	52	11,12	728
Operating weight (ex riser l	861	904	0	2621	1792	1098	111,12	7275

TECHNICAL REPORT

Tesla Date: 09.06.2015 Cost year: 2015 Currency: NOK Region: North Sea South

Topside – Stand Alone

	Procurement			Fabrication/installation				Total	
	Weight	kUSD/t	mill.USD	mhr/t	mhr	USD/mhr	mill.USD	kUSD/t	mill.USD
Equipment	1327	100,44	133	13	17031	103	2	102	135
Electrical	186	54,33	10	289	53853	103	6	84	16
HVAC	60	43,47	3	193	11520	103	1	63	4
Instrument/tel	172	114,10	20	289	49710	103	5	144	25
Piping	685	65,20	45	225	153942	103	16	88	60
Surface protec	60	32,60	2	1027	62079	103	6	138	8
Safety and los:	96	32,60	3	193	18508	103	2	52	5
Architectural	360	32,60	12	77	27696	103	3	41	15
Structural alun	0	6,52	0	183	0	103	0	0	0
Structural stee	3601	4,89	18	64	231147	103	24	11	41
Total	6547	-	245	64	625486	64	64	47	309
Hook-up (offsi	6547	-	-	3	19642	265	5	1	5
Commissionin:	6547	-	-	5	32737	200	7	1	7
Commissionin:	6547	-	-	5	32737	265	9	1	9
Engineering	6547	-	-	130	851152	216	184	28	184
Total	6547	-	245	0,00	1561752	0,00	269	78	513

Marine Operations

	mob/demob	operation	duration	Day-rate	mill.USD
Transportation/logistics	5	33	43	0,13	5
Total topsides installed					519
Living quarters material	Steel		0 tonnes of aluminium		

TECHNICAL REPORT

Tesla Date: 09.06.2015 Cost year: 2015 Currency: NOK Region: North Sea South

Substructure

Platform selected: FPSO 5

ENG

Design parameters

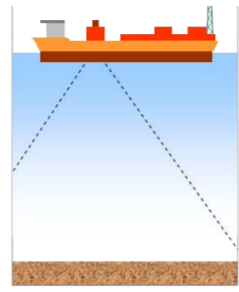
Water depth	115 m
Operating topside weight	7275 tonnes
Dry topside weight	6547 tonnes
Oil storage volume	95500 m3
Loads from flexible risers, umbilicals and cables	64 tonnes

5

Production ship with turret

Maximum op:	6516 tonnes
Oil storage v	95500 m3
Number of ri	5 0
Length	257 m

Width	41 m
Depth	25 m
Loaded draft	14 m
Ballast draft	12 m
Turret diame	24 m
Displacemen	111025 tonnes
Hull dry weig	21140 tonnes
Number of n	12 0
Mooring line	2691 tonnes
Anchor weig	657 tonnes



TECHNICAL REPORT FPSO Ship shaped

Tesla

Parameters and indicators

Summary of weights (steel and metals)	tonnes
Topside weight	6547
Substructure weight	23908
Conductors	0
Tensioned well risers	0
Piles or anchors	657
Mooring lines	2691
Subsea equipment and structures	1329
Other subsea structures	181
Flowlines	162
Flowline risers and J-tubes	58
Umbilicals and cables	97
Export pipelines	34
Wells	7589
Total weight	43253

Summary of marine operations – vessel days	days
Platform construction and installation	123
Mooring system installation	47
Subsea templates	17
Other subsea equipment	92
Flowlines/pipelines (S-lay and J-lay)	0
Flowlines/pipelines (Reel-lay)	18
Umbilicals and cables	31
Risers	17
Gravel dumping	5
Trenching	3
Surveys	1
Total number of vessel days	354

Summary of costs	mill.USD	mill.NOK
Platform	1374	8246
Subsea production	479	2872
Export pipelines	1	9
Wells	347	2085
Total costs	2202	13211

Average cost per tonne of steel

USD/tonne	50906
NOK/tonne	305434

Use of steel and metals	tonnes	kg/boe
All facilities	35665	0,709
Wells	7589	0,151
Total	43253	0,860

Fuel consumption (tonnes) – project execution

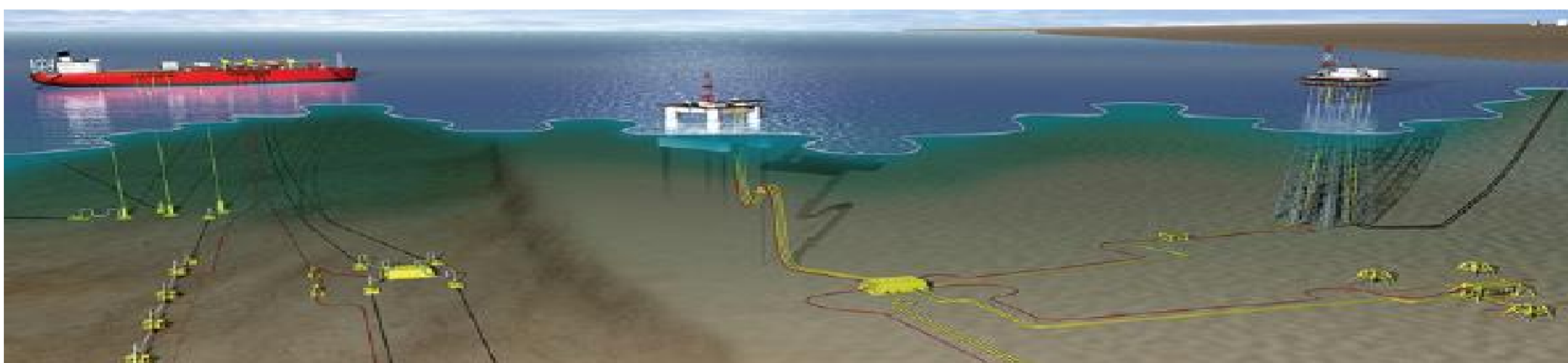
Drilling rig	4847
Drilling services	2344
Platform installation	1444
Subsea equipment installation	926
Pipelines, umbilicals, cables, risers	564
Gravel dumping, trenching, surveys	76
Total for project execution	10201

Fuel consumption (tonnes) – production phase

Production operations per year	14619
Production operations services per year	4983
Well maintenance operations per year	237

G2 COST REPORT

Date: 09.06.2015



Resume

Project name	Tesla
Location	North Sea South
Development Concept	Stand Alone
Water Depth	115 m (MSL)
Reservoir Depth	2290 m (MSL)

Wells	Number
Producers	4
Water Injectors	2
Gas Injectors	0
Total	6

Platform

Concept	FPSO
Number of inlet systems	1
Living quarters capacity	40 beds
Liquid capacity	16000 Sm ³ /d

Cost

Capex facilities	11126 mill.NOK
Capex wells	2085 mill.NOK
Opex per year	557 mill.NOK
Lease costs	0 mill.NOK
Removal and abandonment	0 mill.NOK
Cost Reference Year	2015
Currency	NOK
Currency Factor	6,00 NOK/USD

Price and tariff

Oil price	71,76 USD/bbl
Oil tariff	1,79 USD/bbl
Gas price	0,00 NOK/scm
Gas tariff	0,00 NOK/scm

COST REPORT

Tesla

Cost year: 2015

Currency: NOK

Region: North Sea South

Capex Facilities Overview

mill.NOK

Cost element	Engineering	Procurement	Construction	SUM EPC	Marine op	SUM EPCI	Management	Base estimate	Contingency	Total
Topsides	1104	1468	508	3081	33	3113	436	3549	532	4082
Substructure ii	706	1493	569	2768	190	2958	414	3372	506	3878
Piles, anchors	0	113	0	113	105	219	31	249	37	287
Sum Platform	1810	3075	1077	5962	328	6290	881	7170	1076	8246
Subsea produc	190	1139	36	1365	84	1448	203	1651	248	1899
Flowlines	11	34	27	71	52	123	17	140	21	162
Flowline/pipel	13	65	14	92	59	150	21	172	26	197
Umbilicals/rise	22	64	18	104	109	213	30	243	36	279
Riser bases, Pl	8	26	0	33	222	256	36	291	44	335
Sum Subsea	243	1327	95	1665	525	2191	307	2497	375	2872
Export pipelin	0	1	2	3	3	7	1	8	1	9
Power cables/r	0	0	0	0	0	0	0	0	0	0
SUM Facilities	2053	4403	1174	7630	857	8487	1188	9675	1451	11126

Capex Wells Overview

	days per well	days	mill.NOK
Drilling	37	221	1168
Completion	26	159	916
Sum Drilling and completion	63	380	2085

COST REPORT

Tesla

Cost year: 2015

Currency: NOK

Region: North Sea South

Removal Cost Overview

mill.NOK

	Engineering	Decommissioning	Removal operations	Dismantling	Sub-total	Management	Base estimate	Contingency	TOTAL
Well plugging and abandonm	39	0	893	0	931	93	1024	154	1178
Platform topsides	21	52	0	94	168	17	184	28	212
Platform substructure	62	38	25	115	240	24	264	40	304
Mooring lines, piles, anchors	2	11	29	4	46	5	50	8	58
Risers, conductors	0	0	17	0	18	2	19	3	22
Flowlines, umbilicals and cab	0	2	16	0	18	2	20	3	23
Export pipelines	0	0	15	0	15	2	17	2	19
Subsea equipment and struct	6	24	76	9	114	11	126	19	145
Sea bottom clean-up	1	0	23	0	25	2	27	4	31
TOTAL	131	127	1094	222	1574	157	1732	260	1992

COST REPORT

Tesla

Cost year: 2015

Currency: NOK

Region: North Sea South

Cost Phasing Assumptions

Capex Facilities

Number of months from project sanction to production start-up:	39	mill.NOK
Expenditure in year	1	2370
Expenditure in year	2	5119
Expenditure in year	3	3489
Expenditure in year	4	148
Total expenditure		11126

Capex Wells

Number of months for drilling and completion	13	mill.NOK
Expenditure in year	1	0
Expenditure in year	2	111
Expenditure in year	3	1974
Expenditure in year	4	0
Expenditure in year	5	0
Expenditure in year	6	0
Expenditure in year	7	0
Expenditure in year	8	0
Expenditure in year	9	0
Total expenditure	0	2085

COST REPORT

Tesla

Cost year: 2015

Currency: NOK

Region: North Sea South

Drilling and Completions Costs

Time for drilling	221 days	7 months
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Time for completion	159 days	5 months
Total time for drilling and completion	380 days	13 months
Drilling cost	181 mill.USD	1087 mill.NOK
Completion cost	142 mill.USD	852 mill.NOK
Planning and other costs	24 mill.USD	145 mill.NOK
Total cost for drilling and completion	347 mill.USD	2085 mill.NOK
Total number of wells	6	
Average well cost	58 mill.USD	347 mill.NOK
Drilling expenditure per month	27 mill.USD	165 mill.NOK
Total steel weight of all wells	7589 tonnes	
Average steel weight per well	1265 tonnes	
Diesel consumption of MODU	7603 tonnes	20 tonnes/d
Fuel gas consumption of platform rig	3802 tonnes	10 tonnes/d

Rates	Basis K USD/day	Index	Cost K USD/day
Platform drilling	59	1,11	66
Platform light intervention	24	1,11	27
MODU drilling – semisub	525	1,11	584
MODU drilling – jack-up	350	1,11	390
Service rate for drilling	400	1,09	437
Service rate for completion	440	1,09	481
Service rate for plugging and abandonment	260	1,09	284

OPEX REPORT

Tesla Cost year: 2015 Currency: NOK Region: North Sea South

Basis for cost phasing – OPEX			mill.NOK
Preparation for operation – last year before production start			331
First period; start-up	Duration – years	1	661
Second period; drilling and production	Duration – years	2	487
Third period; production, maintenance and modification	Duration – years	8	599
Fourth period; preparation for abandonment	Duration – years	2	-19
Total	Duration – years	13	4457

Opex Overview	mill. USD OPEX per year	mill.NOK OPEX per year
Offshore personnel	24	143
Catering	2	9
Production materials, chemicals and diesel	2	14
Communication	0	1
Maintenance materials/spare parts	2	14
Onshore base, purchase and contracts	1	7
Supply vessels	8	46
Stand-by vessels	16	97
Helicopter transportation	3	17
Well maintenance and well monitoring – platform wells	0	0
Well maintenance and well monitoring – subsea wells	5	32
Subsea inspection and maintenance	5	30
Stand-by maintenance of drilling package	0	0
Onshore organization, administration/support	4	26
Onshore organization, subsurface and licence adm	1	8
SUBTOTAL 1	74	446
Modifications/optimization/upgrading	1	8
Reservoir area fee	0	0
Contingency	7	45
SUBTOTAL 2	83	499
Insurance	6	33
CO2 tax	4	24
TOTAL OPEX	93	557
"Day-rate" (USD/day)	254384	1526307
Contingency (percent)	10	10

G3 NPV REPORT

Tesla Cost year: 2015 Currency: NOK Date: 09.06.2015 Region: North Sea South

Recoverable Volumes – metric units	
Recoverable volume of oil	8,00 mill.scm
Recoverable volume of gas	0,00 bill.scm
Daily Production – metric units	
Oil	8219 scm/d
Gas	0,00 mill scm/d

Case Description	
Concept	FPSO
Water depth	115 metres
Reservoir depth	2290 metres
Number of producers	4 P
Number of water injectors	2 WI
Number of gas injectors	0 GI
Gas/oil – ratio	0 scm/scm
Field life (production)	8 scm/scm
Plateau length oil	1,0 years
Plateau length gas	1,0 years
Average number of streamdays	340,0 years

NVP Report FPSO Ship shaped

Recoverable Volumes – oil field units	
Recoverable volume of oil	50,3 mill.bbl
Recoverable volume of gas	0,0 bill.scft
Daily Production – oil field units	
Oil	51693 bpd
Gas	0 mill scft/d

Basis for NPV calculations

Capex facilities	11126 mill.NOK
Capex wells	2085 mill.NOK
Opex	557 4457 mill.NOK
Lease costs	0 mill.NOK
Removal and abandonment	0 mill.NOK
Cost reference year	2015
Currency (NOK/USD)	6 NOK/USD
Discount rate	10,00 percent

Price and Tariff

Oil price	71,76 USD/bbl
Gas price	0,00 NOK/scm
Oil tariff	1,79 USD/bbl
Gas tariff	0,00 NOK/scm

NVP Report FPSO Ship shaped
Economic Indicators (pre-tax)

NPV	NPV	IRR	PI	Capex	Opex	Tariffs	TUC	TUC
mill.NOK	mill.USD	percent	-	USD/boe	USD/boe	USD/boe	USD/boe	NOK/scm
-606	-101	7,86	-0,06	43,76	14,76	1,79	75,16	2836

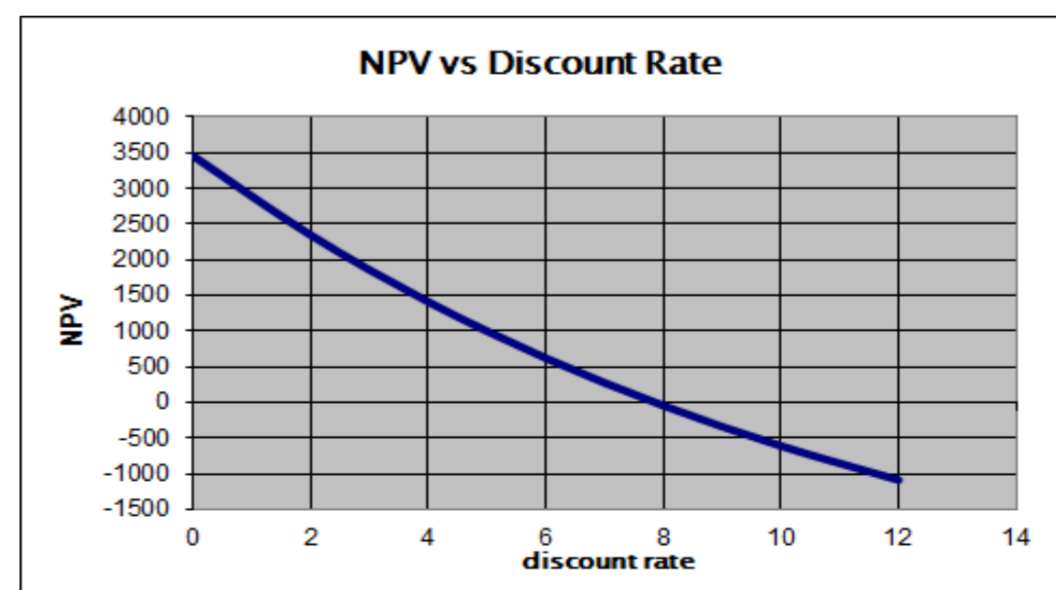
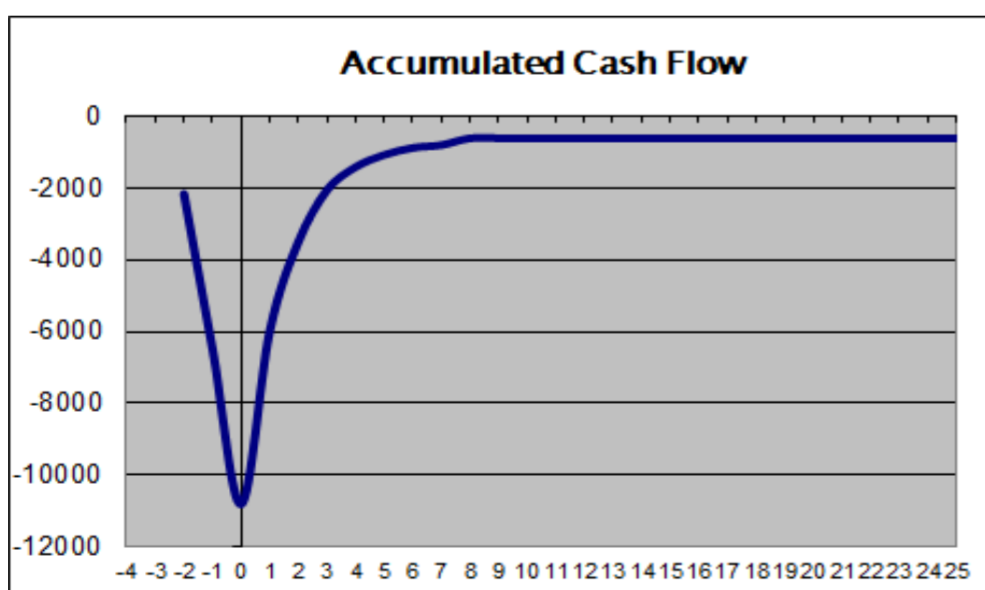
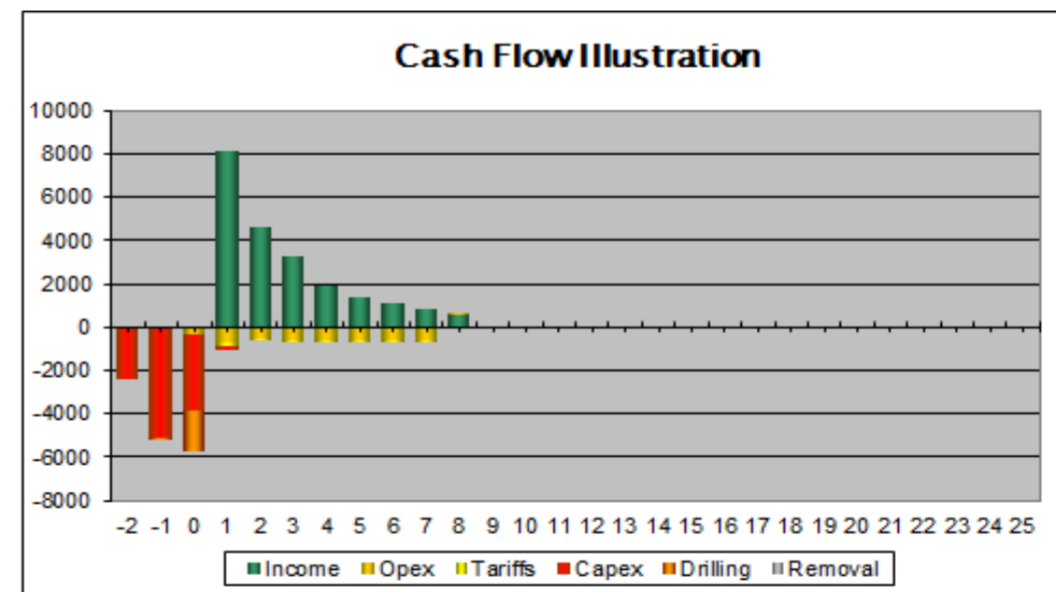
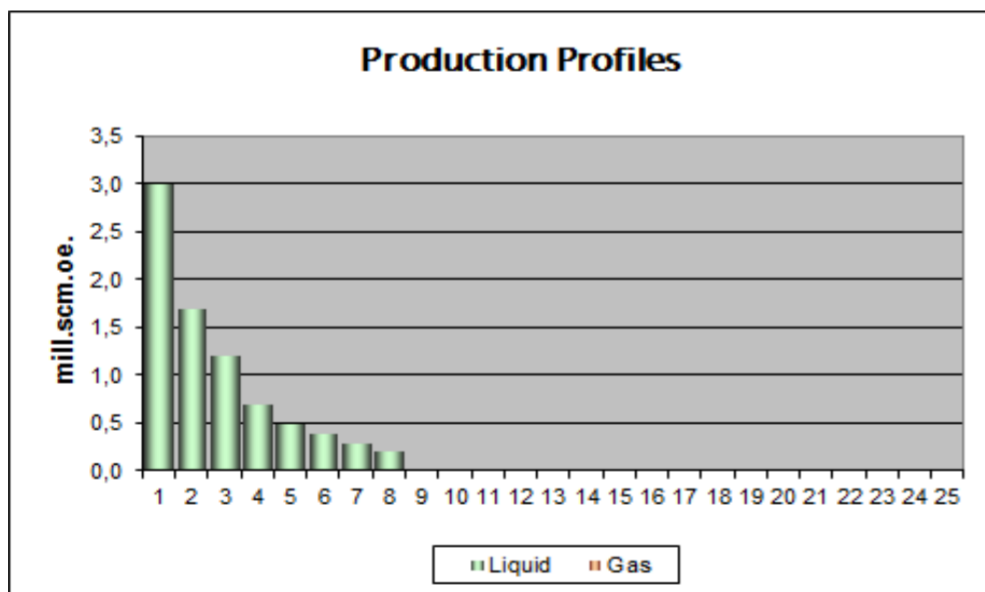
NPV REPORT

Tesla Cost year: 2015 Currency: NOK Region: North Sea South

Year	mill.scm Oil prod	bill.scm Gas prod	mill.NOK Oil inc	mill.NOK Gas inc	mill.NOK Income	mill.NOK Oil tariff	mill.NOK Gas tariff	mill.NOK Opex	mill.NOK Lease	mill.NOK Capex(f)	mill.NOK Capex(w)	mill.NOK Removal	mill.NOK Net CF
1	0	0	0	0	0	0	0	0	0	2370	0	0	-2370
2	0	0	0	0	0	0	0	0	0	5119	111	0	-5229
3	0	0	0	0	0	0	0	322	0	3489	1974	0	-5785
4	3,00	0,00	8124	0	8124	203	0	688	0	148	0	0	7085
5	1,70	0,00	4603	0	4603	115	0	499	0	0	0	0	3990
6	1,20	0,00	3250	0	3250	81	0	601	0	0	0	0	2567
7	0,70	0,00	1896	0	1896	47	0	594	0	0	0	0	1254
8	0,50	0,00	1354	0	1354	34	0	591	0	0	0	0	729
9	0,40	0,00	1083	0	1083	27	0	590	0	0	0	0	467
10	0,30	0,00	812	0	812	20	0	588	0	0	0	0	204
11	0,20	0,00	542	0	542	14	0	-15	0	0	0	0	543
12	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
13	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
14	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
15	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
16	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
17	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
18	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
19	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
20	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
21	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
22	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
23	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
24	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
25	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
26	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
27	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
28	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
29	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
30	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
31	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
32	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
33	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
34	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
35	0,00	0,00	0	0	0	0	0	0	0	0	0	0	0
SUM	8,00	0,00	21663	0	21663	540	0	4457	0	11126	2085	0	3455
NPV	4,73	0,00	12808	0	12808	319	0	2413	0	9108	1575	0	-606
NPV	5,20	0,00	14089	0	14089	351	0	2654	0	7649	1732	0	1703

NPV REPORT

Tesla Cost year: 2015 Currency: NOK Region: North Sea South



NPV REPORT

Tesla Cost year: 2015 Currency: NOK Region: North Sea South

Lease rate for production and storage units		
Capital cost of leased unit:		0 mill.NOK
Contractor's interest rate (base unit)		8 percent
Contractor's interest rate (special equipment)		10 percent
Contract duration (equal field life)		8 years
Lease rate first year		0 USD/day
Lease rate base unit		0 USD/day
Sum of lease costs		0 mill.NOK
NPV of lease costs		0 mill.NOK
NPV of lease costs; year 3 ref		0 mill.NOK
Capital cost of equipment to be leased:		0 mill.NOK
Capital cost of base unit		0 mill.NOK
Capital cost of special equipment		0 mill.NOK
Economical life of base unit		20 years
Contract duration (special equipment)		8 years
Interest rate for base unit		8,0 percent
Interest rate for special equipment		10,0 percent
Lease rate for base unit	0,0 mill.NOK	0 USD/d
Lease rate for special equipment	0,0 mill.NOK	0 USD/d
Leased Storage Tanker included?		No
Leased Production Unit included?		Yes

Leasing of Storage Tanker or Production Unit	percent	mill.NOK
Production unit – base unit	47,0	3878
Production unit – special equipment	53,0	4368
Storage tanker – base unit	75,1	1500
Storage tanker – special equipment	24,9	496