

Financing Prospects in the Gas Industry: A Nigerian Perspective

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Abstract

The objective of this paper is to investigate the financing prospects in gas industry. This paper classified gas financing into four (4) areas such as (a) associated gas (b) dry gas (c) condensated gas and (d) natural liquid gas. There are fourteen (14) job classifications in the gas industry which corporate bodies or individuals can be engaged. Variables are classified as y = gas production, x_i = gas utilization and x_j = gas flared. The values of these variables were obtained from the 2004 statistical bulletin of central Bank of Nigeria (CBN) from 1983-2017. The SPSS/PC was used to subject these variables by the step wise regression analysis. The result shows that 29.10% of gas produced was utilized while 70.90% were flared as financial waste. We tested hypotheses / by the use of coefficient of variation, we concluded that gas utilization has the highest risk investment potential. Hypothesis 2 accepted H_{a2} that means $v > \text{Mean } x_i$. While H_A was accepted because skewness of $x_i > .v$. We recommended a comprehensive investment policy in the gas industry.

Keywords: financing prospects, gas industry, Nigerian perspective

1. Introduction

In Nigeria, the gas industry is one of the most prospective financing ventures. The industry plays a crucial role to the sustenance of the nation's need. The gas industry still remains one of the earning powers of the Nigeria economy along side with oil. Revenue generated from gas production is the mainstay of the Nigerian economy. The industry has been widely described as the nation's life wire of living. According to Akpan (2016), the Nigerian economy has become tertiarized and has not been structurally transformed.

Gas is abundant in Nigeria and it has potentials which if it is developed, should improve our energy needs. Gas can be recognized as a close substitute to coal and it complements crude oil in revenue generation. It is a raw material for fertilizer production, petrochemical industries and environmentally conducive because it is cleaner than crude oil and coal.

Nigeria gas reserves have been producing high estimated values from gas industry. In Obioma and Ogelle (2016), it was presented that gas industry in Nigeria has been widely described as the nation's life wire literature whose estimated at \$8 billion spent annually on servicing the industry in operations of fabrication, engineering and construction while \$15 billion within the next 5 years. We should note that Nigeria has different classes of gas to finance. They are:

- (a) Associated gas
- (b) Dry gas
- (c) Condensate gas
- (d) Natural liquid gas

Each class of the above gas is commercially viable in terms of quantity to be financed produced and sold. Bureau of Public Enterprises (BPE) (2011) stated that Federal Government of Nigeria targets to earn \$12 billion income from gas. In line with these projections, Obasanjo (2006) Ex-president of Nigeria appealed to the members of the National Assembly to hasten legislative bills on the exploitation of natural gas resources.

He told the members of House of Representative Committee on gas that he is committed to the establishment of a

viable framework for the development of Nigeria's abundant National gas reserves for export in return for foreign exchange. Gas, when financed can be sold in the domestic market to industries such as cement, brewery, glass and aluminum as a complement to the use of diesel and fuel oil to operate private generators. The liquid natural gas is in high demand in international market, therefore there is need for gas export financing which can increase the banks revenue base companies are showing more interest in gas because of its lower prices and higher efficiency when compare with sources of energy.

In the production of fertilizer, gas is ammonia based because natural gas is used for production of ammonia used in fertilizer production. There are other components of gas that can be financed by banks. They are methaneprepyle, butimanc, condensate and natural gasoline. Gas is ideal for feed stock which are used in the petrochemical industry for the production of polythulme, ethylene which are used to produce final products such as plastics and resins.

2. Job Classifications in Gas Processing

Engineering, Data processing, Survey Field services, pipeline inspection and coating Electrical Engineering Instruments; Construction, Civil Engineering; Painting; Agents and consultants; Environmental Services; Technical partnership; Field Development Contractor Financing; Gas Utilization; Industrial distribution of Natural Gas; National gas fire equipment; Domestic Natural Gas sales.

3. Literature Review

According to Abiodun (2017), prospecting for oil and gas in the upstream sector began in 1908 by a German company, the Nigerian Bitumen Corporation (NBC), who explored for oil in the South Western area of Nigeria. The company was urged on by the seepages of oil in the so-called Tar sand deposits around Agbadu present day Ondo State, NNPC (2014). Researchers have viewed financing opportunities with different perspectives. Some viewed it in terms of cost production etc. Central Bank of Nigeria (2017) statistics shows that the total gas produce in 2017 was 1,053,350.4, total gas exported was 285,445.4 and total gas consumed was 767,906. However, gas sold to industries increased from 53,379.0 cubic meter in 2016 to 69,727.0 million cubic meters in 2017.

It has been stated that in 2015 alone Nigeria lost about N2.5 billion through gas flaring. However, the Federal Government took measures to reduce gas flaring in the country. Gas flaring has a permanent impact on the earth. It destroys food crops and renders farm land barren. Some experts or scientists are of the view that the incomplete combustion of the flares has resulted in acid rain that can damage crops and drinking water. There are some gas projects in Nigeria which signifies the importance of gas in our development. The LNG project reduced gas flaring from 101,976.0 cubic meters in 2015 to about 69,727.0 cubic meters in 2017. The West African Gas Project, when completed will reduce much of gas being flared in Escravos Gas Fields belonging to Shell and Chevron. It was stated in Abiodun (2017) that the service sector in Nigeria contributes about 53% to GDP in 2014 about 55% to GDP in 2015. The service sectors now contribute more to GDP than any other sectors of the economy. This is not to downplay the relevance and earning powers of the oil and gas sector in spite of resource curse issues, price volatility, the dutch disease syndrome and corruption. All these problems are fully woven into the fabric of the Nigerian economy. Oil and gas sector still remain the foundation of the Nigerian economy

4. Current Challenges in Gas Industry Flaring of Gas

Orubu (2013) stated that flaring of gas is a challenge to investors and financial community, is a fact that financed by financial and non-financial institutions as stated from (a-c) below.

- (a) Banks can form a consortium to invest and convert the flared gas into income yielding.
- (b) The oil and gas producing companies can form consortium to convert the flared gas into revenue generation and profit oriented.
- (c) There may be a joint venture partnership between Bankers and Oil Companies in which they pool their financial resources together to convert the flared into revenue.

They have to invest into the technology to tap this investment/financing opportunities.

Gas Financing Options

PNC (2014) enumerate various stages gas resource can be financed.

- (a) Gas production
- (b) Gas gathering
- (c) Gas processing

- (d) Gas marketing
- (e) Gas distribution
- (f) Gas utilization

4.1 Gas Production

It was an exclusive area for foreign multinational companies because of its capital intensiveness. The technically of gas production is beyond the scope of this paper. Federal Government made laws against flaring of gas after production which had not been complied to but Banks can finance the production of gas by re-injecting the gas with nuisance value to revenue generation.

4.2 Gas Gathering

Gas is gathered when their production is gathered for a purpose. The amount of gas gathered will be a function of the amount flared. Gas gathered are the proportion of produced gas which is re-injected in the ground. The amount used as fuel on site by oil prospectors as gas is sold by them, but it 70% of associated gas is Hared, the 30% may be gathered and can possibly be used in future. This is a waste of resource where Banks and private entrepreneurs can finance the gas gathering aspect as revenue yielding.

4.3 Gas Processing

When gas is gathered, it is processed into usable form which can be classified liquefied natural gas, industrial gas and liquefied petroleum gas or cooking gas. It is this processing area that has potential for financing. Oil companies feel that inadequate capacity was the reason for flaring of gas.

4.4 Gas Marketing

When gas is gathering proceed and produced. It must get to ultimate consumer. The escrovos Gas Project is aimed at gathering and processing all gas now being flared in the NNPC/Chevron off shore Okana and fields in Escravos area. It was planned to be executed between 1993-2006.

Cooking gas or liquefied petroleum gas (LPG) is processed by four (4) refineries in Nigeria. Their installed capacities should achieve self sufficiency in cooking gas, but the production facilities were not re-habi l itate, so they produce below capacity. There were attempts in 1960s by Shell-BP to market the supply of gas to industries in Aba,

Electricity Corporation of Nigeria (ECN) plant in Alarm, there was Sapele Gas Supply scheme Commissioned by NNPC in 1978. But on the domestic and industrial levels they had not been conceited effort of marketing of gas to consumers it is a challenge to Bankers because they can finance the marketing of gas to domestic and industrial users.

4.5 Gas Distribution

Gas is a volatile fuel, which is explosive, poisonous and is therefore hard to store and transport. The difficulties in storage made it difficult to reach limited users. Part of the distribution problems had been solved because companies are laying leak-proof pipelines have now made it possible to safely pipe gas to distance markets. Cooking gas is now distributed by piping along Major pipelines to the deposits of both major and independent marketers for lifting to their retail outlets. The availability of pipeline network is limited and can only to reached by few marketers in certain parts of the country. With these problems Banks can finance the pipelines and other related venture to ensure gas distribution in Nigeria.

4.6 Gas Utilization

Gas utilization in Nigeria has been very low because it is considered elitist. Since 1960s must of gas utilization had been limited mainly to power generation and industrial utilization while domestic consumption is insignificant because of competition of fire wood.

Federal government made effort by establishing. Natural Gas sale and Purchase Agreement that was signed between NNPC, Nigerian Gas Company (NGC) and Shell Petroleum Development Company (SPDC) in 1991. the agreement requires SPDC to supply gas to NGC for the next twenty (20) years. It was a major boost to gas utilization, but the level of gas utilization has been impaired because of product scarcity and inadequate distribution infrastructure. Presently, NGC a subsidiary of NNPC and Shell Nigeria Gas (SNG) a subsidiary of Shell are the two main companies to develop an efficient gas industry to serve industrial and domestic gas consumer. Nigeria is a big country with a lot of population and with the deregulation of the economy Bankers can set a subsidiary or finance some companies in gas utilization.

5. Challenges in Gas Industry

There are some challenges in the Gas Industry in Nigeria. These challenges can be classified as follows:

- i. Federal Government Policy: Government should give tax exemption in full for certain deductions to companies involved in Gas or allied product financing. It should be an encouragement to companies to invest in gas production processing, marketing, distribution and utilization.
- ii. Environment Protection should be encouraged because gas flaring is injurious to individuals and the environment. Banks can finance environmental management to eliminate the effect of population.
- iii. There are infrastructural deficiencies in gas processing and distribution. So the piping, storage and distribution of gas can be financed.

Poor State of refineries in the country is a big hindrance to gas production.

The major shortage of cooking gas is caused by the neglect of the turnaround maintenance (TAM) programme in the refineries. They have operated below capacity. This had led to massive importation of petrol without comparable importation of gas financing some aspects of the refinery to be functional can lead to adequate production of industrial and domestic gas.

6. Empirical Review

Obioma and Onyi-Ogelle (2016) studied the prospect and challenges of the national participation in the Nigeria oil and gas industry. The study considered the legal framework and various policies for the realization of the Nigerian content in the development of the industry and also the prospects and challenges attendant to such initiatives. The study revealed that significant progress has been recorded in the development of local content in the industry. It was recommended that greater majority of Nigerians should be actively considered in the implementation of the policy on national participation in the oil and gas industry for this will ensure the age long control of the sector.

Abiodun (2017) empirically examined oil and gas sector law reform and its implications for economic development in Nigeria using the political economy method to x-ray. The study showed that a consensus has not been reached on the proposed petroleum industry bill as there are counterpoints and point for the passage of the bill into law. It was recommended that policies will be geared towards seeing the bill through and that the Nigerian Monitoring Board and Content Development be strengthened to carry out her oversight duties.

Ocheni (2015) examined oil and gas industry and the growth of small and medium enterprises in Nigeria using a sample size of 567 workers in Elf Petroleum (Total) and Mobil (ExxonMobil) oil companies. The study adopted descriptive statistics using mean, mean set and standard deviations and the result showed that inadequate financing, poaching, tedious pre-qualification and tender processes of staff by the bigger oil companies are constraints on the efficacy of Local Content Policy in Nigeria. It was also revealed that the Local Content Policy influences largely on the size of small and medium oil industries in Nigeria. Thus, it was recommended that there should be an enactment of the Local Content Act. Also, there should be reduction of registration fees with regulatory authorities such as DPR and NAPIMS.

7. Methodology

The following three sub-sections describe the methodology adopted in this research. We adopted non-experimental research method because the variables are known to the researcher. We used the Central Bank of Nigeria (CBN) statistical bulletin from 1983-2017 to determine gas production, gas consumed and the cubic metres flared. The approach enables us to know the level of waste in gas production. These figures were inputs to SPSS computer process to give the expected value of y-gas production, X1-gas utilized and x2 gas flared. This study is in consonant with the works of Ocheni (2015), Abiodun (2017) and Obioma and Onyi-Ogelle (2016) who studied national participation in the oil and gas sector and its effects on the Nigerian economic development.

7.1 Model Specification

The variables were specified as follows:

$$Y = F(X1, X2) \quad (1)$$

$$GASP = F(GASU, GASF) \quad (2)$$

$$GASP = a0 + a1GASU + a2GASF + Ut \quad (3)$$

Where:

GASP = Gas production

GASU = Gas utilization

GASF = Gas flared

a0 - a2 = Parameters

U_t = Error term

7.2 Statistical Tool

The study made use of Stepwise Regression Analysis as estimation technique.

8. Results and Discussion

We obtained the cubic meters of gas produced, gas utilized and gas flared from 1983-2017. The figures are secondary data obtained from statistical bulletin produced by the Central Bank of Nigeria (CBN) 2017.

The variables are related therefore we tested the possible multicollinearity of the explanatory variables prior to running the regression analysis. However, the multicollinearity causes the partial regression coefficients to become statistically unreliable.

A stepwise regression is used in favour of the traditional multiple regression analysis because of the large number of cubic metres of gas as the variables. In stepwise regression, independent variables enter the regression analysis one at a time. The first variable (gas) production) to enter is the one explaining the most variation in-gas utilized and x2-gas flared. At each step, the variable entered explains the greatest amount of remainder variation in X1 and x2.

Table 1. Summary results of the stepwise regression of the variables

Value	Variables Labels		
	Y	X1	x2
Mean	29248	7283	21940
Mode	3298	30.58	7957
SE skew	.40	.40	.40
Max	101976	45 156	75773
Std. error (SE)	3174	1636	1848
Std. Dev.	18775	9680	10933
Sum	1053350	306061	747289
Median	24551	4794	21820
Skewness .	2.10	2.47	4.0
Min	3298	30.58	7957
Variance	352514506	93715773	119521331
	$N = 35$	$N = 35$	$N = 35$

Source: SPSS/PC (2018)

Table 1 shows the result of the stepwise regression. The total cubic meter gas produced is 1053350. 4 out of it 306061 (29%) utilized and 747289 (70.90%). Hared as a waste. The question investors should answer is “what happens to the 70.90% of gas Hared? It should be converted to revenue yielding venture.

When we investigated the level of riskiness. We found that the y coefficient of variation is 64% for X1 and x2 is 50%. Therefore gas utilization has the highest risk potential and gas Haring has lowest risk of investment.

9. Hypotheses

We examined the relationship of y-gas production, X1-gas utilization and x2-gas Hared in the country from 1983-2017 as follows:

HO1: Financing Gas production is not most risky investment among the variable

HO2: The mean of y = equivalent to mean of X1

Hoy the skewness of x2 is < X1.

Test of Hypotheses

We had to test the above hypotheses stated in null form. The first hypothesis investigates the level of uncertainty or riskiness of y variable in the research. The coefficient of variation which is $3/\text{mean}$ is used to test the above assumption. It means a relative measure of risk or uncertainty among variables. Based on the model, coefficient (cv) of y =64%, X1 = 1.33% and X2 = 50%. Based on the theory of cv, X1 (gas utilization) is 1.33% which is the highest coefficient therefore reject Hoi and accept Ho2 which states that gas production is not the most risky area of

investment. Our second hypothesis as in 5.0. The mean of $y = 29249$ and the mean of $X = 7283$, therefore we accept H_A ; that the mean of y is $>$ the mean of X_1 . H_{O1} : Our third hypothesis takes a look at the skewness of x_2 as against X_1 skewed 2.47. Therefore we accept H_{A2} , that x_2 skewness is $>$ x , which shows that high volume of gas were flared.

10. Conclusion

The Nigerian gas can be classified into gas, dry gas, condensate gas and natural liquid gas. Each class is commercially variable if they are financed up to high quality. The important of the industry made Federal Government to send bill to the Federal legislators to improve gas production and exploitation.

We also identify the classifications in the gas industry where investors can be explore for profitable purposes. It ranges from engineering production, gas utilization to industrial gas distribution. The study again shows that from 1970-2004, 1053350 million cubic metres of gas were produced, which represents y variable, the gas utilized (306061) represents the X_1 variable and gas flared represents the x_2 variable (747289).

The gas output declined in the first half of 2005 because of the crisis in the oil and gas production in Niger Delta region of Nigeria. In the literature review, Nigeria's Central Bank (CBN) stated in 2005 that the total gas produced, 62.2% were utilized while 37.8% were flared. This flared gas is economic waste which needs some investors to pull their resources together for profit venture. The gas is a challenge to the financial community, because of humane the opportunities in the gas industry. Some have suggested segmental financing to achieve optimal utilization of the gas produced. The research method employed is the non-experimental design because the variables are known. The figures were derived from the statistical bulletin which classified gas into production, utilized gas and flared gas.

11. Recommendations

- i. There should be a development and implementation of coherent national gas policy.
- ii. There should be an acceptable percentage of the exemption for financing a segment of gas gathering processing, production, marketing, distribution and utilization until the investment is re-coupled. The capital allowance may not be enough for such capital intensive investment; therefore additional investment incentives are required.

Multinational companies are interested in Nigerian crude oil and gas in which they have invested huge amount of money to exploit the natural energy products. There are various segments of financing options such as upstream which embraces exploration services, drilling services and production services. The downstream has petroleum refinery, petrochemical manufacturing and gas development. Banks can participate to finance any stage in the oil sector.

The challenges can be in the area of security of the crude oil and gas facilities. The rehabilitation, expansion and financing of oil facilities prospects in the gas industry can be in associated gas, dry gas condensate gas natural liquid gas. Each class has high potential for investment. The challenges in the gas industry are associated with Federal Government Policy on investment and financing of gas products, environmental protection and infrastructural efficiencies.

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