



in association with



NIGERIA EXTRACTIVE INDUSTRIES TRANSPARENCY INITIATIVE

PROCESS AUDIT 1999-2004

THE PROCESS OF MARKETING GAS

Presented to
The National Stakeholder Working Group

by

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1 EXECUTIVE SUMMARY

The gas market in Nigeria is in a state of flux, with the drive to reduce gas flaring, increasingly companies are looking to find a market for their gas, either through Liquefied Natural Gas (LNG) production and ultimately export of gas from Nigeria to international gas markets, or to consumers within Nigeria itself.

The Nigerian gas market is a growing, with large quantities of gas needing to find a market either in Nigeria or elsewhere in the world's LNG markets. The availability of gas combined with a growing need for gas, particularly from power generators and other process users, means that the Nigerian gas market should be experiencing and continue significant growth over the next few years. The current culture of long-term contracts has meant that in the main good processes, approvals and audit trails are in place.

Despite this positive outlook there are a number of major issues that will limit the effective development of the Nigerian gas market as follows:

- The non-payment of gas bills by Parastatals such as NEPA (PHCN). NGC stated that around 10,000,000,000 Naira is currently owed by non-paying customers; NEPA (PHCN) represents more than 70% of this debt.
- The use of subsidised or non-market pricing of gas sends the wrong economic signals to the gas market (or no economic signals at all). The price of gas to NEPA (PHCN) will undermine the development of new gas fired power generation in Nigeria.
- Some industry entities would like more radical changes to the Nigerian market, involving the formation of an independent regulator, the privatisation and possible restructuring of NGC into transportation and trading companies. It is important to note however that this type of market restructuring took place in North America and the EU with mature markets where the infrastructure was fully in place and paid for. This is not the case in Nigeria, therefore a cautious approach is suggested, where the gas industry should be allowed to mature before full gas-to-gas competition is introduced.

Our findings regarding gas sales processes were:

- Gas was sold via long term gas contracts over 15 to 25 years by the producers both to NGC and other direct users, and by NGC itself to other large users. This reflects best practice.
- The development of a gas market based on economic criteria such as costs and market signals will be constrained by the fact that the current pricing structure in Nigeria bears no relation to the costs incurred in producing and transporting the gas.

In the light of these conclusions a number of recommendations were made as follows:

- The non-payment problem will need to be resolved even if it takes a number of years to do so.
- The current pricing structure of charging parastatals low, uneconomic prices, which are effectively a hidden subsidy, need to be removed and proper economic charges made. If industry subsidies are still needed these should be clearly known and seen by all.
- The Nigerian gas industry needs to understand its costs, both in terms of production and transportation.

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- The absence of a Gas Law together with associated regulation does create problems for the Nigerian gas industry and needs to be resolved.
- Despite counselling caution earlier there is a clear need for some restructuring of the Nigerian gas industry, particularly the complete separation of NGC from NNPC and the establishing of an independent gas regulator.

2 INTRODUCTION

Producers mainly sell their gas via long term contracts to NGC (the national gas company in Nigeria), although they do sell some gas directly to large process users. Where direct sales are used, the gas seller needs to purchase gas transportation services from NGC. Similarly NGC also tends to sell its gas via long term contracts to large process users such as NAFCON and the electricity generator NEPA, now known as the PHCN. NGC also sells gas to reseller distribution companies such as Shell Natural Gas and GasLink who sell the gas to smaller customers further downstream.

We have been asked to review gas markets and the process of gas marketing in Nigeria. The purpose of this report is to identify any sub optimal processes in the way in which gas is sold in Nigeria that lead to financial disbenefits to the Government of Nigeria. The general approach as described in the terms of reference is as follows:

- To review the processes in place and present a report explaining these processes and proposing improvements to align with best international practice and quantify the potential benefit from implementing them.
- As a result of this work this module of the NEITI audit shall make some proposals to the Nigerian Government in order for it to optimise its revenue from gas sales.
- Given that there are no market gas sales between unconnected parties, economic issues may currently be more relevant than techniques of 'marketing'.
- Interaction with NEPA (and restructured NEPA, now called PHCN) will be briefly commented upon, along with possible options for methodologies to set transfer prices of gas to NEPA.

More specifically this report shall provide an overview of current gas marketing policies and practices in Nigeria, covering the following areas:

- An overview of the methodology involved in preparing this paper.
- A brief background discussion on the structure of the gas market in Nigeria.
- A review of how the upstream markets gas
- A review of how the downstream markets gas
- A review of the available FGN gas sales data for the period 1999 to 2004
- Conclusions and recommendations

3 METHODOLOGY

The focus of the review is on gas marketing, between the upstream producers, NGC, large process users such as NLNG, NAFCON and resellers such as Shell Natural Gas and Gaslink. This study does not include the marketing further downstream into domestic and retail marketing to smaller users of gas.

The methodology used to carry out this task has been a combination of the following:

- Information gathered from the industry entities using answers provided in a questionnaire and spreadsheet.
- Information gathered from interviews with a number of relevant entities on the issue of gas metering
- Information gathered from publicly available sources relating to gas marketing in Nigeria.

3.1 Data collection – formal issue of data collection templates

Two types of questionnaires were drafted and sent out to producers, NGC, NNPC-NAPMIS, NNPC-COMD, and other market participants as follows;

- **The Gas Sales Questionnaire** – The objective of this questionnaire is to gather empirical data on gas marketing and metering policies, in place both from a procedural and financial perspective. In particular these questionnaires focussed on the following areas:
 - The system of authorities, procedures and audits in place which govern the choice of customers and commercial terms for the sales of gas.
 - Their methods of accounting for re-injection etc.
 - Decision-making process regarding flaring / liquefaction and calculations that were done to optimise the revenue to FGN.
 - Consideration of available technical alternatives.
- **The Gas Sales Data Questionnaire** – The objective of this questionnaire is to facilitate the gathering of data relating to downstream gas sales.

4 A REVIEW OF GAS MARKETING IN NIGERIA

The purpose of this section is to review gas marketing processes and procedures in the Nigerian gas market. The areas covered are as follows:

- An overview of gas marketing policies and procedures for producers
- An overview of gas marketing policies and procedures for NGC

4.1 Marketing gas by producers

Prior to looking in detail at how the Producers in the Nigerian gas industry market gas it is worthwhile providing a brief description of the role of Producers in the Nigerian upstream gas industry. Fundamentally there are two types of gas found in Nigeria as follows:

- Associated Gas (AG) – This is gas found with oil, and in order to remove the oil successfully the gas needs to be removed too.
- Non-associated gas (NAG) – This is where gas is found in isolation and can be removed as and when required.

Historically the upstream producers active in Nigeria such as Shell, Chevron, Total, and Agip were active in looking for oil not gas in Nigeria. Therefore if only gas was found this would be seen as a failure, since there was not a significant market for gas in Nigeria and neither was there the opportunity to export the gas. If associated gas was found with oil, this posed different problems, since in order to extract the oil the gas was also required to be removed. Therefore for many years associated gas was flared in order to extract the oil. Apart from the financial considerations of flaring gas, with increasing concerns over the environment the flaring of gas was seen as undesirable and a number of deadlines were set for the elimination of flaring (the current target date is 2008.) There was a lack of an obvious market for gas and a lack of infrastructure to move the available gas from the fields to any potential market in Nigeria.

Therefore the gas industry was effectively forced into being by an overriding objective to reduce flaring and to both find and develop markets for gas. In terms of gas marketing activities undertaken by Producers there are really three major areas of activity as follows:

1. Marketing of gas as a feedstock to companies such as NLNG, NAFCON etc.
2. Marketing and sale of gas to NGC, the state owned gas company
3. Marketing and sales of gas to customers direct, transported via NGC's pipelines or possibly via independent pipelines.

1.1.1 A brief definition of the feedstock gas

For the purpose of this report, feedstock gas or 'feedgas' refers to the natural gas (associated and non-associated) gathered from the oil and gas fields and delivered to the LNG plant for processing and subsequent export. The processed gas is made up of LNG (93%), LPG(3.5%), and condensate (3.5%). The feedstock gas is supplied to the NLNG plant from the onshore concession areas of the Eastern part of the Niger Delta area of Nigeria. Three joint venture (JV) operators (SPDC, NAOC, EPNL) are responsible for the feedstock gas supplies to the NLNG plant.

- The SPDC Joint Venture NNPC/SPDC/NAOC/EPNL, referred to as SPDC JV, supplies gas from the SOKU field. (Associated gas from SPDC Offshore field will also supply gas to the third Train.)

- The ELF Joint Venture (NNPC/EPNL) obtains its gas from three oil fields, OBITE, IBEWA and UBETA fields, with another field, OBAGI available as a back-up arrangement.
- The NAOC Joint Venture (NNPC/EPNL) supplies feed gas currently from the MBEDE and OBIAFU-OBRIKORN fields. It is expected that another field, IDU, will be ready by the end of 2005. Back-up arrangements are available and include OMOKU, EBEGORO, OGBOGENE, and EBOCHA fields.

4.1.1 Marketing gas by producers to NLNG

Nigeria LNG (NLNG) is jointly owned by Nigeria National Petroleum Co-operation (NNPC) and four other Joint Venture (JV) operators as follows:

- NNPC 49%
- SHELL 25.6%
- TOTAL LNG 15%
- ENI (NAOC) 10.4%

The NLNG plant commenced production in 1999 with one Train, while a second Train commenced production on February 2000. Currently a total of three Trains are producing LNG, LPG, and Condensate from Feedgas being supplied by the three Joint Venture Operators. Another two Trains (4 & 5) are currently under construction and expected to come on stream between November 2005 and second quarter of 2006. Train 6 is expected to be on stream in 2006. The projected production capacity per annum of the plant when all the trains come on stream, is put at 17million tones of LNG, 3.4million tones of LPG, and 3.5million tones of condensates. Total Natural gas requirement is estimated to be 80 million cubic meters per day when the five Trains will be on stream and up to 96 million cubic meters when all six trains are on stream.

4.1.2 Marketing gas by producers to NGC

In discussions with a number of Producers it proved difficult to identify a clear marketing strategy, although a number of key factors were identified as follows:

- There was a clear commitment to sell associated gas into the market.
- All prices are negotiated between the Producers and NGC.
- The negotiated price for commercial contracts appeared to be loosely based on a percentage of LPFO (Low Pour Fuel Oil).
- The final contract price appears to be based on a form of netback pricing strategy where the final income paid by the customer was divided between the Producer and NGC.
- In terms of marketing gas by the Producers to NGC it does not appear that there is a clear marketing process or strategy, since NGC are a monopoly and there is no shortage of gas. Rather the objective as far as the Producers are concerned seems to be to find a destination for their gas.
- The price paid by NGC to producers is based on a netback strategy.

In discussion with some producers it would appear that there is a desire from both Producers and potential customers to sell gas directly to customers. This was for a number of obvious reasons.

- Removal of the intermediary.
- Sales to a downstream affiliate.
- Increased reliability.

However in order to achieve this in most cases the Producer would need to negotiate a gas transportation contract with NGC. It would appear that this is not easy, since NGC is effectively a monopoly gas transporter as well as the only other competitor to direct sales. Therefore NGC behaves just like any other gas sales and transport monopoly throughout the world where negotiated third party access is available: they either drive such a tough deal on the transportation charges that makes it uneconomic for the Producer to undertake a direct sale, or the marketing arm undercuts the sale and the Producer loses the sale anyway.

4.2 Marketing gas by NGC

4.2.1 General overview of NGC

The Nigerian Gas Company Limited (NGC) was established in 1988 as a subsidiary of the NNPC. NGC currently operates 8 gas supply systems in Nigeria:

- Sapele - supplying gas to the National Electric Power Authority (NEPA) power station at Ogorode, Sapele
- Aladja - supplying the Ajaokuta Steel plant
- Northern Pipeline system
- Imo River-Aba Industrial system
- Obigbo North-Afam - supplying another NEPA station at Afam
- Alakiri-Onne - supplying gas to the National Fertiliser Company (NAFCON)
- Alakiri-Ikot Abasi - supplying gas to the Aluminium Smelter plant (ALSCON) at Ikot Abasi
- Escravos-Lagos Pipeline- supplying gas to NEPA power plant at Egbin, and spurs to Industrial estates in Lagos

NGC operates a total of 1,100 kilometres of pipelines, ranging from 4” to 36”, with a capacity of 2 billion standard cubic feet (scf) of gas per day. The company also has 14 compressor stations, and 13 metering stations. The NGC is also actively developing a number of initiatives including the West Africa Gas Pipeline, being managed by Chevron, the Trans Nigeria Pipeline project, which will provide gas supply to a series of Independent Power Projects being planned throughout the country, and the development of compressed natural gas as an automotive fuel. In many respects NGC is the monopoly seller and transporter of gas in Nigeria, since it owns and operates the majority of the gas transmission network.

4.2.2 Description of the market segments

In terms of market segments NGC effectively markets gas to three market segments as follows:

- Parastatals
- Quasi parastatals
- Commercials

4.2.2.1 Definition of 'Parastatals' market segment

A 'Parastatal' is a company that is under the authority of a Nigerian Government minister, or more simply they are nationalised industries. The sales of gas by NGC to these parastatals represent sales between two different segments of the Nigerian Government. In terms of the Nigerian gas market the parastatals are as follows:

- ASCL – Ajaokuta, Iron and steel
- DSCL – Aladja, Iron and steel
- NEPA – Afam, Delta4, Egbin and Sapele power stations
- WRPC – Wari refinery
- RVSEB – Rivers State Electricity Board

4.2.2.2 Definition of 'Quasi – Parastatals' market segment

A 'Quasi - Parastatal' is a company that is jointly owned by the Nigerian Government and a commercial organisation. The sales of gas by NGC to these types of organisations represent sales between a Government organisation and a quasi Government organisation. In terms of the Nigerian gas market the Quasi-Parastatals are as follows:

- ALSCON – Ikot Abasi, Aluminium
- NAFCON – Onne, Ammonia / Fertilizer

4.2.2.3 Definition of commercial market segment

The third segment that NGC market gas to is the fully commercial market segment. In theory at least sales to this market segment would be undertaken solely on a commercial basis. Typical examples of customers in this market segment would consist of the following:

- Gas distributors – Gaslink, SNG
- WAPCO – Cement
- PZ – Kew metals

4.2.3 Overview of the contract strategy

The contracts put in place between NGC and its customers were based on single contracts for each individual customer. So for example each NEPA power station site would be supplied via its own individual contract put in place by NGC, at the same time NGC would put in place a 'back to back' contract with the producers for the purchase of gas to meet the needs of the gas sales contract. In terms of duration these contracts tend to be quite long term, say 15 to 25 years.

It is also worth noting that on many occasions the basic contract strategy used was a netback strategy where the final sales price was made up of the following:

- Gas price paid by NGC to the Producer
- Gas transportation price as a function of the distance travelled by the gas.

4.2.4 Pricing of gas to the market segments

Having identified the main market segments that NGC markets its gas to, it is also useful to examine what pricing strategies are used by NGC to sell gas into those particular market segments. Therefore the following table provides a summary of the prices paid by customers in those three market segments.

Table 2 – Summary of prices charged to the different market segments

Market Segment	Typical customers	Price N/mscf	Equivalent LPFO Price %
Commercial	Gaslink SNG WAPCO PZ	328.2 – 438.3	60% to 80%
Quasi-Parastatal	ALSCON NAFCON RVSEB	109.6 – 164.4	19.8% to 30%
Parastatal	NEPA ASCL DSCL WRPC	16.64	3.2%

According to NGC, the price paid by the parastatals is 16.64 N / mscf. In discussion with DPR the amount paid by NEPA is around 15.41 M / mscf, and is based on a gas contract negotiated between NGC and NEPA some years ago. As can be seen from the above table the commercial price of gas sales to process industry customers is around 400 N /mscf. NGC, NNPC-NAPIMS, and NNPC-COMD stated that sales to the ‘Parastatals’ were being undertaken at a loss.

It should be noted that sales to the commercial market were priced on the basis of a discount to an alternative fuel ‘Low Pour Fuel Oil’ (LPFO). In discussion with NGC it was stated that often new sales would be based on a larger discount say 60% of LPFO slowly increasing over a number of years to around 80% LPFO. The reason for this large initial discount is to both provide an incentive to switch and to cover any additional expenditure on new equipment etc.

4.2.4.1 Discussion of the marketing process used by NGC

In terms of marketing gas to the ‘Parastatals’ and the ‘Quasi-Parastatals’ one could fairly argue that there has not been a coherent marketing process, since there does not appear to be any real marketing policy either in terms of who gas is sold to in these market segments or what price is being paid. In particular the sale of gas to the ‘Parastatals’ appears to be based more on politics and the needs of these companies to have access to cheap or effectively free supplies of natural gas.

Therefore in terms of a approvals, fundamentally this process involved the agreement of the Nigerian Government to allow these companies to receive gas far below both the market price and, in some cases, below the cost price.

5 ANALYSIS OF DATA FOR SALES OF GAS TO NLNG AND NGC

In preparing this report we requested information from the following sources regarding sales of gas to NLNG and NGC:

- NNPC – Lagos - NAPIMS
 - Gas Revenue Generation
 - Historical Gas Production 1999-2004
- NNPC – Abuja - COMD
 - Summary of JV feedstock data
- Questionnaires
 - Associated Gas and Non-Associated Gas, with responses from JV partners and NLNG

By making a comparison of the data provided by the JV partners with the data collated by NNPC-NAPIMS it was possible to identify possible errors as described by the following analysis.

5.1 Comparison of NNPC-NAPIMS, NNPC-COMD data with NLNG data

The following table is a summary of what should have been identical data from three separate sources.

- NNPC – NAPIMS
- NNPC – COMD
- NLNG

Table 3 provides a summary of the feedstock flows of gas to NLNG from the JV partners over the period 1999 to 2004. It should be noted that since data was not available from NNPC – COMD for 1999 that the comparison data was undertaken for the period 2000 to 2004 only.

Table 3 – Comparison of NLNG gas feedstock flows

	1999	2000	2001	2002	2003	2004	TOTAL 2000- 2004
Data source	mbtu	mbtu	mbtu	mbtu	mbtu	mbtu	
NLNG - DATA (1)	28,116,514	280,148,330	256,027,817	370,718,034	531,832,045	591,357,807	2,030,084,033
NNPC-NAPIMS							
SPDC (2)	13,712,871	152,727,522	186,441,197	200,541,066	278,878,602	344,735,453	1,163,323,841
NAOC (3)	13,400,768	67,056,107	82,972,416	85,656,645	136,159,805	156,605,217	528,450,190
TFENL (3)	264,196	70,476,326	79,277,913	81,980,050	85,687,261	82,897,630	400,319,179
TOTAL (2)+(3)+(4)	27,377,834	290,259,954	348,691,527	368,177,761	500,725,668	584,238,300	2,092,093,210
TOTAL NAPIMS(5)	28,274,147	290,640,673	348,563,332	368,177,761	500,725,668	584,238,300	2,092,345,735
DIFF (6)	-896,312	-380,719	128,195	0	0	0	-1,148,837

Notes:

- (1) The NLNG data has been provided via the templates P2.02 from NLNG.
- (2) The NNPC – NAPIMS data was provided by NNPC-NAPIMS, with a breakdown of feedstock flows from the various JV partners.
- (3) Feedstock flows for SPDC.
- (4) Feedstock flows for NAOC.
- (5) Feedstock flows for TFENL.
- (6) There was a difference between the quoted totals for each year on the supplied spreadsheet and the separately calculated totals for the years 1999 to 2001, the comparison of the totals for 2002 to 2004 produced no differences.
- (7) Financial implications – If it is assumed that the value of the gas sold by the Producers and purchased by NLNG is an average of \$0.5/mbtu over the 6 years considered, the value of the difference between NNPC-NAPIMS data and NLNG is about \$750,000, representing 0.08% of the transaction value. The total revenue received by the JV partners over the period 1999 to 2004 was in excess of \$1,000,000,000.

In relation to the above table there are really three separate sources of data that should at least in theory be the same or similar, allowing for rounding errors etc. The differences and inconsistencies between the three data sets are significant, which is a concern.

5.2 Comparison of NNPC-NAPIMS, NNPC-COMD sales data to NGC

The following table is a summary of what should have been identical data from two separate sources.

- NNPC – NAPIMS
- NNPC – COMD

Table 4 provides a summary of the feedstock flows of gas to NLNG from the JV partners over the period 1999 to 2004. It should be noted that since data was not available from

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NNPC – COMD for 1999 that the comparison data was undertaken for the period 2000 to 2004.

Table 4 – Comparison of gas flows to NGC

Data source	1999	2000	2001	2002	2003	2004	TOTAL 2002- 2004
	mscf	mscf	mscf	mscf	mscf	mscf	
SPDC - NAPIMS (1)	77,342,916	59,250,481	84,542,684	124,257,793	128,392,608	97,604,328	434,797,413
SPDC - COMD (2)	No data	83,911,629	102,347,100	121,058,190	146,572,119	134,989,662	504,967,072
Diff (3)	No data	-24,661,148	-17,804,416	3,199,603	-18,179,512	-37,385,334	-70,169,659
							See note (7)
CNL - NAPIMS (4)	35,868,735	49,299,673	39,321,455	66,971,600	45,303,311	54,348,383	205,944,748
CNL - COMD (5)	No data	No data	39,321,453	66,971,499	47,159,293	54,348,383	207,800,629
Diff (6)	No data	No data	1	101	-1,855,982	0	-1,855,880

Notes:

- (1) This data was provided by NNPC-NAPIMS and related to SPDC.
- (2) This data was provided by NNPC-COMD and related to SPDC.
- (3) Significant differences were noted in the two data sets for SPDC.
- (4) This data was provided by NNPC-NAPIMS and related to CNL
- (5) This data was provided by NNPC-COMD and related to CNL
- (6) A small number of differences were noted.

In relation to the comparison of the sales of gas to NGC:

- a) the differences for CNL supplies are virtually zero for the years 2001,2002 and 2004, with the 2003 figures showing a difference of around 4%.
- b) the SPDC transactions show differences for all years of between 40% and 2%.

It is unclear why there should be such large differences. No reconciliation has been attempted. The differences do not necessarily reflect on SPDC.

In terms of the scope of these sales, if one assumes a price of 10 N/mscf then the differences noted between SPDC-NAPIMS data and SPDC-COMD over the period is around N 700 Million.

5.3 General comments of data comparisons

First of all it should be noted that in an exercise of this sort, with so much data being collected, questionnaires answered etc. that typographical or minor spreadsheet errors may be made. Whenever possible if these have occurred then allowances have been made and, where obvious, changes have been made in the analysis that reflect the likely reality.

Units often proved to be a major problem with units being listed as Millions of Btu's, but provided as thousands of Btu's.

The data gathered by NNPC-NAPIMS focused on MBtu's i.e. the energy measurement unit. The MBtu's are a derived figure based on the volume of the gas delivered and the heating value of the gas. To interpret the data, the heating value of the gas should be provided and a full list of the monthly volumes.

In discussions with the Producers, NGC, NNPC-NAPIMS and NNPC-COMD, it became clear that whilst the ideal would be to measure the Calorific Value of delivered gas this was not always done, either because the necessary equipment was not working, or because it has not been installed.

6 GENERAL REVIEW AND CONCLUSIONS

6.1 *The processes in place for marketing gas in Nigeria*

Gas is currently sold via gas sales agreements with the Joint Venture operators, on behalf of NNPC, to NLNG (since 2001). The pricing of this sale is set at a low level. NLNG is a private commercial operation in which NNPC has a 49% shareholding.

Associated gas fiscal incentives enable upstream operators to offset expenditure on gas for the purpose of PPT liabilities (thus saving PPT at a marginal rate of up to 85%).

Gas sales agreements to fertiliser manufactures, chemical plants, smelting plants, and gas resellers such as Shell Natural Gas (SNG) and GasLink have been negotiated on a more commercial basis.

In discussions with the various entities involved in the Nigerian gas industry and in summary, our opinion of the processes in place are the following:

- **Commercial policies for marketing gas** – It is not apparent that there were any commercial policies for marketing gas; the fundamental driver appeared to be the needs both (a) not to flare gas and (b) to produce oil. This meant that gas was often sold below the likely production and processing costs.
- **Financial policies** – It is not clear whether any satisfactory financial policies existed in relation to marketing gas, although NGC did use an ‘Internal rate of return’ to set transportation tariffs when involved in transportation negotiations. (A figure of 15-17% was discussed, which seems high for a monopoly transporter, typically elsewhere for existing infrastructure 5-8% is more realistic, although new projects may go as high as 17%.)
- **Contractual policies** - There is a general expectation that typical gas sales contracts would be put in place between the ‘seller’ and the ‘buyer’; in general these contracts appeared to follow best practice elsewhere in the world.
- **Legal approval** – discussions with both Producers and NGC indicated that gas contract terms would be approved following consultation with legal experts.
- **Project approval** – in most cases, the contracts were large process type contracts; Board approval was usually required. Where smaller contracts are to be agreed, possibly for direct sales by Producers, delegated approval limits were common.
- **Pricing of contracts** – In general the pricing of contracts is based on a percentage of LPFO, although the pricing of contracts to Parastatals and Quasi-Parastatals seemed to set more as a result of political edict rather than any commercial perspective.

In general it would appear, at least from the companies who responded to the questionnaire, that good practice approval and contractual processes are used in Nigeria. In particular this is driven by the culture of negotiating long-term contracts, which by their very nature involve large amounts of money and as a result tend to require due process to take place. However all of these good practices go to waste where a culture of non-payment of gas bills is endemic.

6.2 *The problem of non payment*

No discussion of the Nigerian gas market would be complete without a brief overview of the problem of non-payment of gas bills that involves millions of Naira. The following table provides a breakdown of NGC’s non-paying customers.

Table 5 – Overview of the NGC debt problem (Source: NGC)

Customer name / type	Size of debt in Millions N
ALSCON	1179
ASCL	57
DSCL	41
NAFCON	1424
NEPA (Pre-2001)	4371
NEPA (Post-2001)	2338
Total debt	9410
NEPA	6709
NEPA % of overall debt	71%

Table 5 provides a useful insight into the problem of non-payment of gas bills by Nigerian Parastatals and Quasi-Parastatals. In short one Nigerian Government business is effectively subsidising another. To talk about establishing a market for gas in line with best practice elsewhere in the world is a nonsense until the issue of non-payment is dealt with.

Therefore the good contractual and procedural processes used at least by some players, are completely undermined by the culture of non-payment. Talk of market related prices, marketing policies and strategies are all irrelevant if people do not pay their bills.

6.3 *Conclusions*

6.3.1 *The Nigerian gas market is a growing gas market*

In conclusion the Nigerian gas industry does stand at cross roads. With large quantities of gas needing to find a market, combined with a growing market need, particularly from power generators and other process users, it seems highly likely that the gas market within Nigeria will continue to grow.

6.3.2 *Policies and procedures in the Nigerian gas market*

In terms of processes and procedures the current culture of long-term contracts has meant that, in the main, good processes, approvals and audit trails are in place. That said the errors or differences in relation to meter readings seen so clearly in the analysis of NLNG and NGC gas purchases from the Producers, does give cause for concern. If a gas market is going to work properly two fundamental foundation stones need to be in place, the accurate measurement of the quantities bought and sold and the speedy payment of bills. Therefore if the Nigerian gas market is going to develop in an orderly commercial fashion the problem of accurate and timely meter readings will need to be addressed along with the non-payment problem.

6.3.3 *Dealing with the problem of non payment*

The non-payment of gas bills by Parastatals such as NEPA is probably the biggest challenge facing the development of the gas market in Nigeria. If the relevant Government and Industry agencies do not address this issue satisfactorily then any future potential development of the Nigerian gas market will be undermined and possibly stunted.

6.3.4 *Dealing with the problem of subsidised gas prices*

Similarly to the issue of non-payment, the issue of subsidised gas prices to certain consumers in the gas markets, at best sends the wrong economic signals to the gas market and at worst sends no economic signals at all. The price of gas to NEPA at 15N is an economic travesty and will undermine the development of gas fired power generation in Nigeria.

6.3.5 *Developing competition in the Nigerian gas market*

If, as has been suggested by DPR, there is a desire for a competitive gas market in Nigeria to develop then more radical surgery will be required, which would entail the formation of an independent regulator, the privatisation and possible restructuring of NGC into transportation and trading companies. This is a huge subject and beyond the scope of this study, nevertheless the development of a truly competitive gas market with a restructured NGC is a reasonable medium term goal. However with considerable investment still required in gas transportation infrastructure, any developments in this area should be undertaken with due care and consideration of the need to invest in new infrastructure.

7 RECOMMENDATIONS

7.1 Resolve the non-payment problem

The culture of non-payment among the Parastatals will be the biggest hindrance to the development of a properly working gas market. Therefore this problem needs to be tackled once and for all. Ultimately NGC and other gas suppliers should be able to curtail supplies of gas to non-paying customers.

Where existing debts are so huge that repayment even over a relatively long period of time would prove difficult, creative forms of repayment should be considered. The Russian gas industry has suffered historically from similar problems, and has used a number of creative solutions, from debt write-offs to taking an equity share.

7.2 Resolve the subsidised gas price problem

It would appear that NGC in particular have been used by the Nigerian Government to provide subsidised energy or in some cases free energy to other inefficient Nigerian businesses. If a proper gas market is to develop this practice needs to stop. With the size of subsidies so great it would be inappropriate to remove them overnight, therefore it is suggested that Nigerian gas prices to subsidised customers be steadily increased over a number of years until in line with normal commercial practice in Nigeria. Key points to note will be as follows:

- The challenge will be to develop a methodology that allows the right economic price to be charged for different types of customer.
- As previously mentioned such an approach will need to be slowly phased in, since the suspicion is that these issues are deeper than just the gas industry.
- It may be that alternative and open subsidies are offered for a time to certain gas users, rather than the hidden subsidies of cheap or free gas.

7.3 The Nigerian gas industry needs to understand its costs

It was clear from a number of discussions that the cost of producing gas particularly associated gas was not always known. A clearer understanding of the costs of production, processing and transportation would enable decisions to be made on economic basis.

7.4 Introduce a Gas or Energy Law

It was apparent from a number of discussions that Nigeria is suffering from a lack of a good energy law, this needs to be addressed. (Since, at the time of writing this report, a new Gas Law was being discussed by the Nigerian Parliament, no other comments will be made.)

7.5 Restructuring of the Market and Regulatory Framework

Notwithstanding that a new Gas Law will address some of these issues, the following should be considered.

- The formation of an independent Gas Regulator.

- The removal of NGC from the NNPC business into a separate business in its own right.
- The possible separation of NGC into trading and transportation businesses.

In relation to the issue of market restructuring, whilst it is clear from the above that there is a clear need for some market restructuring, a cautious approach needs to be taken in terms of gas market liberalisation both in terms of timing and extent. Whilst gas market liberalisation has delivered real benefits to customers in North America and the EU, it should be noted that these were mature markets where the infrastructure was already in place and had been paid for through the profits of the monopoly. If NGC and possibly other players are going to invest heavily in infrastructure the lack of infrastructure is a material circumstantial difference.

APPENDIX I - ANNUAL SUMMARY OF FEEDSTOCK GAS DELIVERIES TO NLNG BY SPDC/NAOC/ELF JV

Table 1 - Annual summary of feedstock gas deliveries to NLNG 2000 - 2004				
YEAR	Total (JV) Gas Deliveries (Mbtu)	NNPC Equity (Mbtu)	Value (\$) Due NNPC	PRICE (\$/Mbtu)
2000	290,259,954	166,519,596	75,253,170	0.445
2001	346,448,676	198,547,145	103,349,048	0.522
2002	368,177,762	210,879,604	96,499,146	0.458
2003	531,420,276	303,373,505	155,601,544	0.513
2004	591,360,786	337,544,743	197,367,717	0.585
Total	2,127,667,453	1,216,864,594	628,070,626	0.505

Notes

- (1) Each unit price is the average of Shell/Agip/Elf's unit prices.
- (2) Total JV deliveries is by Shell/Agip/Elf. NNPC takes 55% of Shell and 60% of Agip/Elf.

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APPENDIX II - MONTHLY FEEDSTOCK GAS DELIVERIES TO NLNG BY SPDC/NAOC/ELF JV

Table 2 - Monthly summary of feedstock gas deliveries to NLNG/NAOC/ELF				
Figures for 2000	Total (JV) Gas Deliveries (Mbtu)	NNPC Equity (Mbtu)	Value(\$) Due NNPC	Unit Price(\$/Mbtu)
Jan	14,228,460	8,131,619	2,687,239	0.330
Feb	17,296,756	10,072,998	4,540,054	0.451
Mar	23,223,183	13,306,090	5,760,994	0.433
April	21,836,803	12,515,823	4,948,159	0.395
May	23,555,286	13,447,946	5,354,085	0.398
June	24,002,005	13,654,722	6,186,391	0.453
July	28,686,671	16,468,891	7,629,583	0.463
Aug	29,571,763	16,929,573	7,601,475	0.449
Sept	28,063,497	16,127,970	7,243,637	0.449
Oct	20,083,276	11,589,442	5,807,072	0.501
Nov	27,693,975	15,923,690	8,073,950	0.507
Dec	32,018,281	18,350,831	9,420,531	0.513
Total (2000)	290,259,954	166,519,596	75,253,170	0.445

Figures for 2001	Total (JV) Gas Deliveries (Mbtu)	NNPC Equity (Mbtu)	Value(\$) Due NNPC	Unit Price(\$/Mbtu)
Jan	32,690,939	18,706,244	10,420,862	0.557
Feb	27,346,218	15,656,969	9,155,979	0.585
Mar	32,619,406	18,719,981	10,685,185	0.571
April	23,366,355	13,417,758	7,153,158	0.533
May	26,428,155	15,191,832	8,024,185	0.528
June	26,760,941	15,338,566	8,244,812	0.538
July	28,731,644	16,451,051	8,873,205	0.539
Aug	29,127,784	16,690,184	8,140,617	0.488
Sept	28,956,376	16,588,579	8,217,200	0.495
Oct	32,199,465	18,490,165	9,020,032	0.488
Nov	30,109,096	17,252,075	8,241,687	0.478
Dec	30,355,148	17,389,451	8,040,776	0.462
Total (2001)	348,691,527	199,892,856	104,217,698	0.521
Total (2000-2001)	638,951,481	366,412,453	179,470,869	0.522

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APPENDIX II continued -

Figures for 2002	Total (JV) Gas Deliveries (Mbtu)	NNPC Equity (Mbtu)	Value(\$) Due NNPC	Unit Price(\$/Mbtu)
Jan	32,792,516	18,800,904	8,531,849	0.454
Feb	29,148,074	16,694,340	7,276,631	0.436
Mar	20,620,237	11,803,327	5,513,528	0.467
April	20,850,448	11,958,305	5,480,120	0.458
May	31,132,143	17,760,978	8,014,127	0.451
June	31,885,799	18,268,976	8,188,756	0.448
July	32,867,711	18,828,222	8,816,741	0.468
Aug	31,350,938	17,972,576	8,187,185	0.456
Sept	32,012,872	18,316,988	8,464,115	0.462
Oct	32,580,211	18,690,464	8,253,480	0.442
Nov	34,927,708	20,014,860	9,121,649	0.456
Dec	38,009,104	21,769,663	10,650,968	0.489
Total (2002)	368,177,762	210,879,604	96,499,146	0.458
Total (2000-02)	1,007,129,242	577,292,056	275,970,015	0.457

Figures for 2003	Total (JV) Gas Deliveries (Mbtu)	NNPC Equity (Mbtu)	Value(\$) Due NNPC	Unit Price(\$/Mbtu)
Jan	39,415,005	22,583,329	11,419,006	0.506
Feb	30,589,082	17,548,643	8,694,782	0.495
Mar	34,519,664	19,695,777	9,778,141	0.496
April	38,892,409	22,206,131	11,307,049	0.509
May	48,108,053	27,430,952	13,608,096	0.496
June	47,060,307	26,827,777	13,239,961	0.494
July	47,173,981	26,916,913	13,547,343	0.503
Aug	51,514,740	29,374,114	14,603,918	0.497
Sept	46,161,964	26,303,587	14,252,515	0.542
Oct	49,005,722	27,990,311	14,813,645	0.529
Nov	49,160,163	28,067,081	14,874,482	0.530
Dec	49,819,186	28,428,891	15,462,609	0.544
Total (2003)	531,420,276	303,373,505	155,601,546	0.513
Total (2000-03)	1,538,549,519	880,665,561	431,571,561	0.512

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APPENDIX II continued -

Figures for 2004	Total (JV) Gas Deliveries (Mbtu)	NNPC Equity (Mbtu)	Value(\$) Due NNPC	Unit Price(\$/Mbtu)
Jan	45,899,623	26,185,230	15,163,741	0.579
Feb	37,127,255	21,209,855	12,592,432	0.594
Mar	49,549,936	28,304,429	15,436,319	0.545
April	49,824,036	28,459,486	15,978,739	0.561
May	53,555,153	30,542,545	16,582,915	0.543
June	50,373,466	28,816,063	15,520,920	0.539
July	49,061,112	27,970,534	16,068,546	0.574
Aug	53,199,296	30,354,727	16,996,542	0.560
Sept	52,482,513	29,993,133	17,305,083	0.577
Oct	53,619,531	30,633,110	19,456,916	0.635
Nov	44,315,795	25,295,367	16,252,446	0.643
Dec	52,353,068	29,780,265	20,013,118	0.672
Total (2004)	591,360,786	337,544,743	197,367,717	0.585
Total (2000-04)	2,129,910,304	1,218,210,305	628,939,278	0.585

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APPENDIX III – LOCAL GAS SUPPLIES TO NGC – DATA PROVIDED NNPC (COMD)

Table 3 - Local gas sales (NNPC / Shell - JV) 2000 to 2004				
YEAR	QTY. SUPPLIED (SCF)	NNPC SHARE (SCF) 55%	UNIT PRICE (MCF) -N-	Amt.Exptd/Due NNPC (MCF) -N-
2000	83,911,629	46,151,396	11	478,303,323
2001	102,347,100	56,290,905	10	567,364,121
2002	121,058,190	66,582,005	11	752,620,594
2003	146,572,119	80,614,666	12	966,893,394
2004	134,989,662	74,244,314	16	1,190,155,226
TOTAL	588,878,701	323,883,286	12	3,955,336,658

Table 4 - Local gas sales (NNPC / CHEVRON - JV) 2000 to 2004				
YEAR	QTY. SUPPLIED (SCF)	NNPC SHARE (SCF) 55%	UNIT PRICE (MCF) -N-	Amt.Exptd/Due NNPC (MCF) -N-
2001	39,321,453	23,592,872	4.27	100,741,564
2002	66,971,499	40,182,899	4.61	185,243,166
2003	47,159,293	28,295,576	4.98	140,911,968
2004	54,348,383	32,609,030	5.38	175,436,581
TOTAL	207,800,629	124,680,377	4.81	602,333,279

