Available online www.ejaet.com

European Journal of Advances in Engineering and Technology, 2021, 8(10):9-16

Research Article **ISSN: 2394 - 658X**

Comparative Economic Analysis of Liquefied Natural Gas Technology and Gas to Liquid Technology

Chikwe Anthony O*., Ukpai Ude Chidera E, Elechi Dominic Urom, Onyia Obinna Stanley

Department of Petroleum Engineering, Federal University of Technology Owerri, Imo State, Nigeria
ogbchikwe@yahoo.ca

ABSTRACT

A huge amount of world's natural gas reserve is abandoned. 40% of Nigeria's complete demonstrated gas reserves have been discovered to be abandoned which are not accessible in present moment. The drive to discover method for adapting these assets prompted the advancement of Liquefied natural gas (LNG) Technology, Gas to liquid (GTL) Technology and different means. An econometric methodology with the use of Microsoft Excel is utilized to assess the financial measurements on different boundaries, for example, capital expenditure (CAPEX), operating expenditure (OPEX), product prices, discount rates, plant capacity, feed gas price. These financial measurements are Net Present Value (NPV), Profitability index (PI) and Payback period. The discount rate of 15% was used to find the Net Present Values for both LNG and GTL, the NPV for LNG is $2,485,462,000while GTL is$3,202,891,554. The Internal Rate of Return (IRR) for both LNG and GTL are 27% and 31% respectively. The Payouts for GTL and LNG 5.056 years and 6.24 years respectively which means that GTL would have a quicker breakeven period. GTL had a higher profitability Index of 1.94 while LNG was 1.67, while the Profit Per dollar for GTL and LNG are $17.89 and $15.35 respectively. From the results, GTL investments are better placed compared to that of LNG.

Key words: LNG, GTL, CAPEX, OPEX, NPV, IRR, Profitability Index, Payback Period, Profit per Dollar

INTRODUCTION

Natural gas is assuming a significant part worldwide in the stockpile of clean energy for both modern and homegrown use supplanting different types of petroleum derivative. The utilization of natural gas overall is projected to increment from 120 trillion cubic feet (TCF) in 2012 to Nigeria had an expected 203 trillion cubic feet (TCF) of demonstrated natural gas reserves as of January 2019 according to the most recent information from the Department of Petroleum Resources. Nigeria is the 10th biggest natural gas holder on the planet and biggest in Africa representing about 3% of the absolute natural gas estimates of 6,923 Trillion cubic feet (TCF). Notwithstanding standing firm on the best 10 foothold for biggest natural gas hold, Nigeria created 1.6 TCF of dry gas in 2019 while the rest are flared or abandoned.

LNG technology to date has been overwhelmed in the Far East essentially because of the nearness of the providers and purchasers with Japan and Korea representing the largest part of the market. The correlation among LNG and GTL is of genuine importance to the asset proprietor, engineer, and financial backer of the same. LNG enjoys the conspicuous benefit of being set up for as far back as 40 years and needs to date delighted in hearty development and a great security record. GTL then again is a rising innovation very nearly showing business feasibility, innovation heartiness, and wellbeing execution. In any case, basically for thefuture, LNG stays the fundamental alternative given the high current and anticipated interest for LNG while GTL technology is on the rise with new plants being completed globally.The utilization of GTL innovation initiated by Qatar prompted the making of the ORYX GTL plant in 2007 with a limit of 34,000bbls/d and pearl GTL in 2011 with a full capacity of 140,000bbls/d.An econometric model was created utilizing financial pointers like Net Present Worth, internal rate of return, profitability index, break even analysis, present worth and discounted cash flow with the utilization of Microsoft excel.

MATERIALS AND METHOD

Ranking of Projects

The ranking of project is necessary in the selection of the most valuable, worthy and economically viable investment using economic parameters. (Task management, 2021). These financial boundaries will give measures to estimating the strength of the two ventures.

Net Present Value

The Net Present Value of a project is the amount of cash flow that matches or exceeds the amount of investment capital required to support it. It accounts for the time value of money on the basis that a dollar in the future is not worth the same as a dollar today (Nagi C. A et al., 2016)

$$\mathrm{NPV} = \sum_{t=1}^{n} \mathrm{R}/(1 + \mathrm{i})^\wedge \mathrm{t} \qquad (1)$$

Where

R_t = net cash inflow during time t

i= discount rate

t= no of time periods

A positive or higher NPV indicates that the projected earnings generated by a project exceed the anticipated costs. It is assumed that an investment with a positive NPV will be profitable while an investment with negative NPV will result in net loss. This concept is the basis for the whole Net present value rule which chooses only projects with positive NPV. (Investopedia, 2021)

Internal Rate of Return (IRR)

Internal rate of return is the discount rate that makes the net present value if all cash flows equal to zero. It is the annual rate that makes NPV equal to zero. (Investopedia, 2021).

IRR is the discount rate which will equal the present value of the future cash flows of an investment with the initial investment. It is one of the several parameters used for investment appraisal. (Nagi C.A. et al., 2016)

Profitability Index (PI)

The profitability index also referred to as profit investment ratio (PIR) is a financial tool that represent the relationship between the costs and benefits of a proposed project. (James Chen, 2021).

The acceptance criterion for accepting or rejecting the decision is that the PI should be greater than 1 for it to be accepted and when the PI is less than 1, the investment should be ignored. (Nagi C.A et al., 2016)

$$\mathrm{PI} = \frac{PV of future cashflows + initial\ investment}{initial investment} \qquad (2)$$

Definitions of Commonly Used Economic Terms

Cash flow is a measure of changes in a company's cash account over the course of an accounting period. The quantity of cash income minus the amount of cash payment is known as cash flow. The budget highlights for cash flow are as follows:

(i). Total Capital Expenditure

(ii). Sales Revenue

(iii). Capital Expenditure

(iv). Product Pricing

(v). Tax Rate

Capital Expenditure

The amount spent to acquire, upgrade and maintain a long-term asset such as property, building, plant, equipment or technology in order to improve the company's efficiency or capacity is referred to as Capital Expenditure (CAPEX). (Nagi, C.A., 2016)

The CAPEX for the LNG project is \$3.4Billion for a plant to process 500 million standard cubic feet of gas per day (MMSCF/D).

The CAPEX for the GTL project is \$3.7Billion to process 500 million standard cubic feet of gas per day. (MMSCF/D)

Operating Expenditure (OPEX)

An operating expense is an expense a business incurs through its normal business operations. The money a company spends on a daily basis in other to run a business is referred to as OPEX. (Nagi, C.A., 2016)

Al-saadon F.T 2015, suggested the annual operating cost for large project to be in the range of 5-7%. For the purpose of this work, the OPEX is 5% of CAPEX. The OPEX used in this research work includes the cost of materials and supplies, direct labor, utility cost, maintenance and feed gas cost.

Sales Revenue

The amount of money gained from the sale of goods and services is referred to as sales revenue. The income/revenue generated by a plant's product sales can be used to analyze the cash flow pattern for that plant. It is critical for a startup to have a great first impression. (Nagi C.A., 2016).

Total Sales Revenue= sales price per unit X No of units sold (3)

Taxation and Royalty

A tax rate is the percentage of income at which an individual or corporation is charged. In Nigeria, the corporate income tax rate is a tax paid by corporate bodies. According to the Federal Inland Revenue Service Nigeria, the corporate tax rate stands at 30% while company royalty rate is 5-7% for oil and gas sector. For this research work, a 30% income tax and 5% royalty rate were used for both projects.

Product Pricing

According to world oil prices, estimates show that the natural gas can be economically produced and delivered to the U.S or Asia. The average LNG delivered into Asia in 2021 was about $11.00/MMBTU to $12.10/MMBTU which is a far increase of $3.5/MMBTU to $5.00/MMBTU.

Shipping Cost

The cost of shipping for each gas project varies based on the type of gas project, the gas product and distance between the selling point and the delivery point, which is proportionate to the ship's operating cost.

The shipping cost for LNG used in this research work is $3.5/MMBTU and the shipping cost for GTL is $4/BBL.

Parameter Assumptions for LNG

Table-1 LNG Parameters

Parameters	**Values**
PLANT LIFE	25 YEARS
PLANT CONSTRUCTION PERIOD	3 YEARS
PLANT CAPACITY	7.67MMTPA
LNG PRODUCT PER ANNUM	7.5MMTPA
CUMMULATIVE PRODUCTION	100%
TAXATION	30%
ROYALTY	5%
QUANTITY OF FEED GAS	1 BSCF/D
FEED GAS COST	$0.5/MMBTU
DISCOUNT RATE	15%
LNG PRODUCT PRICE	$7.00/MMBTU
NUMBER OF TRIPS	12 PER ANNUM
LNG SHIPPING COST	$0.73/MMBTU
GENERAL INVESTMENT COST	$3.7BILLION
PLANT CONSTRUCTION CAPITAL SPENDING	25% FOR YR 1 35% FOR YR 2 40% FOR YR 3

PARAMETER ASSUMPTIONS FOR GTL

Table -2 GTL Parameters

PARAMETERS	VALUES
PLANT LIFE	25 YEARS
PLANT CONSTRUCTION PERIOD	3 YEARS
PLANT CAPACITY	100,000BBL/D
PLANT STREAM DAYS PRODUCTION PROFILE	330
CUMMULATIVE PRODUCTION	100%
COMPANY TAX RATE	30%
ROYALTY	5%
QUANTITY OF FEED GAS	1BSCF/D
FEED GAS COST	$0.5/MMBTU
DISCOUNT RATE	10%
CRUDE OIL PRICE	$0.72
GTL PRODUCT PRICE: DIESEL	$5.00/BBL

NAPHTHA KEROSENE	
GTL SHIPPING COST	$1.22/BBL
GENERAL INVESTMENT COST	$3.4 BILLION
PLANT CONSTRUCTION CAPITAL SPENDING	25% FOR YR 1 35% FOR YR 2 40% FOR YR3

RESULTS

The review on the profitability of the LNG and GTL project were carried out to determine which is more feasible to venture into. Both projects had the same gas feed of 1BCF of natural gas each.The plant life of the projects was 25 years respectively. The construction took 3 years and production started on the 4th year.The internal rate of return for the LNG and GTL technology were calculated to be 27% and 31% respectively at a discount rate of 10%.

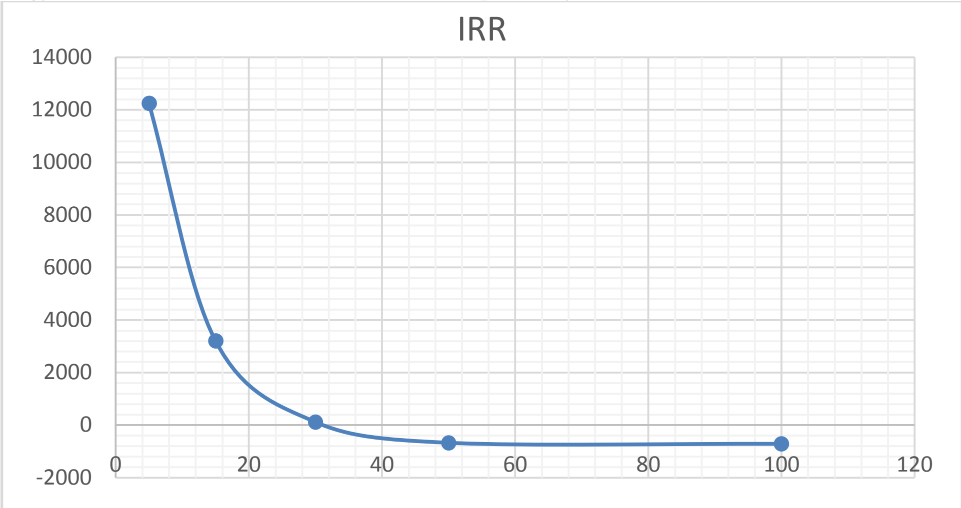

Fig. 1 Chart showing the IRR for GTL

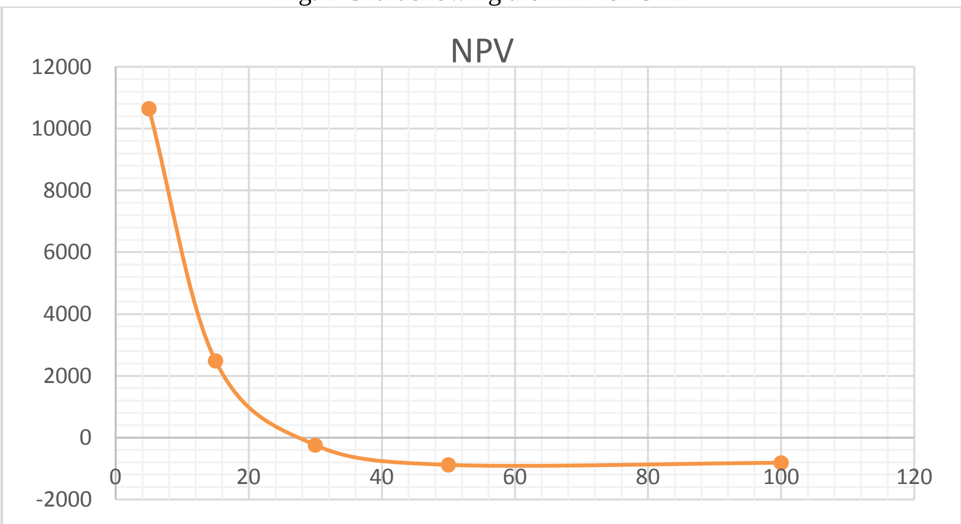

Fig. 2 Chart showing the IRR for LNG

Table-3 Obtained Results

Parameters	LNG	GTL
NPV@15%	$2,485,462,000	$3,202,891,554
IRR	27%	31%
PAYOUT	6.24YRS	5.056Yrs
PROFITABILITY INDEX	1.67	1.94
PROFIT/$	$15.35	$17.89

CONCLUSIONS

The aim of the study was to evaluate the LNG and GTL technology in order to determine which the most profitable way to monetize natural gas. An economic analysis was carried out using Microsoft Excel to develop an economic model which was used to evaluate the economic Parameters such as NPV, IRR, Payout Period, productivity index and Profit per dollar.Both the LNG and GTL projects are economically viable, according to the findings of this study.The discount rate of 15% was used to find the Net Present Values for both LNG and GTL, the NPV for LNG is $2,485,462,000while GTL is$3,202,891,554. The Internal Rate of Return (IRR) for both LNG and GTL are 27% and 31% respectively. The Payouts for GTL and LNG 5.056 years and 6.24 years respectively which means that GTL would have a quicker breakeven period.GTL had a higher profitability Index of 1.94 while LNG was 1.67, while the Profit Per dollar for GTL and LNG are $17.89 and $15.35 respectively. From the research carried out, it can be concluded that both LNG and GTL are economically viable for large scale production, but GTL is more economically viable than LNG because the results for GTL would be more favourable than LNG.

REFERENCES

[1]. Adams Hayes (2021) Investopedia.com

[2]. Adebakin. M.A, Raimi L. (2012). “National Security Challenges and Sustainable Economic Development, Evidence in Nigeria

[3]. Al-Saadoon, F.T. (2005). “Economics of GTL Plants”. SPE 94380. Paper presented at the 2005 SPE Hydrocarbon Economics and Evaluation Symposium in Dallas, Texas, 3-5 April 2005. Texas: Society of Petroleum Engineers. 8 p.

[4]. Antari A, Mokrani T. Gas to liquids technology—A new approach for marketing natural gas. 17th World Petroleum Congress, Rio De Janeiro, 2002. Block 3/Forum 18/Paper 12

[5]. Bakkerud P K. Update on synthesis gas production for GTL. Catalysis Today. 2005.106: 30-33

[6]. B. Jager, R.C. Kelfkens and A.P. Steynberg, “A Slurry Bed Reactor for Low Temperature Fischer-Tropsch”, Natural Gas Conversion II, Elsevier Science B.V. (1994)

[7]. Corporate Finance Institute CFI (2021)

[8]. Chen Z. The 17th World Petroleum Congress’ view on natural gas development and utilization. Petroleum Processing and Petrochemicals. 2003. 34(4):

[9]. CHEVRON. (2004). Chevron Texaco Awards Berlin, Germany, June 2006. 11 p. major contract for Nigerian gas-to-liquid project

[10]. Clarke, S. &Ghaemmghami, B. (2003). Engineering a Gas-to-Liquids Project: Taking GTL Forward. Engineering Solutions. Offshore World Oct-Dec 2003. p.55-62

[11]. Dominique Adolfo *, Carlo Carcasci , Claudio Falchetti , Pietro Lubello. (2018). Thermo economic analysis of natural gas liquefaction plant. 73rd Conference of the Italian Thermal Machines Engineering Association ATI.

[12]. Dong Lichun, Wei Shun’an, Tan Shiyu* and Zhang Hongjing(2008). GTL or LNG: Which is the best way to monetize “stranded” natural gas?. School of Chemistry and Chemical Engineering, Chongqing University, Chongqing 400044, China

[13]. Ekwueme Stanley Toochukwu, IzuwaNkemakolam Chinedu, Obibuike Ubanozie Julian, Kerunwa Anthony, Ohia NnaemekaPrincewill, Odo Jude Emeka, Obah Boniface. Analysis of the Economics of Gas-to-Liquids (GTL) Plants. Petroleum Science and Engineering. Vol. 3, No. 2, 2019, pp. 85-93. doi: 10.11648/j.pse.20190302.17

[14]. EL Shamy, A.A; ** Zayed, AM (2004). Gas to Liquids Technology: A Futuristic View. Egyptian General Petroleum Corporation, Opr. Development Depart., P.O No. 11742.

[15]. Ezeh J.C and G.N Ezeh, Fundamentals of Engineering Economy. M.C Computer, Owerri. pp235- 240

[16]. Fleisch T H, Sills R A and Briscoe M D. Emergence of the gas-to-liquids industry: A review of global GTL developments. Journal of Natural Gas Chemistry. 2002. 11:1-14

[17]. Gaffney, Cline & Associates (2001). Review of a Gas to Liquid Industry for Australia. Report prepared for the Department of Industry, Science

[18]. Han D, Pan J and Jiang J. Progress of making synthetic oil from natural gas and its technico-economic analysis, Chemical Technology Market. 2006. 29(6): 27-41

[19]. Heng H C and Idrus S. The future of gas to liquids as a gas monetisation option. Journal of Natural Gas Chemistry. 2004. 13: 63-70

[20]. Hu J, Zhu B and Wang J. Natural gas chemical technology and application. Beijing: Chemical Industry Press, 2006

[21]. H.R. Batchhelder, “Synthetic Fuels” in Advances in Petroleum Chemistry and Refining, edited by J.J. McKetta, vol.5 chp.1 – Interscience Publishers, John Wiley & Sons (1962)

[22]. John Dodaro(2015). Fischer-Tropsch Process. Submitted as coursework for PH240, Stanford University

[23]. Kashav T S and Basu S. Gas-to-liquid technologies: India’s perspective. Fuel Processing Technology, 2007. 88: 493-500

[24]. Keith, P., "Gasoline from natural gas ", Oil and Gas Journal, June 15, 1946, pp 104-111

[25]. Lazson, N. D., &Ikiensikimama, S. S. (2013). Economic Analysis of Liquefied Natural Gas Floating Production Storage and Offloading Plant (LNG FPSO) Using Probabilistic Approach. Advances in Petroleum Exploration and Development, 5(1), 42-50. Available from: URL: http://www.cscanada.net/ index.php/aped/article/view/j.aped.1925543820130501.1007
[26]. L.P. Dancuart, A.P. Steynberg(2007). Fischer-Tropsch based GTL Technology: a New Process?. Sasol Technology Research & Development, PO Box 1, Sasolburg 1947, South Africa.
[27]. Mark Crocker, ed., Thermochemical Conversion of Biomass to Fuels and Chemicals, (2010) Royal Society of Chemistry.
[28]. Nagi, C. Amy, Prof. DuluAppah, Prof. Godwin Chukwu(2016). Comparative Economic Analysis of Gas to Liquid and Liquefied Natural Gas Technologies. International Journal of Scientific & Engineering Research, Volume 7, Issue 6
[29]. Ovunda Green, OybimpeAdeogun, Omowunmi IledaraeHarnessing Upstream GasResources for Power Generation inNigeria: Issues, Strategies &Economics Paper presented at the SPE Nigeria Annual InternationalConference and Exhibition, Lagos, Nigeria, July 2017.Paper Number: SPE-189116-MSPublished:July 31 2017
[30]. Patel B. Gas Monetisation: A technico-economic comparison of gasto liquids and LNG. 7th World Congress of Chemical Engineering. Glasgow. 2005
[31]. Pyrdol J and Baron B. What is more profitable to build: GTL production facilities or LNG liquefaction plants? Presented at World Natural Gas Market and Trade (EMF-23), Berlin Meeting. June 2006.
[32]. Qian B and Zhu J. Status and development trend of natural gas compound. Natural Gas and Oil. 2007. 25(4): 23-28
[33]. R.C. Alden, "The Conversion of Natural Gas to Liquid Fuels", California Oil World, Oct.1946, No. 2 pp. 5-16
[34]. R.C. Alden, "Conversion of Natural Gas to Liquid Fuels", Oil Gas J, 09.Nov.46 pp.79- 85
[35]. Sambo, A.S (2009) "Strategic developments in renewable energy in Nigeria" IJSER © 2016 http://www.ijser.org International Journal of Scientific & Engineering Research, Volume 7, Issue 6, June-2016 273 ISSN 2229-5518
[36]. Sie S T. Process development and scale up: IV case history of the development of a Fischer-Tropsch synthesis process. Reviews in Chemical Engineering. 1998. 14: 109-157
[37]. Smith R M. New developments in gas to liquids technology. Presented at CERI 2004 Petrochemical Conference. Delta Lodge at Kananaskis, Alberta, Canada
[38]. Ugochinyere. A.C (2013). "Natural Gas Utilization in Nigeria: Economic
[39]. Wang Y. The opportunity, risk, and challenge in LNG industry. International Petroleum Economics. 2005. 13(6): 39-43
[40]. Yang G and Wang X. Liquefaction technology of natural gas. Natural Gas and Oil. 2005. 23(2): 10-16
[41]. Yao G. Development of GTL and related technico-economic analysis, International Petroleum Economics. 2005. 13(5): 23-29
[42]. Y.Q. Zhang and B.H. Davis, "Indirect Coal Liquefaction – Where do we stand?" paper 26-6 presented at the Fifteenth Annual International Pittsburgh Coal Conference, September 1998, University of Pittsburgh, Proceedings, pp.1739-1803 (1998)
[43]. Zeng H.Trends of development in the global LNG market. International Petroleum Economics, 2006. 14(6): 53-56.
[44]. Zhang K and Pang M. The present and future of the world's LNG industry. International Petroleum Economics. 2005. 13(10): 55-59

APPENDIXES

Table-4 DISCOUNTED CASH FLOW FOR GTL

YEAR	CAPEX	OPEX	REVENUE	NCF	CUMM NCF	PV @ 5%	PV @ 15%	PV @ 30	PV @ 50	PV @ 100%
1	850	0	0	-850.00	-850	-809.52	-739.13	-653.85	-566.67	-425.00
2	1190	0	0	-1,190.00	-2040	-1079.37	-899.81	-704.14	-528.89	-297.50
3	1360	0	0	-1,360.00	-3400	-1174.82	-894.22	-619.03	-402.96	-170.00
4	0	170	1552	1,382.00	-2018	1136.97	790.16	483.88	272.99	86.38
5	0	170	1552	1,382.00	-636	1082.83	687.10	372.21	181.99	43.19
6	0	170	1552	1,382.00	746	1031.27	597.48	286.32	121.33	21.59
7	0	170	1552	1,382.00	2128	982.16	519.54	220.24	80.89	10.80
8	0	170	1552	1,382.00	3510	935.39	451.78	169.42	53.92	5.40
9	0	170	1552	1,382.00	4892	890.85	392.85	130.32	35.95	2.70
10	0	170	1552	1,382.00	6274	848.43	341.61	100.25	23.97	1.35
11	0	170	1552	1,382.00	7656	808.03	297.05	77.11	15.98	0.67
12	0	170	1552	1,382.00	9038	769.55	258.31	59.32	10.65	0.34
13	0	170	1552	1,382.00	10420	732.90	224.61	45.63	7.10	0.17
14	0	170	1552	1,382.00	11802	698.00	195.32	35.10	4.73	0.08
15	0	170	1552	1,382.00	13184	664.77	169.84	27.00	3.16	0.04
16	0	170	1552	1,382.00	14566	633.11	147.69	20.77	2.10	0.02
17	0	170	1552	1,382.00	15948	602.96	128.42	15.98	1.40	0.01
18	0	170	1552	1,382.00	17330	574.25	111.67	12.29	0.94	0.01
19	0	170	1552	1,382.00	18712	546.90	97.11	9.45	0.62	0.00
20	0	170	1552	1,382.00	20094	520.86	84.44	7.27	0.42	0.00
21	0	170	1552	1,382.00	21476	496.06	73.43	5.59	0.28	0.00
22	0	170	1552	1,382.00	22858	472.44	63.85	4.30	0.18	0.00
23	0	170	1552	1,382.00	24240	449.94	55.52	3.31	0.12	0.00
24	0	170	1552	1,382.00	25622	428.51	48.28	2.55	0.08	0.00
						12242.49	3202.89	111.30	-679.72	-719.75

Table -4 NET Present Values for GTL at Different Discount Rates

Interest Rates	NPV
5	12242.49
15	3202.892
30	111.2977
50	-679.72
100	-719.75

Table -6 Discounted Cash Flow for LNG

YEAR	CAPEX	OPEX	REVENUE	NCF	CUMM NCF	PV @ 5%	PV @ 15%	PV @ 30	PV @ 50	PV @ 100%
1.00	925.00	0.00	0.00	-925.00	-4,893.17	-880.95	-804.35	-711.54	-616.67	-462.50
2.00	1,295.00	0.00	0.00	-1,295.00	-11,630.87	-1,174.60	-979.21	-766.27	-575.56	-323.75
3.00	1,480.00	0.00	0.00	-1,480.00	-19,648.90	-1,278.48	-973.12	-673.65	-438.52	-185.00
4.00	0.00	185.00	1,448.00	1,263.00	-14,614.53	1,039.07	722.12	442.21	249.48	78.94
5.00	0.00	185.00	1,448.00	1,263.00	-8,600.20	989.59	627.93	340.16	166.32	39.47
6.00	0.00	185.00	1,448.00	1,263.00	-1,512.22	942.47	546.03	261.66	110.88	19.73
7.00	0.00	185.00	1,448.00	1,263.00	6,714.41	897.59	474.81	201.28	73.92	9.87
8.00	0.00	185.00	1,448.00	1,263.00	16,126.33	854.85	412.88	154.83	49.28	4.93
9.00	0.00	185.00	1,448.00	1,263.00	26,758.00	814.14	359.02	119.10	32.85	2.47
10.00	0.00	185.00	1,448.00	1,263.00	38,635.60	775.37	312.19	91.62	21.90	1.23
11.00	0.00	185.00	1,448.00	1,263.00	51,779.44	738.45	271.47	70.47	14.60	0.62
12.00	0.00	185.00	1,448.00	1,263.00	66,205.60	703.29	236.06	54.21	9.73	0.31
13.00	0.00	185.00	1,448.00	1,263.00	81,927.02	669.80	205.27	41.70	6.49	0.15
14.00	0.00	185.00	1,448.00	1,263.00	98,954.26	637.90	178.50	32.08	4.33	0.08
15.00	0.00	185.00	1,448.00	1,263.00	117,296.06	607.52	155.22	24.67	2.88	0.04

16.00	0.00	185.00	1,448.00	1,263.00	136,959.75	578.59	134.97	18.98	1.92	0.02
17.00	0.00	185.00	1,448.00	1,263.00	157,951.53	551.04	117.37	14.60	1.28	0.01
18.00	0.00	185.00	1,448.00	1,263.00	180,276.68	524.80	102.06	11.23	0.85	0.00
19.00	0.00	185.00	1,448.00	1,263.00	203,939.77	499.81	88.75	8.64	0.57	0.00
20.00	0.00	185.00	1,448.00	1,263.00	228,944.76	476.01	77.17	6.65	0.38	0.00
21.00	0.00	185.00	1,448.00	1,263.00	255,295.12	453.34	67.10	5.11	0.25	0.00
22.00	0.00	185.00	1,448.00	1,263.00	282,993.89	431.76	58.35	3.93	0.17	0.00
23.00	0.00	185.00	1,448.00	1,263.00	312,043.78	411.20	50.74	3.02	0.11	0.00
24.00	0.00	185.00	1,448.00	1,263.00	342,447.21	391.62	44.12	2.33	0.08	0.00
						10,654.19	2,485.46	-242.96	-882.45	-813.38

Table -7 NET Present Values for LNG at Different Discount Rates

Interest Rates	**NPV**
5	10654.19
15	2485.462
30	-242.963
50	-882.446
100	-813.375