The Political Economy of Oil and Gas in Africa

The case of Nigeria

Soala Ariweriokuma

Routledge Studies in International Business and the World Economy

The Political Economy of Oil and Gas in Africa

The evolution of the Nigerian oil and gas industry spanned nearly one hundred years, during which time several challenges were encountered and surmounted by major International Oil Companies (IOCs). This book provides a thoroughly researched guide to the Nigerian oil and gas industry.

The author examines the increasing role of Africa in the contribution of oil and gas resources to the global energy market and provides an overview of oil and gas exploration and production activities in Algeria, Libya, Egypt and Angola. The book presents an in-depth review of the growth and challenges of the Nigerian oil and gas industry and also highlights the geological features of the oil and gas bearing regions of the country. In particular, the emerging prominence of the Gulf of Guinea as a prolific hydrocarbon bearing zone is extensively evaluated. There are chapters devoted to environmental issues both in Nigeria and globally, while relevant petroleum laws are brought into focus with a view to guiding potential investors. It culminates with a detailed account of investment opportunities in the dynamic Nigerian oil and gas industry.

This book offers students, potential investors, academics and policy makers the opportunity to get acquainted with various dimensions of the oil and gas industry. It is relevant to subject areas such as environmental pollution, gas monetisation, and oil and gas exploration and production.

Soala Ariweriokuma is an economist and former lecturer at the University of Port Harcourt. He joined the Nigerian National Petroleum Corporation (NNPC) in 1992 and has worked in key divisions of the corporation. He is currently General Manager of NIDAS International (an NNPC/DSME Joint Venture Company).

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To my wife Sabinah, and children Somina, Sopriye, Nemi and Soala Jr

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Abbreviations and acronyms

AENR	Agip Energy and Natural Resources Limited
AFE	Authorisation for expenditure
AGO	Automotive gas oil (diesel)
ALSCON	Aluminum Smelting Company of Nigeria
API	American Petroleum Institute
APPA	African Petroleum Producers Association
APRM	African peer review mechanism
b/d	Barrels per day
bcf	Billion cubic feet
bcm/yr	Billion cubic metres per year
BG	British Gas
BGT	Bonny Gas Transport
BOT	Built, operate and transfer
BP	British Petroleum
BPE	Bureau for Public Enterprises
CABGOC	Cabinda Gulf Oil Company
CAC	Corporate Affairs Commission
CCG	Combined cycle generation
CDU	Crude distillation unit
CIF	Cost insurance freight
CNG	Compressed natural gas
CTP	Corporate transformation programme
CRU	Catalytic reforming unit
CS	Corporate services
DPK	Dual purpose kerosene
DPR	Department of Petroleum Resources
DRSTP	Democratic Republic of São Tomé and Príncipe
DWT	Dead weight
E&P	Exploration and production
EEPNL	Esso Exploration and Production Nigeria Limited
EEZ	Exclusive economic zone
EGAS	Egyptian Natural Gas Company
EGP	Escravos gas pipeline

EGPC	Egyptian General Petroleum Corporation
EITI	Extractive Industry Transparency Initiative
EL	Exploration licence
ENI	Ente Nazionale Idrocarburi
EOR	Enhanced oil recovery
EPCL	Eleme Petrochemical Company Limited
ERHC	Environmental Remediation Holding Corporation
F&A	Finance and accounts
FCC	Fluid catalytic cracker
FDI	Foreign direct investment
FEED	Front end engineering design
FID	Final investment decision
FOB	Free on board
FPSO	Floating production storage offload
FSO	Floating storage and offload
GATT	General arrangement on trade and tariffs
GDP	Gross domestic product
GHG	Greenhouse gases
GOPA	Geregu, Omotosho, Papalanto and Alaoji
GTL	Gas-to-Liquid
GUPCO	Gulf of Suez Petroleum Company
HDPE	High Density Polyethylene
HPFO	High Pour Fuel Oil
IDSL	Integrated Data Services Limited
IEOC	International Egyptian Oil Company
IOCs	International oil companies
IPP	Independent power plant
IRR	Internal rate of return
JDA	Joint Development Authority
JDMs	Joint development models
JDZ	Joint development zone
JOA	Joint operating agreement
JV	Joint venture
KHU	Kero hydro treating unit
KRPC	Kaduna Refining and Petrochemical Company Limited
LCD	Local content development
LDCs	Less developed countries
LDPE	Low Density Polyethylene
Lipetco	Libyan General Petroleum Corporation
LNG	Liquefied natural gas
LPFO	Low Pour Fuel Oil
LPG	Liquefied petroleum gas
MEG	Maghreb–Europe pipeline
MF	Marginal Field
mm scf/d	Million standard cubic feet per day

mmbd	Million barrels per day
MNC	Multi-national company
MON	Mobil Oil Nigeria plc
MOU	Memorandum of understanding
MPN	Mobil production unlimited
MT/year	Metric tonnes per year
MW	Megawatts
MWD	Measurements while drilling
₦	Nigerian Naira
NAE	Nigerian Agip Exploration Limited
NAFCON	National Fertilizer Company of Nigeria
NAOC	Nigeria Agip Oil Company
NAPIMS	National Petroleum Investment Management Services
NBC	National Boundary Commission
NCD	Nigerian Content Development
NDDC	Niger Delta Development Commission
NDT	Non-destructive testing
NEITI	Nigeria extractive industry transparency initiative
NEPA	National Electric Power Authority
NEPAD	New partnership for African development
NETCO	National Engineering and Technical Company Limited
NGC	Nigeria Gas Company
NGL	Natural gas liquid
NHU	Naphtha hydrotreating unit
NICON	National Insurance Company of Nigeria
NIPPs	National integrated power plants
NITEL	Nigerian Telecommunication Company
NLNG	Nigeria Liquefied Natural Gas Company
NNOC	Nigerian National Oil Corporation
NNPC	Nigerian National Petroleum Corporation
NOC	National oil company
NPDC	Nigerian Petroleum Development Company
NPV	Net present value
OECD	Organisation for Economic and Cultural Development
OK-LNG	Olokola LNG
OML	Oil mining lease
OMPADEC	Oil Mineral Producing Area Development Commission
ONGC	Oil and Natural Gas Corporation
OPEC	Organisation of Petroleum Exporting Countries
OPL	Oil prospecting licence
OSCs	Oil service companies
OSP	Official selling price
PA	Participation agreement
PACE	Positioning, aligning, creating and empowering
PANAM	Pan American (airline)

PETAN	Petroleum Technology Association of Nigeria
PHCN	Power Holding Company of Nigeria
PP	Polypropylene
PPMC	Pipelines and Products Marketing Company
PPPRA	Petroleum Products Prices Regulatory Agency
PPT	Petroleum profit tax
PPTA	Petroleum Profit Tax Act
PSA	Production sharing agreement
PSC	Production sharing contract
PSEs	Public sector enterprises
PTDF	Petroleum Technology Development Fund
R & P	Refineries and petrochemicals
ROI	Return on investment
RON	Research octane number
ROR	Rate of return
ROT	Refurbish, operate, transfer
$	US Dollars
SBU	Strategic Business Unit
SC	Service contract
scf	Standard cubic feet
scf/d	Standard cubic feet per day
SNEPCO	Shell Nigeria Exploration and Production Company
SNG	Shell Nigeria Gas Limited
SNOP	Shell Nigeria Oil Products Limited
SPC	Sale and Purchase Contract
SPDC	Shell Petroleum Development Company
TAM	Turnaround Maintenance
TCF	Trillion cubic feet
TOPCON	Texaco Overseas (Nigeria) Petroleum Company
UAE	United Arab Emirates
ULCC	Ultra large crude carrier
UMC	United Meridian Corporation
UN	United Nations
UNCLOS	United Nations Convention on the Laws of the Sea
UNDP	United Nations development programme
VDU	Vacuum distillation unit
VLCC	Very large crude carrier
WAGP	West African gas pipeline
WRPC	Warri Refining and Petrochemical Company Limited

About the author

Soala Ariweriokuma is on the staff of the Nigerian National Petroleum Corporation (NNPC) and works in the Commercial and Investment Directorate. His background is in business administration and economics, and he obtained his doctorate degree from the University of Nebraska, Lincoln. He was at one time a senior lecturer at the University of Port Harcourt and joined NNPC in 1992. In 1995 he was appointed technical assistant to the Honourable Minister of Petroleum Resources and in that capacity interacted extensively with key players of the oil and gas industry. His areas of interest include energy economics, petroleum investment analysis and hydrocarbon transportation economics. For relaxation he enjoys fishing, golf and gospel music.

Foreword

Africa has great energy potentials which remained unexplored for many years and the oil and gas industries in the various countries present unique opportunities and challenges. Oil exploration in the continent derived its roots from the early 1900s and in the mid-1950s oil was discovered in commercial quantities in Nigeria, Algeria and Libya. In recent years Angola, Gabon, Equatorial Guinea, Chad and Sudan have joined the ranks of oil producing countries, but the low technological development of the continent hindered the progress of the oil and gas industry. Consequently, the pace and scope of development of the industry has depended on external entrepreneurial participation and the interest of the international oil companies (IOCs) has steadily increased, thereby expanding crude oil production from a million barrels per day (mmbd) in the 1950s to over 10 mmbd in 2006. Africa currently accounts for about 10% and 8% of global oil and gas reserves respectively. The oil and gas producing countries in the continent have coalesced to form the African Petroleum Producers Association (APPA) guided by the fundamental objective of sharing valuable information and experiences that could maximise the benefits derived from oil and gas resources. Revenues from these resources have substantially enhanced the economies of producing countries and some, such as Nigeria, Algeria, Libya and Angola, belong to the OPEC family and contribute significant volumes to the aggregate production of the organisation.

The Nigerian oil and gas industry started in 1908 and has made huge progress. With the discovery of oil at Oloibiri in 1956 production commenced at a modest level of 5,100 b/d and subsequently escalated to about 2.4 mmbd in 2006. The industry covers a broad terrain spanning land, swamp, shallow continental shelf and the Deep Offshore. The ranks of the IOCs have increased and in recent years the pioneer oil companies – Shell, Mobil, ChevronTexaco, Total, Agip and Panocean – have been joined by the National Oil Companies of China, Brazil, Norway and Korea. The industry is characteristically vibrant and adjudged the biggest in Africa. Nigeria's oil and gas reserves are estimated to be 36 billion barrels and 187 trillion cubic feet (TCF) respectively. There is a strong prospect for further expansion in reserves in view of the aggressive exploration and production activities in the

Deep Offshore. The collaborative joint development of the overlapping maritime boundaries of Nigeria and The Democratic Republic of São Tomé and Príncipe (DRSTP) in the Gulf of Guinea offers additional opportunities of reserves expansion.

Although the industry has been widely explored, the evolution, challenges and numerous investment opportunities have not been adequately captured in books and scholarly literature. Against this background, the publication of this book is most timely. It is based on themes, namely: Regional oil and gas activities; Evolution of the Nigerian hydrocarbon industry; The upstream sector; The downstream sector; Gas monetisation; Privatisation and liberalisation of the industry; Environmental pollution; Elements of petroleum law; and Investment opportunities. Regional upstream activities focus on the exploration and production of oil and gas in Algeria, Libya, Egypt and Angola. The evolution of the industry in Nigeria presents a succinct account of the pioneer activities and the discovery of the first oil, while the section on the upstream sector presents an elaborate account of the achievements of the sector. Similarly the theme on the downstream sector features an interesting account of the dynamics and growth of the activities in the sector. Gas monetisation has become a major activity in the industry leading to the establishment of the world-class Nigeria Liquefied Natural Gas Company (NLNG) plant at Bonny. The success of the pioneer LNG programme has paved the way for Brass LNG and OK-LNG projects which are at advanced stages of execution. The book also presents an insightful discussion of pollution at the national and global levels.

In order to guide potential investors, two chapters are devoted to Nigerian Petroleum Law and Memorandum of Understanding (MOU). These chapters provide useful information on applicable taxes, royalties and incentives for investors. The book culminates with a chapter which clearly outlines the vast investment opportunities in the Nigerian oil and gas industry. The content of the book is rich in well-researched information and statistical data on the Nigerian oil and gas industry and some selected producing countries in Africa. It naturally presents itself to a wide spectrum of readers, both locally and internationally. As an interested participant in the global oil and gas industry, it gives me great pleasure to introduce this book and I feel certain that every reader will benefit from the vast amount of information captured in it.

RILWANU LUKMAN
Former Minister of Petroleum Resources of Nigeria, former President of OPEC and former Secretary General of OPEC

Preface

The starting point in the search for oil and gas in Africa is often traced to the late nineteenth century and over the years oil and gas have been discovered in commercial quantities in countries including Nigeria, Algeria, Libya, Egypt and Angola. The growing significance of these natural resources in Africa warrants the evaluation of the evolutionary pattern of the regional hydrocarbon industries and the challenges confronting the producing countries. Africa has made significant progress and contributes substantial volumes to the aggregate production of OPEC member countries. This notwithstanding, information on the oil and gas activities in the above countries, especially Nigeria, is limited. In view of this, an effort will be made to provide a fairly detailed account of the evolutionary pattern of the oil and gas industry in Nigeria. In addition the text will examine and analyse key issues which include gas monetisation, marginal field development, oil assets privatisation, petroleum products subsidy, environment, revenue generation etc. Nigeria is currently rated as the leading oil and gas producer in Africa; the industry is dynamic and has experienced rapid development in the past two decades, while its current level of reserves and contributions in OPEC distinguishes it as a force to be reckoned with in the African region. The oil and gas industries in Algeria, Libya, Egypt and Angola will be briefly examined and the aim will be to delineate areas of similarities in development and other challenges experienced by the producing countries referred to.

The text will also provide a detailed analysis of the impact of the oil and gas industry on the Nigerian economy in terms of its contributions to the GDP, employment and federal government earnings. The oil and gas business is a high revenue earner; therefore numerous interests impinge on the activities in the African region. Political power in the continent tends to be absolute in nature and therefore unilateral actions which are often not in the interest of the public are taken in order to satisfy personal and political interests. The impacts of such actions on the oil and gas industry are evaluated. The industry in Africa is confronted by major challenges, including low technological development, corruption and low value addition. The above challenges are profound in nature and cause major distortions in the growth and earnings from the oil and gas industries.

For purposes of fluid reading the text is divided into eight themes:

- oil and gas in Africa;
- the Nigerian oil and gas industry;
- the upstream sector;
- the downstream sector;
- petroleum law;
- the Niger Delta;
- shipping activities;
- industry re-engineering.

Oil and gas in Africa

This theme provides an overview of oil and gas exploration and production activities in key producing countries and members of the OPEC family such as Algeria, Libya and Angola. The Egyptian oil and gas industry is also examined. The analysis of the upstream activities in the aforementioned countries provides an opportunity to evaluate the trend of development of oil and gas activities and the contributions of the region to the global energy market.

Nigerian oil and gas industry

This provides an in-depth review of the evolution of the Nigerian, oil and gas industry. It provides an insight into the geological characteristics of the various regions of the country. Different rock types – granite series, volcanic rocks, Albian age formation, Maestrichtian equivalent, marine formation etc. are discussed in order to isolate distinct geological epochs and oil- bearing rocks in the country. It also examines the formation and role of the Nigerian National Petroleum Corporation (NNPC) in the industry. Chapter 4 provides a brief account of the formation of the Joint Ventures (JVs) between NNPC and International Oil Companies (IOCs), Production Sharing Contracts (PSCs) and Services Contracts (SCs). The Corporate Transformation Programme (CTP) is also discussed.

Upstream sector

Under the domain of exploration and production, the Nigerian upstream sector which depends on a gamut of cutting edge technology is analysed. Chapter 6 reviews the Marginal oil Field (MF) development programme of the Nigerian government. Chapter 8 examines the Nigerian Content Development (NCD) which derives from serious agitations for the domiciliation of a significant proportion of the expenditures of the IOCs in Nigeria.

Downstream sector

This theme evaluates the performance of the refineries and petrochemical companies. The low performance of these companies and the associated petroleum products scarcity are discussed in Chapters 10 and 11. Also examined is gas monetisation, which has in recent times become an important issue in the context of environmental pollution mitigation and revenue generation.

Petroleum law

Chapters 13 and 14 focus on the laws governing the Nigerian oil and gas industry. The discussions cover the origins of Nigerian petroleum law, Petroleum Profits Tax (PPT) ordinance, National Petroleum Investment Management Services (NAPIMS) and Joint Operating Agreements (JOAs). The Memorandum of Understanding (MOU) is also examined.

Niger Delta

The Niger Delta is the pivot of oil and gas activities in Nigeria. In recent years it has become volatile due to various agitations emanating from the region. In Chapters 15 and 16 some major issues concerning the plight of the communities in which oil is produced and the impact of oil and gas activities on the environment are critically examined.

Shipping activities

This theme evaluates the origin of global tanker transportation. It also focuses on the shipping business in the National Oil Companies (NOCs) and more particularly on the shipping opportunities in Nigeria.

Industry re-engineering

This examines the restructuring activities in the industry which include privatisation of oil and gas assets as well as liberalisation of the industry. Chapter 19 explicates various investment opportunities in the oil and gas industry which are available to potential investors.

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1 Oil and gas in Africa

Introduction

Africa is abundantly endowed with oil, gas and other energy resources. Exploration of these resources in the continent can be traced to early 1900; however, commercial discoveries were only recorded in the 1950s. In the 1970s consuming countries relied on oil from the Middle East for major industrial and domestic activities, but recent events in the Middle East have necessitated the shift of activities of IOCs to oil bearing areas in Africa. A hot spot in the region is the Gulf of Guinea, which is estimated to have 5–12 billion barrels of crude oil. The continent is technologically backward; therefore oil and gas exploration and exploitation depends on external entrepreneurial initiatives. Experts are of the view that the continent at current levels of production accounts for 10 per cent and 8 per cent of global oil and gas reserves respectively. Global interest in the industry has steadily increased, accounting for the expansion in crude oil production from less than 1 mmbd in the 1950s to well over 10 mmbd in 2006. The degree of contribution of each country varies, which in part determines the different levels of inflow of capital into the upstream sectors of the region. The industry in each of the producing countries presents unique opportunities and challenges: in the case of Nigeria it is observed that the terrain covers land, swamp, shallow continental shelf and Deep Water. Nigeria, Libya and Algeria have long been associated with hydrocarbon production and also belong to the OPEC family. Egypt, on the other hand, is actively involved in the African Petroleum Producers Association (APPA). In recent years Angola, Sudan and Equatorial Guinea joined the ranks of oil producing countries in the region. In view of the diversity of the continent, it can be contended that the political economy of the oil and gas industry in Africa covers a broad spectrum, with each shade of the spectrum exhibiting distinct characteristics which demand thorough analysis. Nigeria serves as the primary focus of the discussion; however, it can be posited that contextually the various oil and gas industries in the continent have political, economic and social/cultural links. The formation of APPA is an eloquent attestation of these links. In view of these relationships it would be necessary to briefly examine the upstream activities of selected

countries, namely Algeria, Libya, Egypt and Angola, in order to establish basic characteristics in the evolutionary and operational patterns of the oil and gas industries in Africa. Such an analysis would provide an opportunity to estimate the potentialities of the various industries and the underlying political forces that shape them.

REGIONAL CRUDE OIL PRODUCTION

Algeria

Oil and gas activities

Algeria started oil and gas production around 1956 and currently has proven reserves of 12.3 billion barrels of crude oil (Figure 1.1). It is ranked third largest producer in the continent. An estimated 70 per cent of the proven reserves are located in the Hassi Messaoud Basin, while about 30 per cent are found in Berkine Basin. In 2006, average daily production amounted to 1.4 million barrels. In addition 440,000 b/d of lease condensate and 305,000 b/d of natural gas liquids (NGL) were produced from active fields. Available data (Figure 1.2) indicates that aggregate production of hydrocarbons (i.e. crude oil, condensates and NGLs) in 2006 amounted to 2.13 mmbd. Algerian Sahara Blend is rated high grade hydrocarbon with a sulphur content of 0.1 per cent and has a 45° API rating. Prior to 2005, the industry was dominated by Sonatrach, the NOC. The role of Sonatrach was modified through the enactment of the hydrocarbon reform bill. The bill paved the way for foreign

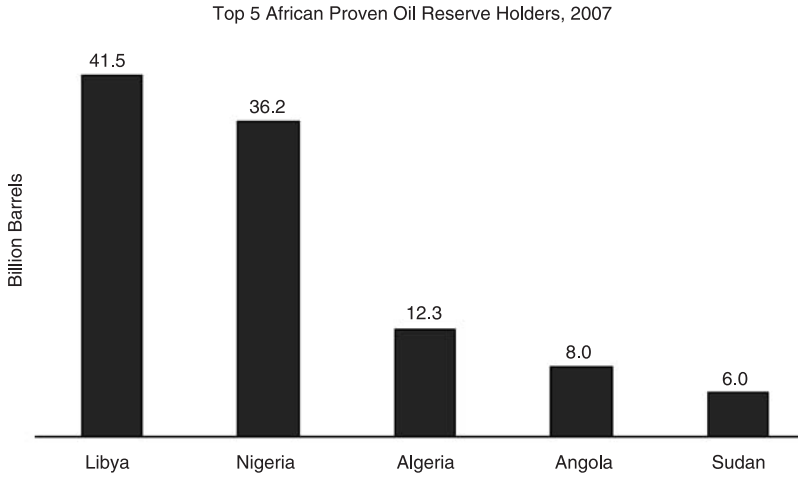

Figure 1.1 Proven oil reserves of reference countries.

Source: http://www.eia.doe.gov. EIA Country Analysis Publication, 2007

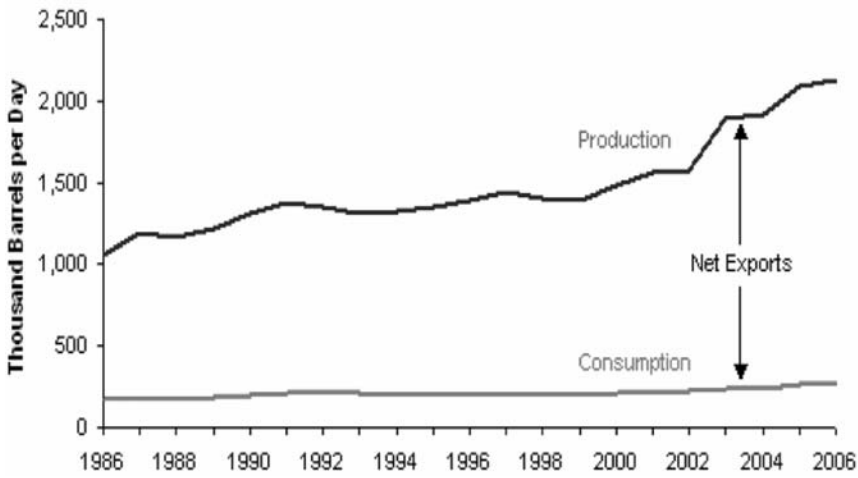

Figure 1.2 Algerian crude oil production and consumption.
Source: http://www.eia.doe.gov. EIA Algeria Country Analysis 2007

participation and empowered the NOC to acquire at least 51 per cent equity interest in new oil and gas concessions or joint venture (JV) companies in the industry.

Sixth licensing round

In 2005 the NOC executed its sixth licensing round which placed on offer ten Blocks for IOC participation. On the whole, 54 companies expressed interest and took part in the bid process. BP won three concessions while Shell, BHP-Billiton and the UAE-US consortium won two concessions each. Sonatrach attained a production level of 440,000 b/d at the Hassi Messaoud field in 2006, by far the highest individual company. It is also associated with the Hassi R'Mel field (north of Hassi Messaoud) which has an estimated crude oil production of 18,000 b/d. Other fields are located at Zarzaitine, Ben Kahla, Ait Kheir, Tin Fouye and Tabankort. The enactment of the hydrocarbon reform bill paved the way for active foreign participation in the industry and first among the foreign producers was Anadarko, with a production capacity of 500,000 b/d. The company also operates in Ourhound (Eastern Algiers) and Hassi Berkine South fields which collectively account for 450,000 b/d. The NOC continues to inject new investment capital into its operations, thereby paving the way for the simultaneous development of seven fields in Block 208 of the Berkine Basin. Production from these fields was due to come on stream in 2008.[1]

Libya

Background

Oil exploration and production activities started in Libya in 1953, shortly after the discovery of oil in Algeria. The Libyan General Petroleum Corporation (Lipetco) was founded in 1968 through a royal decree. Following the overthrow of the monarchy in 1969 Lipetco was restructured under Law no. 24 of 3 March 1970 to form the Libyan NOC, which was mandated by the decree establishing it to engage in exploration and production of oil through its affiliate companies or in collaboration with IOCs. The dominant mode of operation was the Production Sharing Agreement (PSA). Structurally the NOC had fully-owned companies which were responsible for carrying out exploration, development and production activities. These companies were also charged with responsibility for local and international marketing of crude oil and products. The NOC's primary export markets were Germany and Spain. Initially the NOC signed a participation agreement with selected IOCs but these agreements were subsequently converted to PSAs. The oil and gas industry in Libya progressed smoothly until the PANAM Flight 103 bombing incident over Lockerbie, Scotland in 1988. Libya was accused of sponsoring terrorist activities which led to the bombing of the passenger aircraft. Following this incident UN sanctions were imposed on Libya on 31 March 1992. Consequently, oil and gas activities in the country suffered a serious setback and the NOC did not enter into new collaborative activities with foreign companies in the 1990s.

Lipetco in the 1960s

The activities of Lipetco in the 1960s and 1970s were primarily defined by political and economic events. In the early 1950s Libya was essentially a subsistence agrarian economy with modest to low income from the sector. The discovery of oil in 1957 dramatically changed the fortunes of the country and annual growth rate progressed to about 20 per cent in the 1960s. The new revenue stream from oil became the vehicle of growth, thereby necessitating elaborate structural changes in the economy. The outcome of one of these changes was the creation of Lipetco. In 1969 the monarchy was overthrown, paving the way for Colonel Muammar Gadaffi to become head of State. The new government espoused self-reliance and Socialist ideologies. These initial manifestations of the new regime indicated government intention to participate actively in economic planning, policy formulation and other broader issues of national interest. The need for the new regime to actively participate in governance was signalled by the introduction of more aggressive policies targeted at ownership of oil assets and a new pricing policy. The strategy of price control through production cuts was introduced by OPEC and was widely embraced by the members. Libya joined OPEC in 1962 and progressed

to be an influential member and the seventh largest producer in the organisation in 1977, but this position could not be sustained in the era of UN sanctions. JV agreements were signed between Lipetco and the IOCs, the first with French companies ERAP (later ElF), and SNPA (Aquitaine). In 1969 additional JV agreements were signed with Royal Dutch/Shell, ENI's Agip and Ashland Refining.

JV activities in the 1970s

As pointed out earlier, Lipetco was transformed into Libyan NOC through Law no. 24 of 1970. The law restricted the formation of new JVs with IOCs. Alternatively, Production Sharing Agreements (PSAs) were introduced as the new mode of engagement of foreign oil companies. Production sharing was at a ratio of 85:15 onshore and 81:19 offshore. In July 1970 a new law was enacted vesting in the NOC the authority to market all oil and gas products in Libya. In order to carry out this mandate Brega Petroleum Marketing Company was established as a subsidiary of the NOC. The foreign owned companies – Shell, Ente Nazionale Idrocarburi (ENI) marketing subsidiaries and Petrolibya were transferred to the NOC. The operations of Brega (the marketing company) would under these circumstances be responsible for importing, distributing and marketing of petroleum products in the country. The NOC aggressively pursued the policies of the government including the new higher oil prices policy and PSAs. These policies were objectionable to IOCs, who put up stout resistance. The government was resolute and companies were initially given the opportunity to surrender voluntarily participatory interest in their concessions in compliance with the new partial nationalisation policy of the government. Some companies voluntarily complied while others continued on the path of resistance. Non-compliant companies were subjected to stiff political pressure to relinquish the concessions.[2]

Crude oil production

Aggressive crude oil exploration in Libya commenced in 1953 and the first oil was discovered at West Fezzan in 1957. However, Esso (later Exxon) made the first commercial discovery in 1959 at Zaltan. The Zaltan field was linked with export facilities at Marsa al Burayqa in 1961. The early discoveries were followed by others which included major strikes in Sirtica Basin field, classified as one of the largest oil fields southeast of the Gulf of Sidra. The Sirtica Basin production remained a major source of crude oil until 1987. In 1969 another major discovery was recorded at Sarir, southeast of Sirtica Basin field. In addition to the major fields some other oil deposits were discovered in fields located in Northwest Tripolitania. The intense exploration and development activities led to the discovery of new oil deposits at the Ghadamis Basin, about 400 km southwest of Tripoli. Similar strikes were recorded in 1974 at fields located about 29 km northwest of Tripoli. It is important to

note that in 1977 major oil exploration activities were localised in the offshore fields. In 1987 NOC and Agip collaborated to put on stream the Bouri field. It is significant to note also that the settlement of the maritime boundary disputes between Libya and Tunisia in 1982 and that of Malta in 1983 expanded the scope of offshore exploration activities. The settlement of these disputes was considered strategic in an area believed to hold about 7.5 billion barrels of extractable crude oil. Oil production in 1984 was principally governed by the Petroleum Law of 1955 which was subsequently amended in 1961, 1965, and 1971. In an effort to expedite national development, the concession contracts had enshrined in them progressive nationalisation of foreign operations in the industry within a period of ten years. In this regard the government placed its share of operations at 25 per cent, with a provision for rising to 75 per cent. The PSA with Esso (first exporter of Libyan crude oil in 1961) being among the first, it served as a litmus test for the profitability of the PSA model. The Esso experiment proved successful and this encouraged many companies from Europe and the US to sign similar agreements with the Libyan government. Available records indicate that in 1969 about 32 companies agreed concession agreements with the NOC. The government intensified its nationalisation objectives in the industry and the NOC actively served as the vehicle for the execution of the nationalisation agenda.

The post-revolutionary nationalisation programme commenced in December 1971. The first casualty in the exercise was British Petroleum in the BP-Bunker Hunt Sarir field. Industry experts described the action against BP as a retaliation for Britain's failure to prevent Iran from seizing three small islands in the Persian Gulf believed to belong to the United Arab Emirates. In 1972 the NOC requested a 50 per cent participatory interest in the Bunker Hunt operations. The request was denied, which led to total nationalisation of all Bunker-Hunt assets in 1973. In 1972 ENI and the NOC mutually settled for 50 per cent government participation. Similar discussions took place between the NOC, Occidental Petroleum Corporation and Oasis Group. Occidental conceded to the NOC the purchase of 51 per cent of the assets. In 1973 Oasis Group owned by Continental Oil (33.3 per cent), Marathon (33.3 per cent), Amereda (16.6 per cent) and Shell (16.6 per cent) agreed to a 51 per cent assets acquisition by the government through the NOC. The government pressed ahead with the nationalisation programme and on 1 September 1973 it made a blanket announcement confirming the acquisition of 51 per cent interest in all the remaining companies in the industry. Shell opposed the government acquisition of its interest in Oasis and initiated legal proceedings against the Libyan government. The government took exception to the action of Shell and as a result nationalised all its assets in 1974. The Libyan-American Oil Company, Asiatic Company and Texaco had their assets nationalised and were paid compensation in 1977. The unfavourable posture of the government to IOCs forced Exxon to pull out of Libya in 1981. Mobil took a similar action in 1982 by withdrawing from its operations in the Ras al Unuf system. The withdrawal of these companies

from the Libyan upstream sector indirectly expanded the scope of operations and control of the NOC. In 1987 the total equity of the NOC in the industry was estimated to be about 70 per cent. The Libyan oil industry suffered a serious setback during the period of isolation emanating from the UN sanctions against the oil rich country. The sanctions imposed in 1992 lasted until April 1999. Upon the lifting of the sanctions the country initiated revisions of the petroleum regulatory laws. Available data also indicates that about 135 Blocks were earmarked for bid/offer to the IOCs. The situation in the country has improved and a good number of IOCs have returned to Libya to reactivate the upstream sector. In 2004 Libyan crude oil production stabilised at about 1.2 mmbd. In view of the enhanced production activities, it was projected that production would attain 2 mmbd in 2007.[3]

Egypt

Oil and gas production

Egypt is a significant oil and gas producer and long standing member of the APPA. It has aggregate crude oil reserves of 3.7 billion barrels. Average daily production increased over the years and peaked at 576,000 b/d in 2005, but recent trends indicate a decline in production which is taken seriously by the government. In this regard, appropriate steps were taken to introduce cutting edge technology to the exploration, and production programmes and Enhanced Oil Recovery (EOR) techniques have also been adopted as options for slowing down the declining rate of production. Oil is derived from four main territories, namely: the Suez Canal, which accounts for 50 per cent of recoverable oil; the Sinai Peninsula; and the eastern and western deserts. The Gulf of Suez Petroleum Company (GUPCO) is the producer in the Gulf of Suez Basin under a PSA arrangement between BP and the Egyptian General Petroleum Company (EGPC). Production in the GUPCO fields commenced in the 1960s and increased until about the mid-1980s when regression in production was apparent. Petrobel, ranked the second largest producer in the country, is a JV company involving EGPC and ENI of Italy. Its active fields are located at Belayim, proximate to the Gulf of Suez. It is also actively engaged in the implementation of EOR programmes in order to stem production decline in the fields. Exploration and production activities in the industry are also undertaken by the Suez Oil Company (a JV involving EGPC and Deminex), Badr El Din (EGPC and Shell) Petroleum Company, El Zaafarana Oil Company (EGPC) and British Gas-BG JV. As part of efforts to reverse decline in production, BP embarked on a broader programme aimed at discovering rich oil fields. The campaign led to the discovery of a new robust oil field at Saqqara, located offshore in the vicinity of El-Morgan field and by far the largest since 1989. It was programmed to commence commercial production in 2007 and expected to attain a peak production range of 40–51,000 b/d. Exploration and production are currently being targeted at

offshore fields in the Mediterranean. Shell was successful in the bidding round in 1999 and was therefore awarded a Deep Water Block off the Mediterranean coast. Similarly, Total, ENI and BP secured offshore Blocks in the 1999 bidding round. All these concessions are geared toward the enhancement of hydrocarbon reserves in the Egyptian oil and gas industry.[4]

Angola

Gas development

Angola was embroiled in a 27 year civil war which destroyed various facets of the society, but the country is now fast emerging as a significant regional producer of gas. Proven reserves were estimated to be 2.0 TCF in 2007. Aggressive campaigns being carried out in the offshore segment of the industry have led to the discovery of gas fields at Takula, Kokongo and Numbi, which could increase proven reserves to 9.5 TCF. Angola is associated with 85 per cent of gas flare, with the balance of 15 per cent being re-injected to boost the performance of the reservoirs or extracted as Liquefied Petroleum Gas (LPG). In an effort to comply with global environmental standards, Angola has drawn up programmes to end gas flaring in the various fields. The government targeted fields north of the Congo River to be zero flare compliant in 2005 and other fields to attain the same standard in subsequent periods. In 2007 zero flare programmes were being pursued in Nemba, Lomba and Kuito. The reduction and indeed subsequent elimination of gas flaring will boost availability of gas resources as feed stock in the industrial sector. More importantly, availability of gas will pave the way for the conversion of gas to LNG, NGLs and LPG. Angola LNG Limited was established as a JV company between Sonangol, Chevron, ExxonMobil, Norsk Hydro, Total and BP with a view to monetising the gas reserves. The proposed plant is earmarked to cost $5.00 billion and will depend on associated gas which will be derived from Blocks 1–3 and 15–18 respectively. The Ministry of Urbanism and Environment has approved EIA studies and necessary legislation has been enacted to pave the way for the construction of the plant. A contract was awarded to Boskalis International BV and Jan de Nul Dredging Limited. The establishment of LNG plants will expand the revenue base, which if properly applied should lead to enhanced development and improvement of the quality of life of the citizens.

The NOC (Sonangol) was established in 1976 and appointed sole concessionaire by the government in 1978. It achieved daily production of about 900,000 b/d in 2002, ranking second in oil and gas production in the Sub-Saharan region behind Nigeria. It joined OPEC as the twelfth member country on 1 January 2007 and currently has total reserves of about 8.2 billion barrels. Exploration and production activities are carried out through JVs and PSAs with Multi-National Companies (MNCs). The Angolan oil and gas industry is growing rapidly and the contributions of the sector account