

Indonesia Offshore LNG Receiving & Regasification Terminal and 1 Gas Power Plant for 800MW

Description	Values	Unit
Work Start Year	2018	Years
Operating Year	2021	Years
Location of Regasification	New Floating	<-New Floating, GBS, Conversion Floating, Onshore
Location of Power Plant	Offshore	<-Offshore, Onshore
Site and Contry for Project	Indonesia	
Sensitivity of Golobal Financial Crisis	0	Years- Active Crisis Year, Otherwise = 0
Type of Generator	Conventional CC with	Conventional CC with Heat Recovery Steam Generat
Efficiency of power generator	48%	
Power Plant Factor	85%	Plant Factor 85% - 90% for net calorific of Gas ranging
Power Sales Cost	0.0900	USD/kWh =9USc/kwh
Total Sales Required Power	800	MW (=MWh/h)
Assumed Standard Gas Flow	145.03	mmscfd at 288.716°K on 1.013bar
Assumed Normal Gas Flow	137.22	mmNcfd at 273.16°K on 1.013bar
Assumed Operating conditions	1.47	mmcfd at 288.16°K on 100bar
Required MW Electric Power for Regas Operating System	4.351	MW - for operation of system 0.03MW/mmscfd
Theoretical Power Capacty	800	MW (=MWh/h)-Set of 2 Turbine and 1 steam generat
Required LNG	1.011	Mtpa
Rate of kwh per 1mmbtu	121.50	kwh/mmbtu
Storage Tank Capacity	161,316	m³ -26 days return Loading Time
Charter of LNGC Class	170,000	m³ -1 Sets Charter
Assumed LNG Density	470	kg/m³
Claculated British thermal unit	57,648,927	mmbtu/year
Storage/mmcmm	108	Storage(m³)/(mmscfd*0.3048**365)
Initial Inflation of Fuel Natural Gas Price	0	%
Fuel Natural Gas Unit Price	3.83	USD/mmbtu in 2021Years
LNGC Charter Vessel Type	DE	"Steam vessels(=SV)" or "Diesel electric(DE)"
Vessel Spped	19.5	knots
Transportation Distance	10000	km
LNGC Charter Price	13,409,629	USD/year
Working hour per day	24	hr
Working day per year	365	day
Total Electricity Power Sales Cost	630,720,000	USD/year
Unit CAPEX of Regasification	143.00	\$/tonne and Storage/mmcmm is 269\$/tonne
Unit CAPEX of Power	917.00	\$/kW
Regasification Equipment Area	143.13	m²- Floating Storage Sructure
Facilities Area	1431.32	m²- Floating Storage Sructure
LNG Storage Area	7L x52.2B x28.8D x12.2D	Floating Storage Tank
Power Plant Area	194,726	m² without Transmission and Road Area
Unit Space Acquisiton Cost	0	USD/m³ in Indonesia
CAPEX of Area Acquisition Cost	0	USD
CAPEX of Old LNGC(Purchased Price)	0	USD for 10Years Old (189,780,000USD New LNGC)
CAPEX for LNG Terminal and Gas Power Plant	878,195,425	USD - 팔억칠천팔백일십구만오천사백이십오달러
CAPEX for improvement of soft seabed(GBS)	Depth=10.0m	USD only for GBS Type 136.83USD/m3
CAPEX for Break Water Length is	1,000m	100,000,000 USD
CAPEX for Berthing Dolphine	170k DWT x 1 set	30,000,000 USD
CAPEX for Trestle and Piers of	Pipe x 20.00inch x 0m	0 USD
CAPEX for Cryogenic	Pipe x 20.00inch x 0m	0 USD
CAPEX for subsea Cryogenic	Pipe x 20.00inch x 0m	0 USD
CAPEX for subsea Gas	Pipe x 20.00inch x 0m	0 USD
CAPEX for onshore Gas	Pipe x 20.00inch x 0m	0 USD
CAPEX for Spur Transmission Line Length is	25km	18,187,128 USD -165.7Kv --Double Ci
CAPEX for Bulk Transmission Line is	0km	0 USD
CAPEX for Grid Connection(Point Of Interconnection)	1 Sets	91,200,000 USD, Gas=1145/kw, Goal,Nuclear=2275/kw, Solar=11
Total CAPEX for Construction and Fabrication	1,117,582,553	USD - 일십일억일천칠백오십팔만이천오백오십삼
Construction and Fabrication Period	3	Years
Interest FEE during Construction and Fabrication	108,964,299	USD
TOTAL CAPEX AND INTREST FEE DURING CONSTRUCTION	1,226,546,852	USD - 일십이억이천육백오십사만육천팔백오십오
Fixed and Various OPEX	47,116,563	USD/Year
Total cost of purchased Natural Gas	234,205,017	USD/Year(including transportation)
Fund Interest	6.5	%
Return rate on investment of Net Profit, r	3	%

15.556°C	1.013250274bar
0°C	1.013250274bar
15°C	100bar

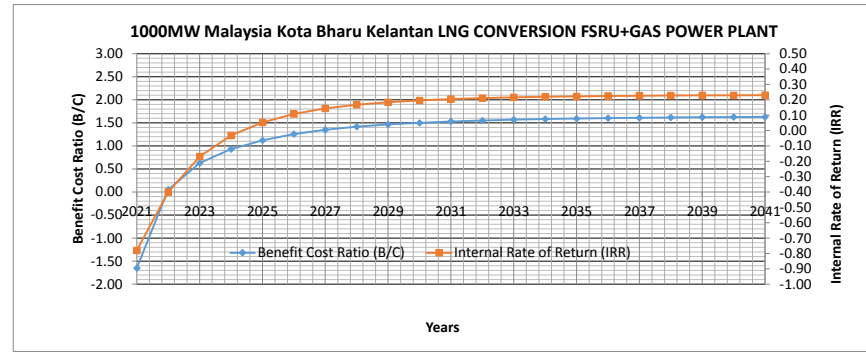
0.95

LNG FLOATING STORAGE TANK				
Storage	Length	Breadth	Depth	Draft
161,316m³	297.0m	52.2m	28.8m	12.2m
0m³	바콜셀			

해 찾기

LNG ONSHORE STORAGE TANK					
Storage	Nos of Tank	Diameters	Center Gap	Edge gap	Required Space
161,316m³	1	64.0m	0.5D	0.5D	16,384.0m²

Operating Periods	25	Years
Project Design Life	30	Years
Benefit Cost Ratio (B/C)	1.63	≥ 1.1 GOOD For 25Years Operating
IRR(Internal Rate of Return)	23.18%	> 0 GOOD For 25Years Operating
NPV(Net Present Value)	3,669,506,615	USD with Asset value of Project for 25Years
Inflation of LNG Purchase Price	0	% , If Inflation= 0, the LNG Unit price shall be quoted Forecast Price, otherwise consider inflation based on 2021Years Sale Cost, If no consider Inflation, the value=10E-11
1. Electric Power Sale Cost is applicable Based on inflation of LNG Forecast Price	0	<-- 0 : Not Applicable, 1 : Applicable of LNG Forecast Price
2. Electric Power Sale Price		
Inflation to be considered in yeras(Increased Previous Inflation)		
Income tax rate for government	30	%
Inflation of Space Acquisition	1	%
First Project residual value	519,675,887	USD after 10 Years(Including Land Acquisition)
Second Project residual value	355,391,252	USD after 15 Years(Including Land Acquisition)
Final residual value on Design Life	111,758,255	USD after 30 Years(Including Land Acquisition)
Net Payback Turn Over Periods	4.020	Years



Actual Payback turn Over Years	5Years	5Years	해 찾기
Initial Value(min 0%, max 20%)	18.552%	18.552%	0
Limit of Initial Value	≤ 20%	≤ 20%	Good

End of Year	①% of Return of Equity	②% of Return of FUND	③Return of Equity (USD)	④Return of FUND(USD)	⑤Remain Cost(USD)	⑥Fund Interest 6.5%(USD)	⑦OPEX(USD)	⑧Yearly Revenue(USD) W/ Inflation	⑨Yearly Purchase Price of Natural Gas(USD) W/ Inflation	⑩(순이익)Net Profit(USD)	⑪(원해 자산가치)Asset value=Residual Value(USD)	⑫(순현재가치)Net Present Value	⑬Benefit Cost Ratio (B/C)	⑭(내부수익률)Internal Rate of Return (IRR)
			20% of Equity	80% of FUND										
2021	18.55%	18.55%	45,508,805	182,035,219	1,226,546,852	79,725,545	47,116,563	630,720,000	234,205,017	29,490,195	1,035,127,032	-936,629,639	-1.65	-0.78
2022	19.28%	19.28%	47,285,339	189,141,358	999,002,828	64,935,184	47,116,563	630,720,000	240,546,399	29,186,610	958,885,831	-682,108,744	0.05	-0.40
2023	20.00%	20.00%	49,061,874	196,247,496	762,576,131	49,567,449	47,116,563	630,720,000	247,464,270	28,883,643	888,478,130	-427,493,485	0.63	-0.17
2024	20.72%	20.72%	50,838,409	203,353,635	517,266,761	33,622,339	47,116,563	630,720,000	255,535,120	28,177,753	822,540,759	-173,501,798	0.93	-0.03
2025	21.45%	21.45%	52,614,943	210,459,774	263,074,717	17,099,857	47,116,563	630,720,000	261,300,013	29,490,195	762,191,301	82,101,384	1.12	0.05
2026	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	269,370,862	219,962,802	706,312,174	337,601,223	1.26	0.11
2027	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	277,441,712	214,313,207	653,785,794	579,288,115	1.35	0.14
2028	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	285,512,562	208,663,612	605,729,744	807,749,950	1.42	0.17
2029	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	293,583,412	203,014,018	561,026,442	1,023,552,085	1.47	0.18
2030	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	301,654,261	197,364,423	519,675,887	1,227,238,169	1.50	0.20
2031	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	304,071,797	195,672,148	481,678,080	1,423,296,037	1.53	0.20
2032	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	306,489,333	193,979,873	445,915,439	1,611,997,257	1.55	0.21
2033	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	308,906,868	192,287,598	413,505,545	1,793,604,050	1.57	0.22
2034	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	311,324,404	190,595,323	383,330,816	1,968,369,600	1.58	0.22
2035	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	313,741,940	188,903,048	355,391,252	2,136,538,363	1.59	0.22
2036	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	316,097,878	187,253,891	329,686,853	2,298,383,625	1.60	0.22
2037	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	318,453,816	185,604,735	305,100,037	2,454,131,083	1.61	0.23
2038	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	320,809,754	183,955,578	282,748,386	2,603,998,648	1.62	0.23
2039	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	323,165,692	182,306,421	261,514,317	2,748,196,712	1.62	0.23
2040	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	325,521,631	180,657,264	242,515,414	2,886,928,400	1.63	0.23
2041	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	327,877,569	179,008,107	224,634,993	3,020,389,813	1.63	0.23
2042	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	330,233,507	177,358,951	207,870,255	3,148,770,266	1.63	0.23
2043	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	332,589,445	175,709,794	192,224,199	3,272,252,516	1.63	0.23
2044	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	334,945,383	174,060,637	177,695,626	3,391,012,987	1.63	0.23
2045	0.00%	0.00%	0	0	0	0	47,116,563	630,720,000	337,301,322	172,411,480	164,284,635	3,505,221,980	1.63	0.23
2046	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2047	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2048	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2049	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2050	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2051	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2052	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2053	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2054	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2055	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2056	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2057	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00

2058	38	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2059	39	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2060	40	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2061	41	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2062	42	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2063	43	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2064	44	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2065	45	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2066	46	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2067	47	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2068	48	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2069	49	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
2070	50	0.00%	0.00%	0	0	0	0	0	0	0	0	0	0	0.00	0.00
	Summation	100%	100%	245,309,370	981,237,482	3,768,467,290	244,950,374	1,177,914,084	15,768,000,000	7,478,143,968	3,948,311,306	164,284,635	3,669,506,615	1.63	0.23

ENVIRONMENTAL EMISSIONS

TYPE OF TURBINE =

1 Conventional CC with Heat Recovery Steam Generator

SO2 (kg/kWh)	Nox (kg/kWh)	CO2 (kg/kWh)	SO2 (kg/day)	Nox (kg/day)	CO2 (kg/day)	SO2 (tonne/year)	Nox (tonne/year)	CO2 (tonne/year)
3.20E-06	2.40E-05	3.74E-01	6.14E+01	4.60E+02	7.18E+06	22	168	2,622,011

Natural Gas Markets Prices and FSRU or Onshore LNG Terminal CAPEX is referred to David Carroll(President of the International Gas Union), 2016, "IGU World Gas LNG Report", LNG 18 Conference & Exhibition Edition, pp.52 to pp.53

CAPEX of Power types and Environmental Emissions are referred to U.S. Energy Information Administration, 2013, "Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants", pp.2-10, Table 2-5 Technology Performance Specifications