Chapter 5: CASE STUDIES

Chapter Highlights

This chapter presents the GCC Oil Industry through six case studies. The Oil Industry generally connotes both oil and gas streams of the business. NOCs in the GCC have the petroleum entity as the major shareholder (parent company) in their gas entities in the form of joint ventures (JVs) or subsidiaries. The following issues are discussed in a typical case study:

- *Company history, Oil & Gas assets, Business Value Chain, Impact on Economy, Industry Forecasts and Key revenue lines by investigating the Business processes of the entities.*
- *Corporate Mission, Vision, Values and Objectives; and Compliance to various Management Systems like Environmental Health and Safety (EHS), Quality Management Systems, Risk Management Systems, Sustainable Development by Management Systems, investigating the Strategic Direction of the entity.*
- *Entity's Organizational Structure comprising of the Board of Directors, Management and Internal Auditors; while reviewing the entity's initiative to Enterprise Risk Management.*
- *Company strategy in terms of value chain positioning via ongoing and upcoming projects, contracts, MOUs, Industry activities pertaining to upstream operations like Discovery, Development, Exploration and Production for upstream entities & downstream operations like Refining & Marketing and Transportation for downstream entities.*

Contents

5.0 GCC Oil Industry

The case studies of the six GCC country's Oil Industry are presented in this chapter. The ***purpose of these case studies*** is to set the background ***'to evaluate the most significant aspect of the case study'*** (Yin, 1994) i.e., the impact of the Enterprise Risk Management system in the corporate governance and business control areas of the oil companies in GCC. Stake (1995) recommended ***categorical aggregation*** as another means of analysis and also suggested developing protocols for this phase of the case study to enhance the quality of the research. The following structure for the case study is therefore set out in all the ***six case studies***, to facilitate a comparative analysis in the next chapter.

Overview of the Business Value Chain

This section investigates the Business processes of the entities via information related to the Company history, Oil & Gas assets, Business Value Chain, Impact on Economy, Industry Forecasts and Key revenue lines.

Corporate Ethos

This section investigates the Strategic Direction of the entity expressed through its Corporate Mission, Vision, Values and Objectives; and Compliance to various Management Systems like Environmental Health and Safety (EHS), Quality Management Systems, Risk Management Systems, Sustainable Development etc.

Corporate Governance Framework

This section investigates the three layers of the entity's Organizational Structure comprising of the Board of Directors, Management and Internal Auditors; while reviewing the entity's initiative to Enterprise Risk Management.

Upstream Petro-strategies

This section investigates the company strategy in terms of value chain positioning via ongoing and upcoming projects, contracts, MOUs, Industry activities pertaining to upstream operations like Discovery, Development, Exploration and Production.

Downstream Petro-strategies

This section investigates the company strategy in terms of value chain positioning via ongoing and upcoming contracts, MOUs, new projects, Industry activities pertaining to downstream operations like Refining & Marketing and Transportation.

5.1 The Bahrain Oil Industry

Overview of the Business Value Chain

National Oil Company in the Kingdom

Bahrain has a state-controlled oil and gas sector. Main government vehicles are:

- ***Bahrain Petroleum Company*** catering for upstream oil & gas, and downstream oil.
- ***Bahrain National Gas Company*** catering for downstream gas.

The State accounts for all domestic oil and gas production, as well as refining and distribution segment. According to various articles in Hydrocarbons Technology and International Petroleum Encyclopedia, The Bahrain Petroleum Company (BAPCO) was formed in 1929, as a wholly owned subsidiary of Caltex Petroleum Corporation, a joint venture of Standard Oil of California (Socal, now ***Chevron***) and the Texas Company (now Texaco). Caltex retained a 40% share in the company until 1981 but by 1997 the Bahrain government assumed total ownership. The ***refinery's current capacity is over 250,000 barrels/day***, (five times the amount produced by the island's oil wells) supplying a range of petroleum products for local and export markets. Approximately one-sixth of its crude oil is obtained from wells in Bahrain, the balance being supplied from Saudi Arabia through undersea pipelines. Before long, BAPCO was expanding its refining operations and began working with Saudi Arabia, by bringing in some of its crude oil. In 1945 an underground pipeline was laid from Damman, Saudi Arabia to Sitra, Bahrain, 54 km away. At the time, it was the longest commercial underwater pipeline in the world. More than 80% of the petroleum that the BAPCO refinery processes comes via pipeline from Saudi Arabia. The seventies saw the Bahrain Government's gradual participation in the producing and local marketing operation of the Refinery, taking over 100% of these operations in 1979. The

First Discovery of oil in GCC

Oil was discovered in Bahrain in 1932 and whilst the oil reserves of Bahrain are quite small and, by Gulf standards, produce only a token quantity, it has still proved to be an advantage. Most people are surprised to learn that Bahrain was pumping oil years before Saudi Arabia began its own search for black gold. A 2007 MEED report states that for much of the 20th Century, the Kingdom of Bahrain led the economic development of the Gulf, having been the first country in the region to discover oil. And when concerns emerged in the late 1960s about the ability of its ageing oil field to maintain output, it was the first country in the region to embark seriously on a programme of economic diversification. According to 2007 Annual Review, the Company celebrated 75 years of oil production in Bahrain and the anniversary of the first discovery of oil in the Arabian Peninsula.

operating responsibility was placed with ***Bahrain National Oil Company*** (BANOCO), which was formed in 1976. But in 1999, the government of Bahrain announced it would merge its two companies, BANOCO and BAPCO. The Supreme Oil Council announced the intent to merge the two companies into a single new entity to be called the ***Bahrain Petroleum Company***. According to Lubbe (1999), 'The government has decided to consolidate the oil industry in Bahrain and to merge the upstream and downstream sectors, thus it will merge BANOCO and BAPCO. This provides an opportunity to improve efficiencies and benefit from the economies through integration of services.'

BAPCO's share of profits is also from the offshore ***Abu Safah oil field*** in the Persian Gulf between Bahrain and Saudi Arabia. When the two countries demarcated their marine boundaries in 1958, Bahrain ceded its claims to an area of the gulf north of the island in return for a Saudi agreement to share the profits from any oil that might be discovered there.

Oil and Gas assets

BAPCO is an ***integrated oil company*** and the business value chain of the entity is best described as 'BAPCO is wholly owned by the Government of Bahrain, is engaged in the oil industry including exploration and prospecting for oil, drilling, production, refining, distribution of petroleum products and natural gas, sales and exports of crude oil and refined products.' Furthermore, the company owns a ***250,000 barrel-a-day refinery***, storage facilities for more than 14 million barrels, a marketing terminal, and a marine terminal for its petroleum products. BAPCO's wharf facility has seven berths and can accommodate transport ships of up to 70,000t. More than 700 ships are loaded annually to export petroleum products. BAPCO's prime customers for crude oil and refined products are based in the Middle East, India, the Far East, South East Asia and Africa, and 95% of refined products are exported.

All of Bahrain's ***125mn bbl of proven oil reserves*** are located in the BAPCO-operated Awali field. ***Peak crude production*** of the aged Awali field was 75,000b/d that has

tumbled to around ***35,000 b/d*** in 2007. Bahrain has natural ***gas reserves of about 92bcm,*** most of which represents associated gas from the Awali oil field. The ***country produces some 11.5 bcm per annum,*** so its domestic reserves will last for less than a decade without new discoveries.

The BAPCO refinery has five crude distillation units (CDUs). Its current upgrading capacity includes a mild hydro-cracker, a catalytic reformer, distillate hydro-treater and visbreaker. The refinery configuration is geared for high middle distillate yield, i.e. heating oils, diesel, bunker fuels and jet kerosene, etc.

Business Value Chain

BAPCO's business value chain comprises of the following major process:

- **Exploration & Development:** BAPCO carries out extensive studies on a continuous basis to explore - with the use of advanced techniques and methods - new oil and gas reserves and obtain more accurate data on the existing reserves.
- **Drilling & Production:** To maintain production from Bahrain field at optimum levels, advanced drilling techniques are applied to new wells as well as working over existing wells. As a result of increased demand by the growing industrial base in Bahrain, BAPCO has expanded its gas facilities and increased its natural gas production capacity.
- **Refining:** The Bahrain Refinery - one of the largest in the Middle East and the oldest in the GCC - refines over 250,000 barrels of crude every day. About one-sixth of this crude originates from Bahrain Field; the remainder is pumped from Saudi Arabia in pipelines extending 27 kilometers over land and a further 27 kilometers under the sea before reaching the northwest of Bahrain.
- **Marketing:** BAPCO exports crude oil to world markets and sells petroleum products locally and internationally. It also supplies and sells aviation fuel at the Bahrain International Airport through its affiliate company. BAPCO also provides the full requirements of natural gas to the power generating plants, petrochemical and other industries in the country.

- **Storage:** There are more than 170 storage tanks at different sites with a total capacity of over 14 million barrels.
- **Products:** Liquefied Petroleum Gas (LPG), Naphtha, Gasoline, Kerosene, Aviation Turbine Fuel, Diesel Oil, Heavy Lube Distillate, Fuel Oil, and Asphalt.

The above business processes are further supported by typical corporate business processes (Finance, IT, HR, Administration, Legal etc) to maximize organizational performance.

Economy

Spurred on by its limited oil and natural gas reserves, expected to last for only another 10 to 15 years, Bahrain had first mover advantage among the Gulf states when it began liberalising its economy. It is now one of the region's most diversified economies, and in 2006 the United Nations Economic and Social Commission for Western Asia described Bahrain as the fastest growing economy in the Arab world. Despite this, Bahrain remains particularly vulnerable to the oil price fluctuations because its budgets are calculated using much higher estimates of oil prices than its regional peers. Oil revenue makes up almost three quarters of government income, although only a quarter of GDP. The financial sector is the second biggest contributor to GDP after oil, contributing 20% to GDP, followed by manufacturing, which contributed 13% to GDP. These two sectors will continue to be the backbone to growth in the Bahraini economy. Crude petroleum and natural gas contribute 25% to total GDP (2007 MEED report).

Key revenue lines

UK's Business Monitor International acknowledges that, the oil revenue equation for Bahrain is complex. There is domestic crude/liquids production. Then there are 'free' crude imports from the Abu Safah field in Saudi Arabia. While these volumes are a constant 150,000b/d, there is scope for Saudi ARAMCO to raise the output of the field to 300,000b/d. ***How much of this would go to Bahrain is unclear.*** If all of the field's oil

flowed to Bahrain, then the country would need to export the surplus. Finally, Bahrain purchases some Saudi crude at a discounted rate, ***where terms are not disclosed***. After all of this, Bahrain is a substantial net exporter of refined oil products.

Several analysts forecast that Bahrain will account for 0.39% of Middle East regional oil demand by 2012, while providing just 0.10% of supply. Bahrain has very modest oil and gas reserves, poor production growth outlook, low reserves-to-production ratios (RPR) and modest non-state involvement in the upstream segment. IOC involvement is very limited and no further significant near-term decline is expected while crude output is now averaging just 35,000b/d (0.035 Mn b/d).

According to various reports Bahrain is heavily dependent on the hydrocarbons sector. In 2006, petroleum exports accounted for 75% of the country's total exports, having risen steadily from 66% in 2001. Oil refining is a major downstream industry, along with aluminium smelting, also an energy-based business. All of Bahrain's 125mn bbl of proven oil reserves is located in the onshore Awali field, which was the first Arabian Gulf oil field to enter production following its discovery in 1932. Peak crude production of 75,000b/d tumbled to around 35,000b/d in 2007. Unlike other GCC states, Bahrain exports refined petroleum products rather than crude oil.

An article in a 2007 Oil & Gas Journal estimates that, ***Bahrain imports about 225,000b/d of Arab Light crude oil from Saudi Arabia*** via a subsea pipeline linking the two countries and with ***current processing capacity of 262,000b/d*** as of 2007. Approximately ***17% of its crude oil is obtained from wells in Bahrain***, the balance being supplied from Saudi Arabia through undersea pipelines. BAPCO has current capacity of almost 250,000b/d and supplies a range of petroleum products for local and export markets.

Corporate Ethos

Strategic Direction

The launch of new BAPCO Strategic Directions took place in 2002. The entity arrived at the following strategic direction which is being reviewed annually. BAPCO's strategic plan model is directed at ***'Striving for Excellence in the oil Industry'*** and the corporate challenges of BAPCO to uphold the above strategic direction are the following:

1) Grow and Diversify
2) Customer Satisfaction
3) Operational Excellence
4) Responsible Corporate Citizen

The above strategic direction is further elaborated in the spirit of the business statements below.

- **Business Purpose** - To engage in all aspects of the petroleum and related industries in Bahrain and abroad, with the aim of maximising contribution to the national economy.
- **Business Mission** - Manage and operate an integrated oil and gas business, supplying crude oil, petroleum products and gas to the international and local markets, to create value for our shareholder, customers and employees.
- **Business Vision** - Striving for excellence in the oil industry.
- **Business Values** - Respect, Business-Like Innovation, Integrity, and Teamwork. Recently in 2008, 'Personal Accountability' is also added to the Business Values.

Compliance to various Management Systems

BAPCO is committed to the protection of the environment and to the health and safety of its employees, contractors, customers, the surrounding community and the general public. The entity believes that Environment, Health and Safety (EHS) are integral parts of its business and culture, and seeks continual improvement to assure full compliance with the laws and regulations of the Kingdom of Bahrain. In the absence of local rules and

regulations, internationally accepted standards are being applied, as appropriate, to the local conditions. BAPCO has pursued the application of sound EHS management and operating practices to minimise any deleterious impact of its operations.

In 2007, BAPCO received the prestigious ***Robert W. Campbell Award*** from National Safety Council (USA). The company was recognized for implementing Safety, Health & Environment (SH&E) programs in sync with productivity, sustainability and business performance. It is the first company outside North America to receive the award.

In line with its Purpose, Mission, Vision and Values, BAPCO is committed to providing its internal and external customers with quality products conforming to agreed specifications and applicable regulatory requirements. BAPCO manages and operates a Quality Management System meeting ***ISO 9001:2000*** requirements to ensure that quality standards are met on a consistent basis at every stage throughout the manufacturing process.

The entity uses several risk management systems like ***HAZOP, HAZAD and Enterprise Risk Management (ERM)***. BAPCO uses the ***COSO ERM*** model for its ERM implementation.

At a corporate level, ERM is a new initiative in the Company allowing better strategic decision making with all risks identified and managed. ERM is used to further develop the annual Business Plans and Internal Audit plans to align the business processes with the overall strategic direction of the Company/entity.

Corporate Governance Framework

Organization Structure – Board of Directors, Management & Internal Auditors

According to a 2007 MEED report, in 2005 the government announced an overhaul of its economy that put hydrocarbons at the heart of the agenda for the first time in decades.

Key to reforms of the sector was the creation of the ***National Oil & Gas Authority (NOGA)***, a holding company that unifies control of the kingdom's natural resources with one body rather than three government departments.

The government is also encouraging foreign investment in the upstream oil sector with the licensing of four offshore exploration blocks. NOGA is the organization responsible for all petroleum and gas related issues in Bahrain, with a mission of the authority is to maintain and develop the kingdom's oil and gas resources while optimizing their utilization in pursuit of generating the highest return there from.

The BAPCO Board comprises of six non-executive Directors and one Executive Director. Furthermore, the Corporate Board is not subjected to any evaluations to improve its Corporate Governance.

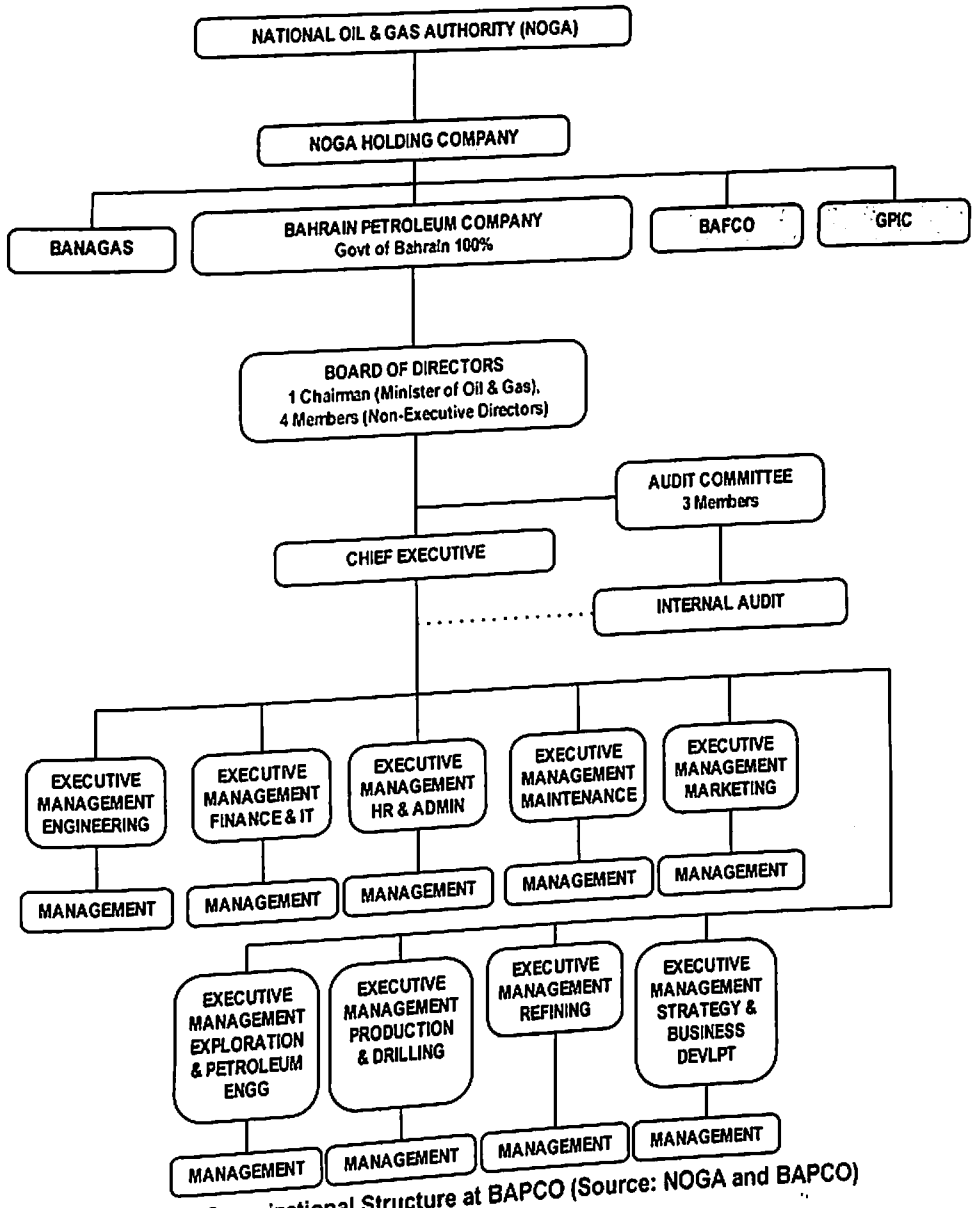

Fig. 5.1, Organizational Structure at BAPCO (Source: NOGA and BAPCO)

NOGA is entrusted with several tasks, such as including proposing and implementing the general policy on oil & gas affaires including determination of the appropriate pricing of products; overseeing the companies and corporations operating in the oil & gas industry (BAPCO: The Bahrain Petroleum Company; BANAGAS: Bahrain Gas; GPIC: Gulf Petrochemical Industries Corporation; BAFCO: Bahrain Aviation Fuels Company) as well as developing the associated industries and conducting studies & researches on the Kingdom of Bahrain's oil & gas resources and on techniques that will ensure prolonged life of the reserve and determining the appropriate pricing policies. The gas and oil sector in Bahrain receives special attention from the higher authority of the country. This is attributed to the fact that the sector plays such a vital and fundamental role in the

economic development process. And accordingly, the structure of this industry is reviewed from time to time to ensure the optimum utilization of the petroleum resources. Fig. 5.1 illustrates BAPCO's organizational structure to elucidate the corporate governance framework within the entity.

The Oxford Business Group has highlighted the status of NOGA as a ***more transparent facilitator*** and a much more proactive model for oil and gas investment. BAPCO is now fully owned by the Government of Bahrain and is ***being overseen by the NOGA*** and employs over 3,000 workforce (full-time employees), of whom 88% are Bahrainis and more than 1,300 contractors (Mirza, 2008).

Revamping the oil sector is now central to the Kingdom's economic strategy, with plans announced in mid-2007 to set up a new holding company called ***NOGA Holding Company*** to control the Kingdom's energy reserves. In August 2007, a holding company was established to administer the government's 100% stake in BAPCO; its 75% of Banagas; its 60% stake in Bafco, the aviation fuel company; and its one-third share of Gulf Petrochemical Industries Company. The holding company will invest in the domestic oil and gas industry, establish new companies and also invest in energy companies abroad.

Initiative in Enterprise Risk Management

BAPCO's 2006 Annual Report states that the key priority of Bapco's corporate governance policy is to ensure that sustained and growing value is generated and delivered to the Bahrain Government, our business partners and our employees - despite the uncertainties and risks faced by commercial organisations.

A detailed ***Enterprise Risk Management Study*** was conducted during 2006 to identify high level risks that could have detrimental impact on BAPCO's ability to generate value for its stakeholders. The comprehensive study addressed the assessment, monitoring, response, control and management of risk.

ERM function and processes

BAPCO has embraced an ERM system that was implemented since 2005. The entity has both an ***ERM process*** and an ***ERM function*** in place and the reference model is the COSO ERM Framework. At the time the interview was conducted, the Executive Management does not consider modifying the ERM system as a short term (3 years) or long term (beyond 3 years) business priority. The significant reason behind such a decision is that the entity believes that they do not experience significant limitations in the COSO ERM Framework. However, a major finding is that BAPCO does not have ***ERM policies and procedures*** in place. The system has evolved by virtue of few individuals who have contributed in its formulation, inception and continued implementation thereof.

ERM Governance

BAPCO's risk governance is ensured by a ***Risk Committee*** in place not appointed by the Board of Directors while the Company has an Audit Committee appointed by the Board of Directors. The Internal Audit function derives its authority from the Board of Directors and utilizes the findings of the Risk Committee presented in the ***Corporate Risk Register***. Internal Audit does not engage itself or participate in the ERM implementation. Furthermore, Internal Audit is also not believed to *fully* asses the effectiveness of the ERM system in place.

Nevertheless, the Risk Committee comprises of the Senior Executives of Upstream and Downstream segments, Internal Audit, Chairman of EHS and an ERM Coordinator. The ERM Coordinator is an internal position and belongs to the Finance discipline. The ERM Committee will oversee the ERM process of the Company. This Committee will act as a part of the Management Committee with special agenda and participation of the additional staff nominated for this purpose. The ERM Committee reports to the Chief Executive who is also the Head of the Committee who then reports to the Board of Directors.

BAPCO as a NOC does not publish its Annual Report along with its Financial Statements. BAPCO communicates its achievements through its ***Annual Review Report***, which also communicates about its ERM initiative as a vertically integrated oil company.

Upstream Petro-strategies

Offshore and Onshore Development Campaign

According to 2006 Annual Review, a natural decline of 14% per year is being arrested by various activities such as work-over, infill drilling, artificial lift and stimulation. Together with other processes and reservoir management, about 1.5 million barrels of new oil were produced in 2006 reducing the natural decline to just 2%. Bahrain is hoping to attract foreign companies to bring in ***new technology and expertise in enhanced oil recovery (EOR)*** in order to boost output from the mature Bahrain field and to identify new reserves.

- **Oil Development Plan & Gas Development Campaigns**: BAPCO said in February 2007 that it was launching a ***15-year development programme*** to boost oil production from the Bahrain field, to meet the country's growing energy needs. The state company's new board approved the drilling of ***63 new wells in 2007 and 2008***, which is expected to increase oil production by 1,000b/d. This is part of a plan to drill ***700 development wells over 15 years***, tapping into already discovered reserves in the Bahrain field. A board meeting approved a development programme to drill 48 vertical wells and 15 horizontal wells during 2007-2008. Company officials have said that they expect the drilling programme to increase the field's production capacity by ***an ambitious 12,000b/d, which could offset forecast declines in output.***
- **Production Sharing Agreements with IOCs**: In March 2007, Bahrain invited IOCs to bid for Exploration and Production Sharing Agreements (EPSA) in Bahrain's ***offshore territory***. The Kingdom announced that four areas, encompassing Bahrain's entire offshore territory. Bahrain has also put the

development of existing ***onshore operations*** on offer, with the specific timing and structure of the offer to be published in the near future. The Kingdom has stated that it needs 'effective and timely technology' in order to successfully exploit its oil and gas resources and has therefore invited IOCs to bid.

The exploration efforts of Chevron, Petronas, PTTEP and EnCana have yet to deliver any offshore discoveries to supplement the ***elderly Awali field***, so there is little near-term chance of a recovery in production levels. Crude output is now averaging just 35,000b/d, although no further significant decline is expected over the near to medium term. Consumption of oil is set to rise with the growth of the economy, increasing by at least 3% per annum over the forecast period and reaching an estimated 46,000b/d by 2012. The intake of the country's sole refinery should be fairly constant, requiring crude imports rising above 220,000b/d by the end of the period.

In February 2008, BAPCO awarded an EPSA to Thailand's PTTEP for offshore Block 2. This follows the award of offshore Blocks 3 and 4 to Occidental Petroleum. Great expectations rest on the upcoming offshore exploration programme, which Bahrain is hoping will usher in a new era of upstream success and growing investment. The exploration efforts of Chevron, Petronas, PTTEP and EnCana have yet to deliver any offshore discoveries to supplement the elderly Awali field. Canada's EnCana has a 50% working interest in Bahrain's exploration Block 5.

- **Deep Gas drilling campaigns:** Until now, the Kingdom has allowed IOCs to drill wells up to a maximum 4,877m (16,000 ft). The new natural gas tenders will allow exploration wells to be drilled to 6,096m (20,000 ft). Bahrain will be hoping that gas exploration achieves more positive results than recent oil exploration efforts that have proved unsuccessful.
- **Gas import from Iran:** The Kingdom has signed a framework deal to import 10.3bcm of gas from Iran's South Pars field, with 2015 as a possible start date. According to Business Monitor International, BAPCO officials have stated that

"At present we see potential for proven oil reserves to be down to 100mn bbl by 2012, while gas reserves are forecast to decline to 90bcm by 2012. Should the deeper gas exploration by IOCs produce commercial results, there is potential upside risk to our gas reserves forecast." Under transportation as a downstream business process, Iran and Bahrain have agreed on a framework deal that will see Iran export 10.3bcm of gas to Bahrain, according to Iran's oil minister Gholamhossein Nozari, quoted by local media sources. During 2008 Bahrain's minister of oil and gas affairs had named 2015 as a start date. Whether Iran and Bahrain will be able to finalise an export deal will depend on how quickly the two countries come to an agreement over the price of the gas. However, with Bahrain's 11.5bcm of gas production expected to last less than a decade without new discoveries, the country is much more desperate than some of its neighbours to quickly finalise long-term supply agreements.

Downstream Petro-strategies

Major Investment Projects & Contracts

According to Business Monitor International, the current upgrading of the refining complex will alter the slate of products offered for sale, raising the value of Bahrain's oil exports. Unless crude processing capacity is increased, the volume of product exports is likely to decline from more than 195,000b/d to around 189,000b/d in 2012.

- **Building the World's largest hydro-cracking unit:** According to Hydrocarbons Technology, BAPCO is to build the ***world's largest hydro-cracking unit*** as part of plans to increase the production of low-sulphur diesel fuel (LSDF) that will ***meet EU environmental laws***. BAPCO has also built a hydrogen unit, a sulphur recovery unit and various other facilities and utilities. BAPCO has also revamped its existing mild hydro-cracker and converted it into a 70,000b/d unit with ultra-deep de-sulphurisation capability. This is part of the Strategic Investment Project set out by BAPCO.

- **Private refining facility**: According to Nov 2007 Gulf Daily News article, Bahrain is also considering building a new $6-8bn refinery if new crude deposits are discovered, in a statement by oil and gas minister Abdulhussain Mirza. The ***new refinery*** would be likely to be built by the private sector, boosting capacity from the existing 249,000b/d.
- **Strategic Investment Programme (SIP)**: News articles in Business Monitor International state that, Bahrain's consumption of oil is set to rise with the growth of the economy, increasing by at least 3% per annum over the forecast period and reaching an estimated 45,000b/d by 2011. The intake of the country's sole refinery should be fairly constant, requiring crude imports rising above 200,000b/d by the end of the period. The current upgrading of the country's refining complex will alter the slate of products offered for sale, raising the value of Bahrain's oil product exports. Unless crude processing capacity is increased, the volume of products exports is likely to decline from 185,000b/d to around 179,000b/d in 2011. According to articles in 2007 Oil & Gas News, BAPCO has worked on the upgrading of its refinery by implementing several projects aiming at improving its competitiveness amidst international market changes, while complying with latest international standards. BAPCO's SIP will propel the company into the forefront of refining technology. The major projects being implemented are the following:
- **Low Sulphur Diesel Production**: This is one of the refinery's modernization projects at a cost of $700 Mn and the plant is designed to produce competitive low sulphur diesel. It is also the focus of the SIP allowing the Company to produce 100,000 bpd of ultra low sulphur diesel. This project is contributing to Bahrain's revenues by $200 Mn annually. One of the ***largest single-train hydrocrackers in world today*** is the centerpiece of this project. Sulphur content will be reduced from the current average level of 650 ppm to 250 ppm and then to 10 ppm to secure a highly competitive position in the international diesel market. Up until now, BAPCO's export sales of diesel were to countries which had less stringent regulations concerning exhaust emissions such as Asia, Africa and Arabian Gulf. With the commissioning of this plant, BAPCO is selling its new

diesel fuel to Europe and the USA with a higher premium which has stricter limits of sulphur content in diesel imports (Al Sayed, 2007).

- **Refinery Gas Desulpurisation**: This project is to eliminate sulphuric substances from refinery gases to ensure compliance with new environmental legislations. This project brings major environmental benefits to the people and the neighbourhood communities (Al Sayed, 2007).
- **Production of Sulphur Pellets**: One of BAPCO's latest ventures is to produce sulphur pellets primarily as an offshoot of the Low Sulphur Diesel production process (Al Sayed, 2007).
- **Production of Prime Lubrication Oil**: BAPCO is building a lube base oil plant through a joint venture agreement with Finland's Neste Oil. Neste oil a major supplier in the high-end lube base oil (Group III) markets (Al Sayed, 2007).
- **Arabian Bahrain Pipeline**: Other strategic initiatives include a new route for the Arabian Bahrain pipeline (Al Sayed, 2007).
- **New Naptha Cracker**: Other strategic initiatives include a new Naptha Cracker in the near future (Al Sayed, 2007).
- **Operational excellence records set in Refining**: BAPCO's refining saw several record-breaking performances due to plant availability of more than 97%, which is a reflection of the whole company,covering oil processing, maintenance, reliability, power and utilities and many other supporting groups. As a result, the refinery's daily throughput target of 253,000 barrels exceeded by 5700 bpd for 2006. Other challenges are to continually reduce the heavy end of the barrel and also reducing the oil mass loss per month (Al Sayed, 2007).

5.2 The Kuwait Oil Industry

Overview of the Business Value Chain

National Oil Company in the State

Kuwait is believed to contain around 101.5bn bbl of proven oil reserves (excluding its share of the Neutral Zone), or roughly 9% of the world's total. This latest estimate is provided by the June 2008 BP Statistical Review of World Energy. The report estimates that the Saudi-Kuwaiti Neutral Zone holds a further 5bn bbl, half of which belong to Kuwait. The December 2007 Oil & Gas Journal had also revised up its estimate to 101.5bn bbl. However, ***there are now serious doubts as to whether Kuwait has the kind of reserves*** that would enable KOC to meet its output targets. These concerns were first aired in January 2006, when oil industry newsletter Petroleum Intelligence Weekly revealed that internal records suggested Kuwait reserves were about 48bn bbl, half the officially stated 99bn. This leaked industry document suggested that reserves have been overstated by the Kuwaiti government, with 48bn bbl possibly a more accurate assessment of the state's resources. The same source implies that only 24bn bbl of oil are actually proven. The Gulf state is denying the accuracy of the reports, suggesting that they relate to only part of its reserves base. In May 2007, former oil minister Sheikh Ali al-Jarrah al-Sabah was quoted as saying "***Kuwait will never disclose the size of its oil reserves for reasons of national security***", according to reports in Business Monitor International.

Oil Discovery and the formation of OPEC

The state of Kuwait is a small, oil-rich country at the northern tip of the Gulf, bordered in the north and west by Iraq, and in the south by Saudi Arabia and the Divided Zone, over which it has joint sovereignty with Saudi Arabia. Kuwait was the first of the colonized Gulf States to gain independence from the UK in 1961. A constitutional monarchy, it was also the first Gulf state to have an elected parliament, and is considered to be the most politically and economically progressive of all its neighbours in the region (2007 MEED Report).

Oil transformed Kuwait. Although Kuwait Petroleum Corporation (KPC) was established only in 1980, it took over a number of companies that had been active in Kuwait for much longer. The most important of these was the Kuwait Oil Company (KOC), which was incorporated in London in 1934. The ruler of Kuwait granted an exclusive concession to the Kuwait Oil Company (KOC), to explore for, produce, and market Kuwait's oil to consortiums comprising of British and the US. The concession covered the whole country and was to last for 75 years. Some reports state that the formation of Kuwait Oil had been in part, the result of a prolonged diplomatic dispute between Britain, the dominant power in the Middle East, and the United States, which supported U.S. oil companies' claims to participate in petroleum development in the region (Chisholm, 1975).

Contd. in next page...

Along with Saudi Arabia and the UAE, ***Kuwait is one of the few countries with surplus oil production capacity*** i.e., able to pump an estimated 2.64mn b/d on a sustainable basis. ***Kuwait is a core member of OPEC and, as such, is governed by output quotas.*** Output has recently been averaging 2.63mn b/d (June 2008). Kuwait's refining capacity was greatly reduced during the 1990-1991 period; tumbling from 820,000b/d to less than 200,000b/d. Repairs and rebuilding have restored capacity to 905,000b/d.

Kuwait Petroleum Corporation (KPC) controls oil and gas activities, ***producing 100% of oil and gas production.*** KPC is a wholly state-owned organisation responsible for Kuwait's oil and gas businesses. Its ***Kuwait National Petroleum Company (KNPC)*** subsidiary has ***100% of national refining capacity and the fuels distribution segment.***

State-owned KNPC operates one of the largest oil complexes in the world, owning three refineries stated below, with a combined processing capacity of around 902,000b/d.

- ***Mina Abdulla Refinery(261,000b/d)***
- ***Mina Al-Ahmadi Refinery (442,000b/d) and***
- ***Al-Shuaiba Refinery (199,000b/d)***

The company was also the monopoly retail fuels distributor in Kuwait until FY2006-07 when it sold 40 stations to Al-Soor Fuel Marketing as part of the company's privatisation programme. KNPC now operates 37 service stations and is constructing a further two, with the network supplied from two main depots in Sabhan and Al-Ahmadi. *(NOTE: KNPC is a subsidiary of KPC).*

Contd.

Soon after, there was growing irritation amongst the Kuwaitis and elsewhere in the Middle East due to the western control over its oil resources as the consortium system limited the bargaining power of host governments. In 1960, Kuwait joined the Organization of Petroleum Exporting Countries (OPEC) as a founder member. OPEC's objective was to unify and coordinate the petroleum policies of its members and protect their interests against the Western oil companies (Evans, 1986).

In 1960, the government also organized the Kuwait National Petroleum Company (KNPC) as a joint enterprise owned 60 percent and 40 percent by the government and private sectors, respectively. Furthermore, in 1962, KOC was forced to relinquish most of its concessional areas to KNPC. For the next two decades, this element of private ownership distinguished KNPC from most other national oil companies in the Middle East (Evans, 1986).

Oil and Gas assets

KPC's Oil reserves are located in the 70bn bbl Greater Burgan area, comprising the Burgan, Magwa and Ahmadi structures. Capacity is estimated at 1.6mn b/d, with the field

considered to be the second biggest in the world, after Saudi Arabia's Ghawar field. It has been in constant production since 1938, hence concerns over its longevity, remaining reserves and longer-term production potential. Kuwait's Raudhatain, Sabriya, and Minagish fields have proven reserves estimated at a combined 11.5bn bbl. All of these fields have been in production since the 1950s. The South Magwa field, discovered in 1984 to the west of Burgan, is believed to house at least 25bn bbl of recoverable oil. In March 2006, Kuwait announced a 10-13bn bbl discovery in the Sabriya and Umm Niqa areas. A month later, the country claimed another major find in Arifjan, south-east of the Burgan oil field.

KPC's Gas reserves comprise of free natural gas fields in the Sabriya and Umm Niqa areas. In 2006, a 991.1bcm non-associated gas find was discovered in the above fields in northern Kuwait. ***This was Kuwait's first gas find that was not part of an oil field.*** Initial studies proved that 60-70% of the discovered volume can be accessed. KOC started producing gas from the fields on June 2008. The fields were estimated to produce around 1.8bcm per annum initially. A target has been set to increase output to 10.3bcm by 2015. ***The gas sector is largely undeveloped in Kuwait,*** although efforts are being made to raise consumption, matched by higher production. There have been several important gas discoveries that could ultimately yield considerable production potential for the country.

KNPC's operates three refineries Mina Abdullah (under modernization) and Mina al-Ahmadi, which have a combined capacity of 703,000b/d, and Shuaiba with 200,000b/d. Kuwait is planning to invest a preliminary $876mn to boost capacity at the first two plants to a combined 800,000b/d. These expansions, along with the new al-Zour refinery, will boost ***Kuwait's refining capacity from 930,000b/d to 1.42mn b/d.*** Shuaiba, an ageing facility which increasingly suffers from mechanical faults, will continue to operate until ***Al-Zour refinery*** starts up, after which it will be closed down. Once operable, the Al-Zour refinery will be the largest in the Middle East after Saudi Arabia's 550,000b/d plant at Ras Tanura.

- Mina Abdulla Modernization Project consisted of 15 new process units and the modernization of existing units such as the crude distillation, hydrogen production

units, sulphur recovery units and others. Among the most important units at Mina Abdulla Refinery are two crude distillation units, four hydrogen production units, two atmospheric residue desulphurization units, a vacuum distillation unit, two delayed coker units, a hydro-cracking unit and several other support facilities and utilities. The new crude distillation unit at the refinery has a design capacity of 180,000 bpd. With the existing unit, the refinery now has two crude distillation units with a total capacity of 240,000 bpd.

- Mina Al-Ahmadi Refinery Modernization Project (RMP) was intended to provide the local and world markets with low sulphur content petroleum products, and to reduce dependence on gas as fuel, thus providing cheaper and more stable fuel and reducing air pollution. The refinery now contains 29 new units, in addition to the old ones, the Fluid Catalytic Cracking Unit, the Atmospheric Residue Desulphuriztion Unit, the Vacum rerun unit and the Sulphur recovery Unit.
- Shuaiba Refinery consists of the following main units - crude distillation unit, hydrogen production unit, naphtha unifiner unit, H-Oil unit, Merox unit, two gas oil processing units (Isomax) for hydrogen cracking (Isocracker, Isomax) two sulphur recovery units, two light and heavy diesel unifiner units, a kerosene unifiner unit, and a naphtha fractionation unit. Shuaiba was the first export refinery in Kuwait, due to its high quality products which conformed with the highly sophisticated specifications of the world markets.

Business Value Chain

Kuwait Petroleum Corporation (KPC) is universally recognized as one of ***today's top ten oil energy conglomerates***, and a leader in providing safe, clean energy to the global markets.

KPC was first established in 1980 in order to bring together all state-owned elements of the Kuwait oil sector under one corporate umbrella. Today, KPC oversees a fully-integrated industry with operations ***spanning six continents***. KPC brings hydrocarbon energy from their own domestic reservoirs and their upstream interests abroad direct to the consumer through ***a series of specialized subsidiary operating companies***. KPC is a diversified energy conglomerate, encompassing all aspects of the hydrocarbon industry,

from onshore and offshore upstream exploration and production through refining, marketing, retailing, petrochemicals and marine transportation.

KPC's Business Value Chain comprises of the following activities as the group is actively involved in every step of the oil and gas industry.

- **Upstream oil and gas segment:** Discovering reservoirs. This component is carried out by the subsidiary Kuwait Oil Company (KOC).
- **Downstream oil and gas segment:** Delivering clean and safe fuel to the world's motor vehicles, aeroplanes, ships, even farms and power stations. This component is carried out by Kuwait National Petroleum Company (KNPC).
- **Downstream Petrochemicals segment:** Providing many of the base petrochemicals necessary to the materials of our modern world. This component is carried out by Petrochemical Industries Company (PIC) – which is not covered in this study.

KOC's Business Value Chain can be further broken down to elaborate key activities into the following:

- **Exploration**
- **Drilling**
- **Production**
- **Export**

Kuwait Oil Company's responsibilities under the KPC's umbrella are the exploration, drilling, and production of oil and gas within the State of Kuwait. Kuwait Oil Company is also involved in the storage of crude oil and delivery to tankers for export.

KNPC's Business Value Chain can be further broken down to elaborate key activities into the following:

- **Refining (3 Refineries)**
- **Projects and General Services**
- **Planning & Local Marketing**

The above core activities are supported by Finance, Safety and other departments.

Economy

Despite diversification efforts, Kuwait's economy is still heavily dependent on oil export revenues, and GDP is determined as much by the oil price as anything else. With the oil boom of recent times, this has worked to the state's advantage as nominal GDP growth has averaged more then 20 per cent in the last four years to see the economy grow to more than $95bn.

Kuwait's major challenge however has been translating these surpluses into expenditure. The issue is mainly budgetary. Budgets, and thus expenditure, are estimated on a conservative oil price of just $36 a barrel. The result of this fiscal conservatism is that ministries receive much less to spend than the state can afford. The result is a massive yearly underspend.

The other major issue is the heavy involvement of the state in economic activity. More than 90 per cent of the local working population work for the government. As a result, private sector growth has been stunted and remains heavily reliant on government spending. ***There is very little innovation and entrepreneurialism in Kuwait.***

Government plans to open up and diversify the economy have been met with resistance, particularly since high oil prices have allowed the government to deliver economic expansion without the need for significant structural reform. ***The economy remains largely closed and unreformed.*** Foreign firms have to pay up to 55 per cent tax on their profits and there is little consequent international investment. In 2005, less than $250m was invested in Kuwait, ***less than many sub-Saharan countries*** (2007 MEED Report).

Key revenue lines

Several analysts forecast that the country will account for 2.63% of Middle East (ME) regional oil demand by 2012, while providing 10.37% of supply. Kuwait is a substantial exporter of refined oil products, with the trade amounting to more than 500,000b/d and worth more than $7bn per annum in 2006.

Kuwait hopes to increase its domestic natural gas production, both through reduced flaring of associated gas and through new drilling. Production of gas could reach 15bcm by 2010 and, ultimately, Kuwait could export the fuel.

KPC states that with total assets of more than $37 billion and annual revenues of almost $28 billion, KPC is a major contributor to the revenues of the State of Kuwait.

Corporate Ethos

Strategic Direction

KPC express their ***overall strategic direction*** as ***'Energy for our world'*** and further state that 'Kuwait Petroleum Corporation is the state-owned entity responsible for ***Kuwait's hydrocarbon interests throughout the world.*** As part of the global energy industry, we help to supply the world with its vital oil and gas needs by exploring for, producing, refining, transporting and marketing these precious natural resources both in our home country and internationally.' The above strategic direction is further elaborated in the following Business statements below. ***KPC's mission statement states that it is a corporation of economic character, run on a commercial basis and fully owned by the state.***

- **Business Mission:** KPC is a corporation of economic character, run on a commercial basis and fully owned by the State. It is one of the world's major oil & gas companies and its activities are focused on petroleum exploration and production, refining, marketing, petrochemicals, and transport. KPC's mission is to manage and operate these integrated activities worldwide in the most efficient and professional manner, in addition to growing shareholder value whilst ensuring the optimum exploitation of Kuwait hydrocarbon resources. KPC has an important role in contributing to the support and development of the Kuwaiti

economy, developing national manpower, maintaining superior commercial and technical expertise and proactively managing the environmental, health and safety aspects related to KPC's businesses.

- **Business Vision:**
  1) Be a highly profitable and performance driven company.
  2) Contribute significantly to the support and development of the Kuwaiti economy.
  3) Strengthen the world class reputation of all KPC operations.
  4) Encourage continuous learning in all areas related to KPC's business.
  5) Become a regional leader in HSE performance and apply the latest and the most appropriate technologies in KPC's operations.
- **Business Values:**
  1) Motivating Environment
  2) Customer Satisfaction
  3) Teamwork
  4) Trust
  5) Commitment to HSE
  6) Honesty, Integrity and Transparency
  7) Quality and Excellence
  8) Innovation/ Responsiveness

KNPC believes that as an entity they will face the challenge from the unprecedented growth in the worldwide demand for energy as it presents them with the opportunity to transform their business into a leading global force. KNPC will achieve it by aligning their ***performance***, their ***people*** and their ***practice*** to this changing environment. Their mission, vision and values show such a way.

- **Business Mission:** Add value to Kuwaiti hydrocarbons.
- **Business Vision and Business Values:** The entity's vision and mission are depicted below in Fig 5.2.

Fig. 5.2, Business Vision and Mission at KNPC (Source: KNPC)

Compliance to various Management Systems

KPC firmly believes that its role transcends managing and developing the oil industry. Spurred by its social responsibility, KPC avidly takes part in social activities, supports worthy causes, takes initiatives to enhance its ***HSE*** performance, hones the skills and talents of its staff, and improves the quality of life wherever it operates its business. The entity's HSE statement is ***'Passion for Safety'*** and the values and business principles are further expressed in their business statements below:

- **HSE Vision:** The actions of our people, the excellence of our processes and our respect for our stakeholders will visibly demonstrate KPC's commitment to World-Class HSE performance.
- **HSE Mission:** We direct our company according to the best industry practice both in terms of results and effectiveness to ensure the safety and health of our employees, contractors, suppliers, community and customers as well as the protection of the environment wherever we conduct our business.

KNPC believes in the statement ***'Caring for a Cleaner World'*** as part of its environmental concern and initiatives. KNPC is an ISO-14001 certified company which

makes it mandatory to identify, manage and streamline environmental issues at all its Operations/Sites. It has also commissioned many strategic environmental projects.

KPC has set out to develop and apply common approaches and ***policies to manage all risks*** facing KPC in the most efficient and effective manner, in line with its strategy direction to attain further success and progress.

Corporate Governance Framework

Organization Structure – Board of Directors, Management and Internal Auditors

KPC itself serves the function of the group head office in Kuwait. From its headquarters, KPC strategically coordinates and supervises its operating subsidiaries, finances their operations, and the international marketing of crude oil, refined product as well as gas. The Corporation also provides significant support to the Kuwait Ministry of Energy in its dealings with OPEC. KPC supports its international business through its worldwide regional marketing offices.

With the nationalization of Kuwait's oil and gas assets, KPC's '***Performance through Integration***' is evident in their new organizational structuring. With all the major pieces of the industry now in its hands, the Government put the final touches on how to make them work together in the most effective manner possible. The answer was KPC, which successfully welded all the oil companies into one integrated oil industry and the new structure allowed central planning of the industry with more effective and efficient distribution of the work, close coordination between various elements, and the better use of engineering economies of scale which are so important in a thriving oil industry. ***Each company was to focus on their own activity which provided the commercial flexibility necessary to run a successful oil business.*** KPC took over the function of marketing Kuwait's oil outside Kuwait from the ***Ministry of Oil (MOO).***

Fig. 5.3 illustrates KPC's organizational structure to elucidate the corporate governance framework within the entity.

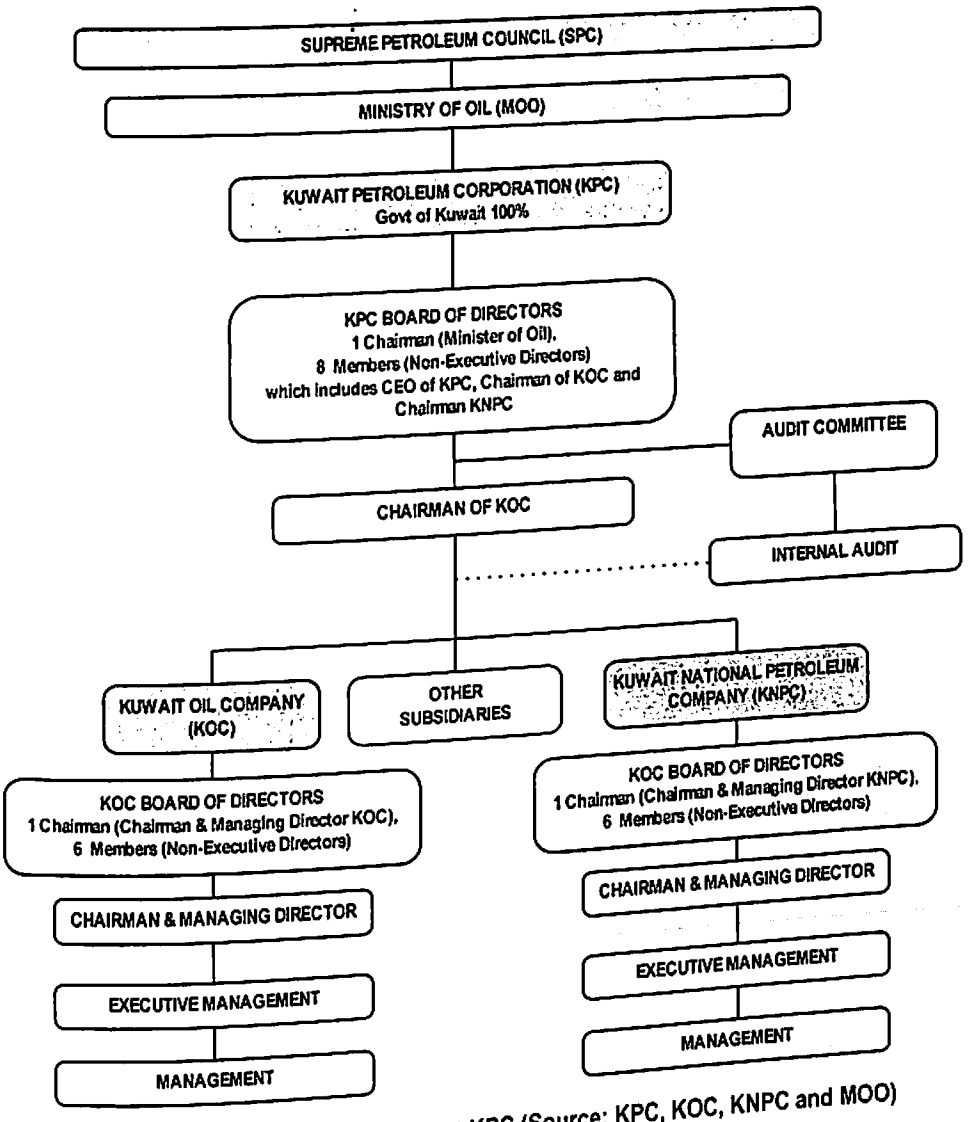

Fig. 5.3, Organizational Structure at KPC (Source: KPC, KOC, KNPC and MOO)

Supreme Petroleum Council (SPC) is the highest policy body for the hydrocarbon wealth in Kuwait. More, specifically, it has supervisory authority upon KPC. Prominent among SPC duties is the regulation of the oil sector and supervisory body for KPC and its subsidiaries. SPC's Chairman is the Prime Minister of Kuwait and has a Policy functionary along with Supervisory role. MOO is headed by the Minister of Oil who is also a member in the SPC; and has a Regulatory functionary. KPC as an entity has the Operational functionary.

The KPC Board comprises of four non-executive Directors and seven Executive Director. Furthermore, the Corporate Board is believed to be subjected to evaluations to improve its Corporate Governance.

Initiative in Enterprise Risk Management

ERM function and processes

KPC has embarked on an ERM system since mid 2007. The ERM is a new approach at KPC and the management consultant is reviewing the activities and it is widely believed to be a framework which will be based on risk and likelihood. It is not evident whether the reference model is the COSO ERM Framework which is currently under construction. Therefore, the entity has ***ERM function*** and not an ***ERM process*** in place. At the time the interview was conducted, the Executive Management seems to seriously consider introducing and further modifying the ERM system as a short term (3 years) business priority. As the process is under construction, the entity believes that they have to complete the ERM project soon to enable them to test the same across their value chain. KPC is more systematic and is currently setting out ***ERM policies and procedures*** in place for implementation.

ERM Governance

KPC's risk governance is ensured by a ***Risk Committee*** in place fully appointed by the Board of Directors, just as the Audit Committee is also appointed by the Board of Directors. The Internal Audit function derives its authority from the Board of Directors and does not utilize the findings of the Risk Committee. There is no ***Corporate Risk Register*** in place. Furthermore, there is no clear indication as to whether Internal Audit Plan would be derived from the Corporate Risk Register in future.

The Risk Committee comprises of the Chief Risk Officer (CRO) and the ERM Manager; the length of time for the CRO position in place is one year and the source of CRO

position is internal and belongs to the Finance discipline. The Risk Committee reports to the Chairman of KPC who then reports to the Board of Directors. KPC as a NOC does not publish its Annual Report along with Financial Statements. However, its subsidiaries like KNPC etc disclose their Financial Statements in their Annual Report. They do not communicate about the ERM initiative along with their other achievements.

At KNPC, the Enterprise Risk Management team has launched an ***awareness program*** for all KNPC staff members in Nov 2008. The awareness program is aimed at introducing the KNPC staff to the major elements of the ERM program, and underlines its importance for the KNPC and briefing staff on all the required implementation procedures, being set out.

Upstream Petro-strategies

Overall Business Development and Expansion Strategy

KPC was a ***remarkably successful national oil company*** but however recently face several risks most importantly due to ***political rifts*** and ***state intervention*** which threaten the progress of the planned strategies. During the 1980s, it achieved a far greater degree of integration than any other OPEC producer, with the possible exception of Petroleos de Venezuela. KPC was the first; and by 1990 the only state-owned, national oil company from the Third World to sell its oil under its own brand name and through its own service stations. KPC's Business Development & Expansion directions are presented below.

- **Seeking to be an Integrated Oil major:** KPC developed an ambitious strategy to ***integrate its oil industry*** from the well-head to the petrol pump in consumer countries. Considerable attention was given to expanding and upgrading Kuwait's refinery capacity, in order to enhance Kuwait's ability to respond rapidly to changes in the pattern of export demand. By 1989, KPC had three modern refineries at Mina Abdullah, Mina al-Ahmadi, and Shuaiba plants; and plans were further being made to integrate their operations to attain the greatest possible economic efficiency.
- **National & International Subsidiaries:** Kuwait Petroleum Corporation operates through ***a series of specialised subsidiaries in Kuwait and across the world***, with activities encompassing all aspects of the hydrocarbon industry. All of these

subsidiaries are fully-owned by KPC. ***Principal Subsidiaries*** of KPC are the following, Kuwait Oil Co.; Kuwait National Petroleum Co.; Petrochemicals Industry Co.; Kuwait Oil Tanker Co.; Kuwait Aviation Fueling Co.; Kuwait Foreign Petroleum Exploration Co.; Kuwait Petroleum International Ltd.; Kuwait Gulf Oil Co.; Oil Sector Services Co.; and, Oil Development Co. KPC's most dramatic move was to ***expand overseas***. It has acquired several companies overseas especially in the US and the EU.

However ***there were problems which stifled KPC's overall business strategy*** due to the following reasons:

(1) It faced resistance to its growth and ambitious expansion from established IOCs.
(2) More fundamentally, there was some conflict between the strategies 'of expanding refinery capacity within Kuwait' and 'seeking to become an integrated oil major.'
(3) KPC's state ownership created several political problems, leading to political risks.
(4) ***KPC's greatest liability is its strategic risk***, which was due to the geographical location of Kuwait itself. KPC has relied entirely on sea transport through the Persian Gulf to export its oil, and the resulting vulnerability of KPC was evident during the Iran-Iraq War, Kuwait Invasion and political volatility of the Straits.
(5) In the oil sector, ***the Kuwaiti constitution forbids foreign ownership of resources,*** but the government has been considering foreign investment in upstream oil development under terms that provide fees to the foreign firms rather than traditional production sharing agreements (PSAs).

Nevertheless, KPC's Major Investment Projects initiated are the following:

- **Vision 2020:** The Kuwait Government's 2020 vision calls for an increase in capacity to 3mn b/d by 2010, 3.5mn b/d by 2015 and 4mn b/d by 2020. Kuwait has estimated that its national oil industry alone will need to spend around $27.6bn on domestic upstream oil development to meet the 2020 production goal. Project Kuwait is one of the agendas in Vision 2020.
- **Cost escalation due to political opposition in 'Project Kuwait':** The country's Project Kuwait is an $8.5bn, 25-year plan to increase the country's oil production

with the help of IOCs. In particular, Kuwait aims to increase output at five northern oilfields (Abdali, Bahra, Ratqa, Raudhatain, and Sabriya) from their current rate of around 600,000b/d to 900,000b/d within three years. The project envisages 4mn b/d of capacity by 2020. Kuwait's largest field, Burgan, is to remain off-limits to foreign investment under the new plan. ***Project Kuwait has been repeatedly delayed, however, due to political opposition and resistance from nationalists and Islamists in Parliament to the idea of allowing foreign companies into the country's oil sector.*** Business Monitor International quotes about a recent internal report which states that the delay in the approval of the Project Kuwait northern oil fields scheme has seen an increase in its cost from $3-4bn to $8.5bn. The report warned that the cost could increase to $10bn by the time the project is approved. Should there be a substantial downwards revision of the country's proven oil reserves, then efforts to rebuild resources may be stepped up, which could lower the barriers for entry and enable IOCs to participate more freely in the Kuwaiti oil sector.

- **Exploration and development in Northern fields:** KPC made a significant move in 2001 when it announced plans to allow foreign oil companies to develop its oil fields in Northern Kuwait. Kuwait Oil Company said in October 2007 that it had reached a preliminary deal with ExxonMobil to produce heavy oil at a possible 900,000b/d by 2020. The project involves exploration for and development of heavy oil in the Lower Fars field in northern Kuwait. Terms and details are not available.
- **Negotiating performance related oil and gas contracts with IOCs:** In May 2008, KPC announced that, for the first time, it is looking to negotiate performance related contracts with IOCs, according to a report in the Financial Times. Since the country nationalized its energy sector in the 1970s, IOCs have been restricted to short-term service contracts. The new contracts, under the name of ***'enhanced technical service agreements'***, would link technical and commercial arrangements to performance, with the aim of boosting Kuwait's oil and gas production. KPC is also seeking to develop gas projects, potentially in partnership with IOCs.

Downstream Petro-strategies

Ambitious mega projects in the Energy sector

KNPC which operates the country's refining segment announced in June 2008 that it would spend as much as $30bn by 2012 on its development. The company plans to build one new refinery and upgrade two others.

- **Capacity expansion of ULSD fuels:** According to KNPC's chairman Farouk Al Zanki, $15bn will be spent on building the new refinery at Al Zour and the remaining $15bn will be spent on upgrading and expanding the existing refineries at Mina Abdulla and Mina Al-Ahmadi. The first aim of the investment is to increase capacity to produce ultra-low-sulphur transportation fuels.
- **Enhance processing of Heavy and Sour Crude Slates:** According to KNPC's chairman Farouk Al Zanki, the second aim of the investment is to process an increasingly heavy and sour crude oil production slate as new oil field developments come online. This is mainly focused on to the existing facilities. A contract for an upgrade to the Mina Al-Ahmadi refinery was signed with Hyundai in May 2005, which will allow it to reconfigure lower sulphur diesel and gasoline, and reduce the proportion of fuel oil in its product mix. The upgrade project was expected to be completed in 2008 at a cost of $400mn but has been repeatedly delayed.
- **'Fourth Refinery Project' at Al –Zour:** According to a report in the Al Rai newspaper, the new Al-Zour refinery may cost as much as $19bn, $5bn more than the budget allocated to the project at present; and is now scheduled to come onstream in March 2012. The new refinery will be the largest in the Middle East once it is completed in 2012. Al Zour will replace Kuwait's ageing 190,000b/d Shuaiba refinery, becoming the country's third plant alongside its Mina Al-Ahmadi and Mina Abdulla refineries.
- **Exploring investment opportunities in the rapidly growing Asian market:** Several partnerships with Chinese and Indian companies in downstream business are in the plans. The plans are aiming to build refinery and chemicals facility in ***India, China, Vietnam and Japan*** through its local players.

5.3 The Oman Oil Industry

Overview of the Business Value Chain

National Oil Company in the Sultanate

Oman's petroleum deposits were discovered much later than those in the key Gulf oil states and are generally smaller and less productive than the vast fields of Saudi Arabia, Kuwait and Iraq. With lower output per well and more difficult reservoirs, Oman uses ***enhanced recovery techniques*** that make its cost of extraction a multiple of that seen elsewhere in the Middle East. In November 2006, the country said it was investing $4bn to lift crude oil production, mainly through enhanced recovery methods. ***Petroleum Development Oman (PDO)*** holds more than 90% of the country's oil reserves, and accounts for more than 90% of production. PDO aims to restore and stabilise output at 600,000b/d. It hopes to achieve this by increasing recovery rates, and by discovering and exploiting new fields, particularly in the south. Gas fields are operated by PDO exclusively on behalf of the Omani Government.

Oil & the development of modern Oman

Oman is the oldest independent state in the Arab world, and is regarded as strategically important due to its position at the entrance to the Gulf. Like most countries in the Persian Gulf area, Oman's economic prosperity is closely linked with the oil industry. It was the development of the oil industry and the use of the resulting revenues for economic and infrastructural development purposes that enabled Oman's gross national product per capita to expand by 8% in real terms from 1965 to 1987, according to World Bank estimates. Petroleum Development (Oman and Dhofar) Ltd. was founded in 1937 by a consortium of Western oil companies. Its name was changed to Petroleum Development Oman in 1951.

According to a PDO publication, the timeline of oil discovery in Oman actually begins in 1956 with the find at Marmul by the American oil firm Cities Service, a business that was later acquired by Occidental Petroleum (which itself is still active in Oman today). The development of the oil industry coincided with and helped bring about the key event in modern Omani history (Said Zahlan, 1998; MEED Report).

Until 1982 all Oman's crude production was exported, but in November of that year the country's first refinery was opened. The refinery is operated by the ***Oman Oil Refinery Company (ORC)***, which is 99% owned by the Petroleum Ministry and 1% by the Central Bank of Oman. The initial throughput capacity was 50,000 b/d, to cater for the Oman's local strategic demand of refined products, later expanded to 80,000 b/d after modifications that took place in 1987 and 2001. A Revamp project in 2007 brought up its capacity to 106,000 b/d.

Oman currently has two state-owned refineries namely:

- ***Oman Refinery Company (ORC)*** with a capacity of 106,000 barrels per day
- ***Sohar Refinery Company (SRC)*** with a capacity of 116,400 barrels per day

Through a Royal Decree in 2007 (Times of Oman), The Government of Oman merged ORC and SRC in the year 2007, ***to create a competitive world class refining company*** in the Sultanate. The merged entity is named ***Oman Refineries and Petrochemicals Company (ORPC).*** ORPC has the above two refineries one in Mina Al-Fahal and another in Sohar. The Mina Al-Fahal refinery has been operating since 1982 and the present refining capacity is 106,000 bpd. The Mina Al-Fahal refinery produces gasoline, gas oil, jet fuel, LPG and long residue. The Sohar Refinery capacity is 116,400 bpd and it started operation in the year 2007. The Refinery is designed to maximize propylene yield and it produces straight run naphtha, LPG, gas oil, gasoline, fuel oil and jet fuel. The Sohar Refinery is designed to supply the raw material to Oman Polypropylene (OPP) and Aromatics Oman Ltd. (AOL).

The government, with the majority of Petroleum Development Oman (PDO), Oman Refinery Co (ORC), ***Oman Oil Marketing Co (OOM)*** and ***Oman Oil Company (OOC)***, dominates the industry. Oman Oil Marketing Company SAOG, with the brand name ***Omanoil***, is Oman's first and only 100% Omani owned fuels marketing Company. Oman Oil Company S.A.O.C. (OOC) is a commercial company wholly owned by the Government of the Sultanate of Oman. The Company was incorporated to pursue investment opportunities in the energy sector both inside and outside Oman. Through participation in energy and energy related projects, the Company plays an important role in the Sultanate's efforts to diversify the Omani economy and to promote Omani and foreign private sector investment.

Based on the above data, the business value chain is relatively disparate and fragmented within the Omani industry. Nevertheless, the key upstream player is ***Petroleum Development Oman (PDO)*** and the key downstream player is the *very recently* formed entity ***Oman Refineries and Petrochemicals Company (ORPC)*** in which the erstwhile state-owned ***Oman Refinery Company (ORC)*** still owns and operates the national refining system.

Oman Liquefied Natural Gas LLC (Oman LNG) is a limited liability incorporated joint venture company (with Shell International and Itochu Corporation) established by a Royal Decree and organised under the laws of the Sultanate of Oman. It engages in the business of producing and selling Liquefied Natural Gas (LNG) and by-product Natural Gas Liquids (NGLs). The Company undertakes, directly or indirectly, project operations and activities necessary to liquefy, store, transport and market Oman's natural gas and to deliver LNG to customers. Currently, the extent of Company operations is a two-train liquefaction plant with a capacity of 7.1 million tonnes per annum. The Company's activities contribute to the Government of Oman's objective of diversifying the economy away from its current dependency on oil. Oman LNG's Head Office is in Muscat and the plant is located on the coast of Qalhat near Sur, in the Sharqiyah region, one of the areas that have been targeted by the government for economic development.

Oman Gas Company S.A.O.C. (OGC) is the major gas transportation company in Oman delivering natural gas to main economic sectors and major consumers comprising of Domestic, Power and Desalination plants, Fertilizer, Methanol, Petrochemical, Refinery, Steel and Cement plants.

The Company is involved in the transmission and distribution of natural gas, through a large network of gas pipelines, compressor stations and gas supply stations. The Company also provides project management services in pipeline construction.

OGC was established in August 2000 as a closed joint stock company between the Government of Oman represented by the Ministry of Oil & Gas holding 80% of the shares and Oman Oil company holding the remaining 20%. A Royal Decree has granted the Company concession rights for 27 years to own, construct, maintain and operate natural gas facilities in the Sultanate of Oman.

The company's gas pipeline network is spread across the country with more than 2300 kilometers of high pressure transmission pipelines and ancillary facilities covering Fahud, Muscat, and Sohar in the north and from Saih-Rawl to Salalah in the south of the country.

OGC has made numerous achievements since its inception, and the company is proud to be associated with the first cross boarder gas transportation. The first import gas received from the ***Dolphin pipeline*** from Qatar in October 2008.

Oil and Gas assets

Several commentaries acknowledge that, for hydrocarbons, ***Oman's geology is well known for its complexity***, as it's different from that of Saudi Arabia and the UAE. Omani fields are small, deep and more complex, with many having low permeability. About 2,000 producing oil wells in Oman average about 400 b/d, compared to 3,700 b/d from 1,800 wells in Saudi Arabia.

PDO's Oil reserves are estimated at just 5.5bn bbl, the bulk of which are located in the country's northern and central regions. The largest fields are in the north and include Yibal, Fahud, al-Huwaisah, and several others that face future output declines. Among the best southern prospects is a group of fields that includes Ghafeer, Sarmad and Harweel. There are also others fields from both new discoveries and from older known accumulations in the Sultanate. In 2007, the country delivered no more than 740,000b/d of crude oil and gas liquids, down from 961,000b/d in 2001.

PDO's Gas reserves are put at no more than 980bcm, although there is scope for significant upwards revision. Domestic consumption was an estimated 13bcm in 2007. This provides for around 13bcm of gas exports. The partly state-owned PDO account for more than 90% of the oil and gas produced in the country, but relies on IOCs to maintain volumes. Historically Oman's gas industry was once in the shadow of the oil business but now it is seen as crucial to the Sultanate's continued prosperity which is a ***strategic shift in PDO***.

Several estimates also assume ***750,000b/d of 2008 oil and liquids production.*** Oil revenues account for some three quarters of total export earnings and 40% of Oman's GDP. As oil fields are mature and little upside potential has been revealed, the emphasis is on exploiting gas and other natural resources.

Business Monitor International states that between 2007 and 2018, they are forecasting a decrease in Omani oil production of 24.2%, with crude volumes peaking at 760,000b/d in 2010, before falling steadily to 561,000b/d by the end of the 10-year forecast period. Gas production is expected to peak at 35bcm by 2013-2015, before slipping to 30bcm by the end of the period. With 2007-2018 demand growth of 47%, this provides an export capability falling from 13bcm to under 11bcm by 2018.

ORPC operates two refineries, a fairly simple one at Mina Al Fahal (MAF) and a much more complex one in Sohar. The MAF refinery, situated next door to PDO's headquarters, can handle 106,000 barrels of crude oil per day, turning it into a variety of useful products including motor gasoline, diesel and jet fuel. The bottom-of-the-barrel product, also called long residue, produced at the MAF Refinery is sent to the Sohar refinery, which has an input capacity of 116,400 barrels per day. The Sohar refinery can turn its inputs into petrochemical feedstock, such as propylene, besides motor fuels like gasoline and diesel.
SRC plant has a residue fluid catalytic cracking unit with a capacity of 75,260b/d, as well as a Merox unit, a gasoline desulphurisation unit and a deep desulphurisation unit, and will produce fuel oils, LPG, gasoline, naphtha, gas oil and kerosene.

MAF plant can now process more than 100,000b/d following an upgrade. Output from the facility, which is operated by the state-owned ORC, is used to meet local product demand.

Business Value Chain

In PDO, the operation of PDO's front line oil business is ***split regionally*** – with one operating unit covering the north of Oman and the other the south of Oman; in addition to PDO's gas operations.

PDO's business value chain comprises of the following major processes which are focused in the company's assets i.e., Oil Business North, Oil Business South and Gas Business.

- **Exploration:** To find new oil and gas reserves within PDO's concession area.
- **Petroleum Engineering:** To work out ways to bring oil to the surface as economically as possible.
- **Engineering & Operations:** Engineering works closely with Operations and maintains all the pipelines and flowlines, pumps and generators, as well as fixing them quickly during break down to minimize any lost oil production.
- **Well Engineering:** To design, drill and complete wells, before handing them over to Operations to manage on a day-to-day basis.

The above business processes are further supported by typical corporate business processes (HR, Finance, HSE, Infrastructure, Planning & Economics etc) to maximize organizational performance.

OPRPC's business value chain comprises of the following major processes:

- **Refining at MAF Refinery:** Crude oil, the basic raw material for the Refineries, is received first by the Mina Al Fahal Refinery from the adjacent crude storage tank farm through a dedicated pipeline. MAF Refinery processes the feedstock to meet the Omani retail fuel market demand. The MAF refinery produces gasoline, gas oil, jet fuel, LPG and long residue.
- **Refining at Sohar Refinery:** The Sohar Refinery is designed to maximize propylene yield and it produces straight run naphtha, LPG, gas oil, gasoline, fuel oil and jet fuel.

Economy

The government is in the 2nd year of its 6th five-year development plan, which aims at modernising the economy, privatising state utilities, attracting foreign investment, and diversifying the country's industrial base. It has smaller oil fields than its fellow GCC states and these are generally more scattered, less productive and with higher production costs. The economy remains dependent on oil revenues but the government has a stated long term economic goal of moving away from reliance on oil by 2020. An important factor will be the ability of Petroleum Development Oman (PDO), the consortium that controls 90 per cent of the state's hydrocarbon reserves, to achieve a significant increase in gas production (2007 MEED Report).

Key revenue lines

Several analysts forecast that the country will account for just 0.67% of Middle East (ME) regional oil demand by 2012, while providing 2.54% of supply.

PDO's Medium-term oil production may rebound to 780,000b/d and, if output remains at current levels, reserves would be exhausted in fewer than 20 years. Original estimates suggested that Oman had at least 50bn bbl of oil in place, so there is a focus on finding ways to improve recoverability.

PDO's Gas production of an estimated 26bcm in 2007 is forecast to reach at least 33bcm in 2012, dependent on progress in field and infrastructure development. Given that domestic demand is forecast to rise from 13bcm to 16bcm by 2012, exports are forecast at 17bcm by 2012, ***putting pressure on the country to develop new resources or risk falling export volumes and revenues.***

As regards, ORPC, after supplying the Sultanate with the sufficient fuel through local marketers the rest is marketed internationally. The fuel - gasoline, Kerosene (Jet Fuel) and Diesel - is ***marketed by three major local marketing companies*** in Oman on purchase from the Refineries. A further three companies lift Liquefied Petroleum Gas (LPG) with road tankers for local bottling and distribution for domestic use.

Most of Oman's crude oil exports go to Asia, with China, Japan, South Korea, and India the largest importers. Oman is ***targeting production of 1mn b/d by 2012***, but this will require higher investment levels and success by domestic and foreign operators.

Corporate Ethos

Strategic Direction

A ***Statement of General Business Principles for PDO*** was first issued in 1984, and the last revision was issued in 1998. These principles apply equally to corporate decision-making as to the behaviour expected of individual employees in conducting the business of the Company. The Statement of General Business Principles is further elaborated in the ***'values and business principles'*** through the business statements below.

- **Business Objectives** - The objective of PDO is to engage efficiently, responsibly and safely in the exploration, production, development, storage and transportation of hydrocarbons in the Sultanate of Oman. The Company seeks a high standard of performance with the aim to further the long term benefits of its Shareholders, its Employees and the society of the Sultanate of Oman at large.
- **Business Responsibilities** - Various inter-related responsibilities of the Company are recognized towards Shareholders, towards Employees, towards those with whom PDO does business and towards society at large.
- **Business Integrity** - The Company insists on transparency, honesty, integrity and fairness in all aspects of its business and expects the same in its relationship with its contractors and suppliers. All transactions on behalf of the Company must be transparent and appropriately described in the accounts of the Company, in accordance with established and recognized procedures and standards, and be subject to audit.
- **The Company and the Community** - The Company accepts and endeavours always to act through the Laws of the Sultanate of Oman in a socially responsible manner. The Company does not have, and therefore does not state, views on either national or international political matters, and it will abstain from

participation in politics and interference in political matters. The Company is mindful that the utmost co-operation with the Government of the Sultanate of Oman enables the Company to maximize its ability to contribute to the exploration for and development of the Sultanate's hydrocarbon resources and to pursue its objectives. Furthermore, the Company considers that the most important contribution it can make to the social and material progress of the Sultanate of Oman is in performing its primary activities as efficiently as possible. It will thereby endeavour to promote the economy of the Sultanate by engaging local enterprise in the course of its business, where appropriate and feasible.

ORPC's *Business vision and mission statements* are as follows:

- **Vision** - To become a competitive enterprise and a model for industrial excellence with a proficient workforce.
- **Mission** - To secure the nation's needs for refined petroleum products and to compete internationally through expanding capabilities and business activities in order to sustain superior growth for the benefit of stakeholders.

ORPC's *Business statement* is communicated as 'The Company's operations are customized to process Omani crude to ensure better management of natural resources available in the country. Besides supplying the domestic market, ORPC exports the surplus to the international market.'

Compliance to various Management Systems

PDO endeavours to conduct its business in such a way as to protect the ***health and safety*** of its Employees, its contractor employees and other persons affected by its activities, as well as to protect the environment, minimize pollution and seek improvement in the efficient use of natural resources. The Company has established a Health, Safety and Environmental Protection Policy and is guided in the conduct of its business by the principle that Health, Safety and Environmental Protection forms an integral part of, and are as important as, all other primary business objectives. ISO14001 certification for its company-wide environmental management system is being maintained by PDO.

In 2008, ORPC's MAF Refinery was recertified for ISO 14001:2004 and OHSAS 18001:1999. A three-time winner of the British Safety Council's International Safety Award in 2004, 2005 and 2006 consecutively, it is obvious that ORPC place great emphasis on the overall well-being of their employees. ORPC's ***Health and Safety Management System*** - OHSAS 18001, helps continually improve systems, technology, employee skills and promotes safety awareness.

In 2008, ORPC's MAF Refinery was recertified for ISO9001:2000 ***Quality Management System***. Furthermore, in 2006, MAF Refinery was awarded ISO 27001:2005 for ***Information Security Management Systems.***

As part of PDO's Safety initiatives, Hazards and Effects Management Process (HEMP) is in place. PDO activities have the potential to harm people and the environment, to cause damage or loss to assets, to defer oil production, to cause financial loss, and to adversely impact the Company's reputation. A ***Hazards and Effects Management Process (HEMP)*** provides a structured approach to managing the hazards and potential effects of PDO's activities.

On similar lines like PDO, ORPC's risk management initiatives also dwell on HSE and also in complying with OHSAS 18001.

PDO embraces the 3 pillars of Sustainable Development i.e., ***People, Planet and Profit*** in accordance to the Brundtland Commission of 1987. In other words, the drive for economic prosperity (Profit) must not outweigh the prudent management of the environment (Planet), nor must it be at the expense of members of society (People), which includes staff and communities. In other words all of the three elements have to be taken into consideration at the same time. For this reason, PDO has devised 6 sustainable development principles based on the three elements shown in the matrix below.

PLANET	PEOPLE	PROFIT
1. Protect the environment	3. Respect and safeguard people	5.Generate profitability
2. Manage resources efficiently	4. Work with stakeholders	6. Benefit communities

Corporate Governance Framework

Organization Structure – Board of Directors, Management & Internal Auditors

PDO is the country's second-largest employer after the government. It is a consortium comprising the Omani government (60%), Royal Dutch Shell (34%), French group Total (4%) and Partex (2%). It holds more than 90% of the country's oil reserves, and accounts for about 94% of production.

According to the Energy Information Administration Report, Oman's government manages its investments in the downstream sector through the state-owned ***Oman Oil Company (OOC)***. The company was established in 1992 as a government-owned vehicle to pursue energy sector investments domestically and abroad. OOC's operations are financed by funds from the State General Reserve Fund (SGRF), which uses oil revenues to help diversify Oman's economy.

Oman's ***Ministry of Oil and Gas (MOG)*** coordinates the state role in the country's hydrocarbons sector, although all energy sector developments must receive approval from the Sultan of Oman. Fig. 5.4 illustrates PDO's organizational structure to elucidate the corporate governance framework within the entity.

In a significant step towards providing ***unity of direction & a common set of targets***, the merger of the two refineries has taken place to form the 'Oman Refineries and Petrochemicals Company LLC (ORPC). OOC's shareholding in the merged company (ORPC) is 25% and the remaining stake 75% is with the Omani Government through The Ministry of Finance.

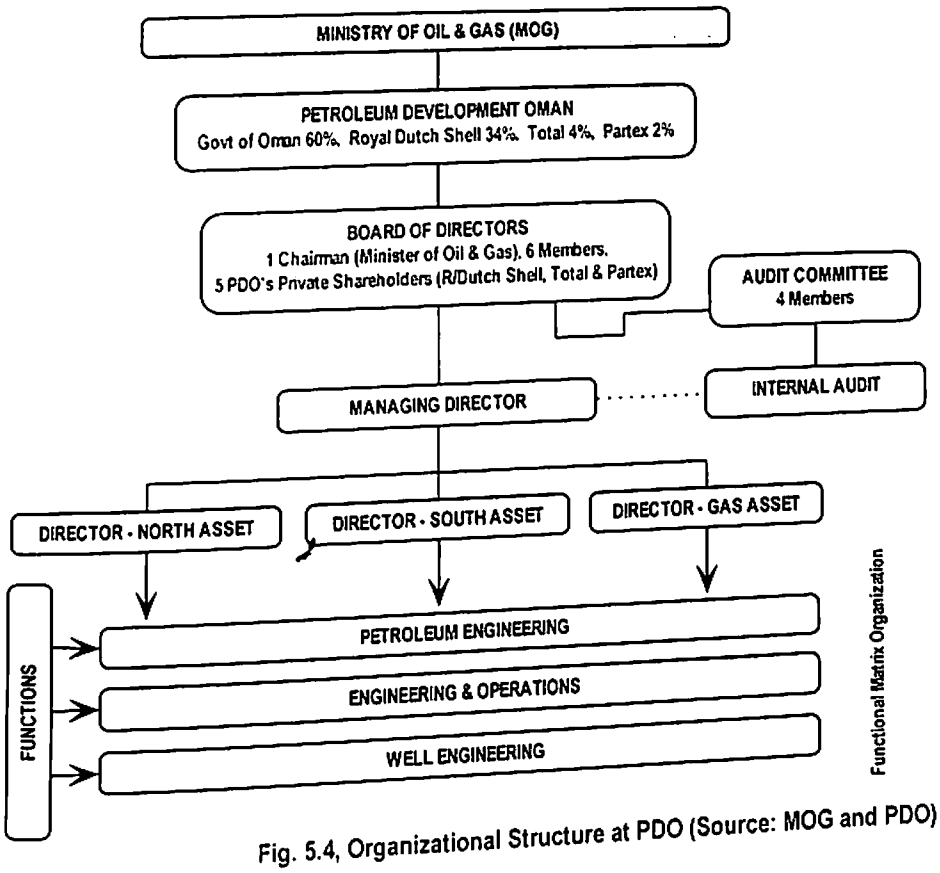

Fig. 5.4, Organizational Structure at PDO (Source: MOG and PDO)

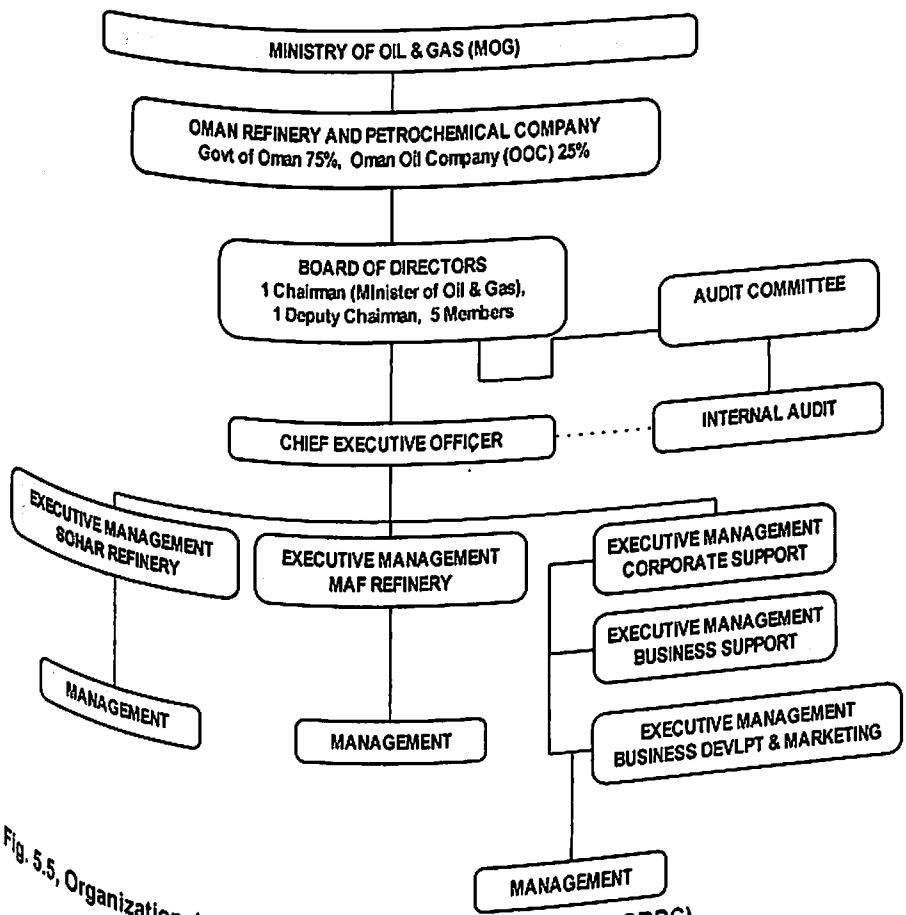

Fig. 5.5, Organizational Structure at ORPC (Source: MOG and ORPC)

Today, ORPC as a single entity remain as one of Oman's key industries. Fig. 5.5 illustrates ORPC's organizational structure to elucidate the corporate governance framework within the entity.

Initiative in Enterprise Risk Management

ERM function and processes

PDO has embraced an ERM system that was implemented last quarter of 2007. The entity has both an ***ERM process*** and an ***ERM function*** in place and the reference model is the COSO ERM Framework. At the time the data was collected, the Executive Management seems to seriously consider introducing and further modifying the ERM system as a short term (3 years) business priority. However, a major finding is that PDO does not have any established ERM ***policies and procedures*** in place.

ERM Governance

PDO's risk governance is ensured by a ***Risk Committee*** in place fully appointed by the Board of Directors, just as the Audit Committee is also appointed by the Board of Directors. The Internal Audit function derives its authority from the Board of Directors and does not fully utilize the findings of the Risk Committee. Furthermore, there is no ***Corporate Risk Register*** in place. Internal Audit does not engage itself or participate in the ERM implementation.

Risk Committee comprises of the Senior Executives of Petroleum assets in Northern fields and Southern fields, Gas assets and Chairman of EHS. The ERM Coordinator is an internal position and belongs to the Finance discipline.

PDO as a NOC does not publish its Annual Report along with its Financial Statements. However, PDO communicates its achievements through its ***Annual Report to the Ruler***

(Sultan of Oman) which is made available in the public domain. PDO's latest Annual Report of 2007, however does not communicate about its ERM initiative.

There is no information available on ERM in the very recently formed entity ***Oman Refineries and Petrochemicals Company (ORPC).*** However, some sources state that Sohar Refinery seems to have embarked in an enterprise-wide risk management initiative in its refinery. Furthermore, It is believed that Internal Audit team is also engaged in its assessment.

At ***Oman LNG (OLNGC)***, the Enterprise Risk Management team has launched an ***awareness program*** for select staff members recently in 2008. The awareness program is aimed at introducing the OLNGC staff to the major elements of the ERM program.

Upstream Petro-strategies

Offshore and Onshore Development Campaign

According to BP's World Statistical Review, Oman has just ***5.6bn bbl of proven reserves*** compared to the UAE's 98bn and Saudi Arabia's 264 bn. At current output levels oil is expected to be exhausted in two decades. According to various sources, ***maintaining oil production and exports is the government's biggest challenge for Oman.*** Oman's Minister of Oil and Gas announced in April 2006 that the country planned to invest $10bn in upstream oil and gas projects during the next five years. Much of this effort will ***focus on EOR initiatives*** to ***improve recovery rates*** at several of the country's oil fields. Oman also plans to increase exploration activities, although the gas sector will receive much of this investment.

- **Cross Country Pipeline for Water Injection Projects:** One of the difficulties faced by leading operator PDO in the south is the unusually high level of water

cut in the fields, which has also become a problem in the north. A proposed solution on the above problem is the construction of a 300km pipeline that will carry water from the south for use in ***re-injection*** in the north where ***water flooding*** has already been used successfully on wells in the Yibal and Bahaja fields. ***The programme is expensive and will inflate the unit cost for Omani oil extraction.*** However, PDO hopes to minimise the decline in output and stabilise production at around 600,000b/d from 2009. PDO's most recent discovery is in the Shuaiba Formation, which lies in north-west Oman. PDO said in February 2007 that it had discovered three new oil fields.

- **Raising production through large-scale Steam Injection Projects:** PDO estimates that there may be reserves of 250mn bbl, with a potential maximum production of 100,000b/d. In June 2005, the Omani government awarded the Mukhaizna field to Occidental Petroleum, after it was relinquished by PDO. Occidental plans to raise production at Mukhaizna to 150,000b/d by 2011, using ***large-scale steam injection***. Oil Minister Mohammed Al-Rumhy said in a February 2008 interview that during 2008 the state will pump an average 790,000b/d of oil and condensates. Most of the additional production will come from the Occidental Petroleum-operated ***Mukhaizna field***, and some smaller properties. Occidental's Mukhaizna field, which is expected to add 200,000b/d to the country's output when it reaches full capacity, is the key near-term project, according to Al-Rumhy. He failed to provide details of the development schedule.
- **Soliciting International Consortiums for new discoveries (Oilex JV):** A consortium led by Australian explorer ***Oilex*** has launched a drilling programme in Oman by spudding the first of three planned wells. The JV partners started drilling the Sarha-1 exploration well in the Block 56 production sharing contract (PSC) area on December 31 2007. Block 56 is operated by Oilex, with a 25% stake, alongside ***Videocon Industries*** and ***Gas Authority of India Ltd***, both with 25%, and India's ***Hindustan Petroleum*** and ***Bharat Petroleum*** with 12.5% each. The block was awarded to the Oilex JV in July 2006 and the partners have since pursued an active exploration programme. Oilex is hoping that the combined

knowledge and experience presented by the JV will allow any discoveries to be progressed quickly into production.

- **Extension to Concessions:** While PDO is the principal oil and gas producer in Oman, the group is ***battling with declining output from a set of mature fields that are increasingly difficult to extract from.*** PDO sees more potential elsewhere and is willing to offer attractive production terms to companies that want ***to take the responsibility off its hands.*** For this reason, many reports suggest it was a prudent for Shell and PDO to have recently extended the terms (*for 40 years*) of the concession in Block 6 until 2044.

Gas explorations

Oman has developed a number of ***gas-related industries*** in line with its ***Vision 2020 Plan***, such as petrochemical and fertiliser production, boosting its manufacturing contribution to GDP from 5% in 1995 to an expected 15% by 2020. According to various sources, ***Gas has become the chief focus of Oman's economic diversification strategy.*** Gas reserves, currently assessed at 980bcm, are believed to have upside potential and we are assuming at least 1,100bcm by 2011/12. The 5.5bn bbl of proven oil reserves are, however, at risk of declining steadily over the forecast period (to 4.9bn by 2012), particularly if production levels are raised. According to various articles in Business Monitor International and MEED, PDO is currently working on ***several upstream gas projects***, and hopes to increase production significantly over the next decade.

- **Partnership with BP and BG Group:** PDO now plans to invest over $1bn in projects to boost output over the next few years. In addition, BP and BG Group aim to spend up to $1bn over the next three to five years on gas field development.
- **Exploiting & Developing Iran's Kish gas:** Oman's $2bn proposal to develop Iranian natural gas reserves and build a subsea gas export pipeline is moving closer to completion. The Gulf state is involved in discussions to develop Iran's Kish gas field and export at least 10bcm per annum through a pipeline to Oman.

- **Enhancing the LNG Business:** Several reports state that upwards of 30% of ***Oman's liquefaction capacity currently sits idle***, as the country has been reluctant to sign additional LNG supply deals in light of increasing domestic gas requirements. LNG constitutes a large part of Oman's plan to develop its gas sector, and the country is investing heavily in it. Oman's LNG programme is being co-ordinated by the state's ***Oman LNG Company (OLNGC)***.
- **Dolphin project:** Oman is one of the participants in the ***$3.5bn Dolphin project*** being led by Dolphin Energy Limited (a JV between the UAE government, Total and Occidental). The goal is to link the gas networks of Qatar, the UAE, and Oman as well as to eventually help supply the south-Asian subcontinent. Under a deal reached in March 2003, the state-controlled ***Oman Gas Company (OGC)*** began supplying gas to DEL in the fourth quarter of 2004. In September 2005, Dolphin Energy secured a contract with state-controlled ***Oman Oil*** to deliver 2bcm of gas annually from early 2008. This project is now completed and most of the gas will be used as feedstock at Occidental's enhanced oil recovery project at the Mukhaizna field.

Downstream Petro-strategies

Diversification and Expansion projects

- **Duqm Refinery Project:** Oman is currently considering building a large refinery and ***petrochemical complex at Al Duqm*** in southern Oman, costing an estimated $7bn and geared toward export markets. Under current plans, a JV of the Omani government and international investors would build a 200,000-300,000b/d refinery, a crude oil export terminal, and several large petrochemical facilities. If the government proceeds with this plan, construction is expected to get underway at the end of 2008, with commercial production scheduled for 2012 at the earliest. According to a MEED report, Oman has placed its ambitious integrated Duqm refinery and petrochemicals complex on hold after raising doubts over securing vital project finance for the deal.

5.4 The Qatar Oil Industry

Overview of the Business Value Chain

National Oil Company in the State

Main government vehicle is ***Qatar Petroleum (QP)***, which owns all downstream oil interests, negotiates E&P agreements, shares in upstream projects and is involved in LNG and GTL schemes. It has 50% of oil and 40% of gas production. IOC upstream involvement is extensive, and rising. Foreign groups are active in oil production, gas field development, LNG projects, as well as GTL and petrochemicals schemes. The oil and gas sector is state-controlled through Qatar Petroleum, which is responsible for E&P. National Oil Distribution Company (NODCO) is in charge of refining and distribution. ***Qatar Liquefied Gas Company (Qatargas)*** and ***Ras Laffan LNG Company (RasGas)*** are responsible for the production and marketing of LNG. The state controls virtually all aspects of the energy sector, sets policy and determines domestic pricing. Qatar Petroleum itself accounts for 50% of national oil production and almost 40% of gas volumes.

The outlook for liquids production is relatively good, even though more emphasis is being placed on gas. ***Being an OPEC member, the absolute level of oil production is outside Qatar Petroleum's (QP) control.*** Qatar in

Oil Discovery and membership in OPEC

Until the mid-1970s, the hydrocarbon industry was largely in the hands of foreign companies. In 1974, the Qatar General Petroleum Company (QGPC) was established with the objective of gaining full control of the country's oil and gas resources for the state. This goal was quickly realized. QGPC's operations cover the whole range of oil and gas activity from exploration and production to downstream refining and fertilizer and petrochemical production, through key subsidiaries and joint ventures. QGPC was later renamed as Qatar Petroleum (QP) and was created in 1974 following the government's nationalization of the oil sector. QP is a state owned petroleum company in Qatar. It is now the company which operates all oil & gas activities in Qatar, including exploration, production, refining, transport, and storage.

Qatar is OPEC's smallest oil producer, though it remains an important supplier to world oil markets. In 2006, Qatar produced 1.1 Mnbpd of total oil liquids (815,000 bpd was crude oil). Qatar also produced an estimated 250,000 bbl/d of NGLs and 35,000 bbl/d of condensate, which are exempt from the country's OPEC production quota. Qatar's proven oil reserves were 15.2 Gbbl as of January 2007. The development of the Qatari oil industry has resulted with living standards that are among the world's highest (Said Zahlan, 1998; MEED Report).

Following a coup in 1995, Qatar initiated policies aimed at increasing oil production, locating additional oil reserves and investing in advanced oil recovery systems to extend the life of existing fields. The government therefore improved the terms of Exploration & Production contracts and Production Sharing Agreements. The aim was to encourage IOCs to improve oil recovery in producing fields and to explore for new oil deposits. There has been considerable success in the field of natural gas, but there is less IOC involvement in oil (Said Zahlan, 1998).

Major foreign oil companies now involved in Qatar include Anadarko Petroleum, Chevron, ExxonMobil, Royal Dutch Shell, Maersk Oil & Gas, Japan's Marubeni and Mitsui, Occidental Petroleum, ConocoPhillips and Total (Business Monitor International).

March 2008 was producing around 830,000b d of crude oil, against its OPEC entitlement of 830,000b/d and current sustainable capacity put at around 900,000b/d.

The QP group's key subsidiaries and affiliates include LNG companies Qatargas and RasGas.

- ***QatarGas:*** QP has a 65% interest in the upstream portion of Qatargas. Qatargas downstream consortium comprises of components split between QP (65%), Total (10%), ExxonMobil (10%), Mitsui (7.5%) and Marubeni (7.5%). Qatargas operates three LNG trains with a combined capacity of 9.6mn tpa.
- ***RasGas:*** RasGas produces 16mn tpa of LNG from two trains and its shareholding is split between QP (63%), ExxonMobil (25%), Kogas (5%), Itochu (4%) and LNG Japan (3%). RasGas II is a 70:30 JV between QP and ExxonMobil. Train 3 started up operations in Q104 and Train 4 began in Q405. LNG from the third train is being delivered to India's Petronet LNG, while Edison of Italy has bought the output of Train 4.

Qatar Petrochemical Company (QAPCO), in which QP holds an 80% stake together with ATOFINA, produces 525,000tpa of ethylene, 360,000tpa of low density polyethylene (LDPE) and 70,000tpa of sulphur. QP has a 51% interest in ***Qatar Chemical Company*** (Q-Chem) together with ChevronPhillips Chemical Company. Q-Chem operates a world-class petrochemical plant producing high density polyethylene (HDPE), medium density polyethylene (MDPE) and 1-hexene (alpha olefin). Other group companies include ***Qatar Fuel Additives Company*** (QAFAC 50% interest), ***Qatar Vinyl Company*** (QVC 25.5%), and ***Gulf Helicopters*** (100%).

Oil and Gas assets

Several estimates state that there has been a ***healthy trend in Qatar's hydrocarbons reserves***, and analysts expect it to continue. For oil, analysts expect a short-term increase from 15.2bn bbl to around 16bn by 2011/12. However, gas reserves have already climbed

from 14,400bcm in 2000 to an estimated 25,650bcm in 2007, with further growth to at least 27,000bcm predicted by the end of the 2012.

The operations and activities of Qatar Petroleum are conducted on various onshore locations, which include Doha, Dukhan, Mesaieed and Ras Laffan Industrial Cities, as well as offshore areas including Halul Island, Offshore Production Stations, Drilling Platforms and the North Gas Field.

Domestically, the vast majority of Qatar's total energy consumption comes from gas (79%), while the balance is supplied by oil. ***QP is active in all segments of the energy chain*** and participates in all major oil and gas developments.

QP's oil reserves are centered on the onshore Dukhan oilfield and the offshore Bul Hanine and Maydan Mahzam oilfields. The state firm also holds stakes in seven offshore fields that are being developed under PSAs. Business Monitor International estimates assume 1.26mn b/d of 2008 oil and liquids production, rising to 1.66mn b/d by the end of the forecast period. Between 2007 and 2018, analysts are forecasting an increase in Qatari oil and gas liquids production of 65.6%, with volumes rising steadily to 1.93mn b/d by the end of the 10-year forecast period.

Qatar has recently been producing around 830,000b/d of crude oil (March 2008), plus additional volumes of gas liquids. Its sustainable limit is currently put at around 900,000b/d of crude alone. Proven oil reserves are estimated at 15.2bn bbl. The onshore Dukhan field, located along the west coast of the peninsula, is the country's largest producing oil field. Qatar also has six offshore fields: Bul Hanine, Maydan Mahzam, Id al-Shargi North Dome, al-Shaheen, al-Rayyan, and al-Khalij.

QP's Gas reserves are centered on the giant North Field. Qatar contains the ***world's third largest natural gas reserves base***, behind Russia and Iran, and the ***largest non-associated gas field in the world***. It is emerging as a major exporter of LNG due to its substantial gas resource base. The June 2007 BP Statistical Review of World Energy estimates

proven gas reserves at 25,360bcm, while the December 2007 Oil & Gas Journal survey suggests 25,650bcm at the beginning of 2008. Business Monitor International forecasts that gas production should reach 92bcm by 2012, up from an estimated 55bcm in 2007. Consumption is expected to rise from 20.0bcm to 25.2bcm by the end of the forecast period, allowing exports of almost 67bcm. Some analysts estimate that gas production is even expected to rise from 55bcm to 140bcm by the end of the ten year forecast period.

Energy Minister, Al-Attiyah claims that Qatar will have at least trebled gas production by 2012 and the country does not want to undermine its reserves base, wishing to maintain 100 years of production. While there is uncertainty over the country's ultimate gas export potential, ***Qatar is not committing any more of the fuel to new customers before 2010.*** Qatar took a decision in 2005 to stall new projects because of concern that too rapid development of LNG exports might damage the North Field's reservoir. The outcome of the field assessment will either allow the export moratorium to be lifted, or cap the production from the field. However, the ***reservoir impact study*** is taking longer than expected because of the size of Qatar's projects. Some LNG production units under construction can process 7.8mn tpa, which makes them the biggest made to date. Qatar expects to export 77mn tpa (106bcm) of LNG a year by 2010, making it the world's largest supplier.

QP's owns a refinery that started as a small topping plant in 1958, which has grown over the years into a giant refinery organization, successfully making the State of Qatar self-sufficient and export oriented in refined oil and petroleum products. QP operates the country's 137,000b/d refining capacity and is planning to construct a new condensate refinery capable of processing 27,000b/d of North Field condensate and 30,000b/d of Dukhan Arab D Cap condensate.

Business Value Chain

QP is active in all segments of the energy chain and participates in all major oil and gas developments. Qatar Petroleum is responsible for all phases of the oil and gas industry in

Qatar. Principal activities cover exploration, drilling, production, storage and transport and sale of crude oil, natural gas liquids, liquefied natural gas, gas-to-liquids, refined products, petrochemicals and fertilizers, helicopter and financing services.

Qatar Petroleum's business value chain comprises of the following major processes:

- **Exploration:** Prospecting new and existing oil and gas fields both offshore and onshore.
- **Drilling:** Utilizing the latest technology to improve crude oil reserves and off-take by application of state-of-the-art technology.
- **Production:** Adopting the policy of developing hydrocarbon resources through EPSA and DPSA with major international oil and gas companies.
- **Refining:** The main activity of the Refinery is to process the crude oil and condensate into various finished petroleum products.
- **Marketing:** The main finished products are liquefied petroleum gas (LPG), naphtha, premium gasoline, super gasoline, jet fuel, diesel and fuel oil. The finished products are intended to meet the domestic demand as well as for export. Marketing and commercial aspects for the export of the refinery products are entirely controlled by the Qatar Petroleum Marketing Directorate.
- **Planning & Scheduling:** Marketing of QP Refinery products in the international market is solely undertaken by the Marketing Directorate in close co-ordination with the Planning & Scheduling Division of QP. The Planning & Scheduling Division in the refinery is responsible for working out annual, quarterly and monthly planning and products exports schedule.

The above business processes are further supported by typical corporate business processes (HR, Finance, etc) to maximize organizational performance.

Economy

Qatar's economy has been transformed by the development of the world's largest non-associated gas reservoir, the North Field, and in 2002 the size of the field was more than

doubled to an estimated 900 tcf, promising further prosperity. 2001 GDP of $16.152 million represented a 60% increase on 1998, while inflation has averaged no more than 3% a year over the same period, suggesting growth in real terms of an average of roughly 11% to the end of 2001.

The government is pursuing a four-pronged strategy to develop the gas industry:

1) ***To address domestic needs driven by soaring demand for electricity and water***
2) ***To expand the LNG industry***
3) ***The development of a regional gas pipeline network***
4) ***To develop export-oriented downstream industries***

In the energy sector QP and its foreign partners are planning to spend $3 Bn a year for the next five years expanding oil & gas capacity and the downstream industrial base (2007 MEED Report).

According to 2006 figures, the most recent official data available from the Central Bank, oil and gas accounted for 62% of GDP - up from 54% in 2004 - and the hydrocarbons sector will remain the key driver of the Qatari economy.

Key revenue lines

Several analysts forecast that the country will account for just 1.22% of Middle Eastern regional oil demand by 2012, while providing 5.75% of supply.

The most recent supply deals involve South Korea's Kogas, which agreed to purchase 2.1mn tpa of LNG, and Japan's Marubeni which in April 2007 signed a 1mn tpa deal. Japan, the US, India and even Indonesia are buyers of Qatari gas. South Africa's Sasol has recently begun converting gas to diesel fuel using GTL technology at the $1bn Oryx project. Revenues from the oil and gas sectors amount to 60% of the country's GDP.

Qatar exports almost all of its oil production to Asia, with Japan by far its largest customer. A pipeline to carry Qatari gas to the UAE has been completed and supplies started in mid-2007.

Crude oil and liquids exports should earn $33.69bn in 2008, and revenues are set to rise to $38.80bn by 2012.

Corporate Ethos

Strategic Direction

QP's strategic direction is epitomized by a statements ***'Committed to Excellence'*** and ***'Qatar Petroleum: Leading Qatar to Become the World's Largest LNG Exporter'.***

The strategic planning process in QP aims at building a shared understanding among all stakeholders (staff, management, subsidiaries, and government bodies) and making sure that strategies are implemented through good plans. ***The scope of the process is a corporate one, hence it spans over all the functional and business activities in the QP group.*** According to QP, The formally approved Corporate Mission and Objectives act as the ultimate criteria by which actions are judged; they also act as the vehicle by which the corporation is glued together.

- **Business Mission and Objectives:** According to QP, "Our mission is to ensure the State gets maximum benefit from its petroleum resources by engaging directly or indirectly in all activities that would add value to these resources. Our overall objective is to maximize our contribution to the national wealth of the State of Qatar, through the safe, efficient and environmentally acceptable exploitation of Qatar's hydrocarbon reserves and through related activities. Specifically we seek:
  a) To provide the state with a reliable cash flow, of maximum value, from diversified business interests.
  b) To build an organization with internationally competitive business and technical expertise.
  c) To maximize the employment of capable Qatari nationals, and develop them to the competence level of the leading International Oil Company employees.
  d) To meet National oil and gas demand in a cost-effective way.

While our key physical assets are the country's Oil & Gas reserves, our ability to maximize the economic returns to the State from these resources depends totally on the quality and commitment of our staff; whom we value as our greatest asset."

- **Business Values:** According to QP, "We also value our great partners, suppliers and customers and we shall endeavour to:
  - (A) Set an example in Qatar in personal and organizational integrity and transparency.
  - (B) Treat all people fairly and with mutual respect.
  - (C) Have total participation of an excellent diverse workforce, rendering our diversity a source of strength.
  - (D) Reward and promote based on merit, performance and competence.
  - (E) Openly communicate and work as a single integrated team."
- **Business Ethics:** According to QP, "Qatar Petroleum is committed to conducting its business in accordance with the highest standards of ethics and integrity. Our Code of Ethics and Conflicts of Interest Regulations define our ethical principles and the standards that govern the business relations between QP employees and our contractors, consultants and suppliers."

Compliance to various Management Systems

Qatar Petroleum is committed to the highest standards for ***health, safety and the environment (HSE)*** throughout its operations. They recognize that HSE best practice is good business practice and they are working hard towards a goal of zero harm to people or the environment.

Maintaining the quality of the environment for future generations is an important part of QP's objectives, and they are seeking accreditation to the ISO 14001 standard, a globally recognized benchmark for excellence in environmental management. They are also striving towards certification to OHSAS 18001, an international health and ***safety management system***. QP's long-term goal is to ensure that all QP employees and the people of Qatar live in a clean, safe world.

The Corporate Quality & Management Systems Department provides quality services in management systems and, with the implementation of ISO Standards compliance, maximizes savings in cost, time and integrity of procured equipment and materials through well defined control measures. Above 95% of QP departments have now been certified to ISO 9001:2000 Standards of Certification for implementation of ***Quality Management Systems***.

Corporate Governance Framework

Organizational Structure – Board of Directors, Management & Internal Auditors

QP carries out its business activities through the subsidiaries, joint ventures and other investments. The chairman of Qatar Petroleum, Abdullah Bin Hamad Al-Attiyah, is also the head of the ***Ministry of Energy and Industry (MEI)*** and, also, the Deputy Prime Minister of Qatar. QP's operations are therefore directly linked with state planning agencies, regulatory authorities, and policymaking bodies. Fig. 5.6 illustrates QP's organizational structure to elucidate the corporate governance framework within the entity.

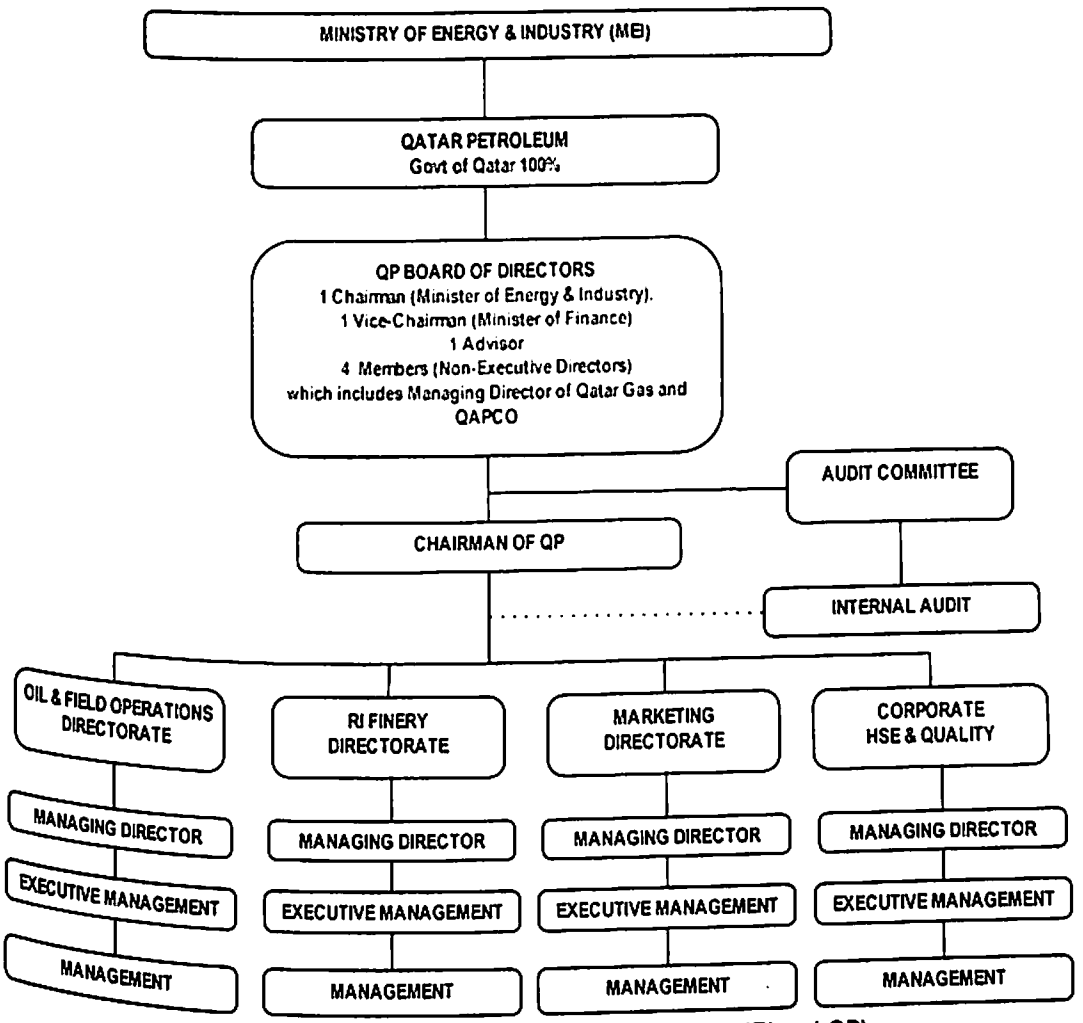

Fig. 5.6, Organizational Structure at QP (Source: MEI and QP)

The MEI invests the oil revenues, and has been optimally employed in laying out solid foundations for the development of oil & gas and other basic industrial sectors, and the establishment of ultra modern infrastructures capable of servicing national industries, and responding to their changing needs and future challenges.

Initiative in Enterprise Risk Management

A detailed ***Enterprise Risk Management Study*** was conducted during 2006 to identify high level risks that could have detrimental impact on QP's ability to generate value for its stakeholders in its various subsidiaries and joint ventures.

ERM function and processes

The entity has both an ***ERM process*** and an ***ERM function*** in place and the reference model is the COSO ERM Framework. At the time the interview was conducted, the

Executive Management seems to seriously consider introducing and further modifying the ERM system as a short term (3 years) business priority. QP does not have established ***ERM policies and procedures*** in place.

ERM Governance

QP's risk governance is ensured by a ***Risk Committee*** in place fully appointed by the Board of Directors, just as the Audit Committee is also appointed by the Board of Directors. The Internal Audit function derives its authority from the Board of Directors and does not utilize the findings of the Risk Committee presented. There is a ***Corporate Risk Register*** in place, but there is no clear indication as to whether Internal Audit Plan would be derived from the Corporate Risk Register in future.

Risk Committee comprises of the Senior Executives of the various Directorates and no further information was available.

QP's as a NOC is the only NOC in the GCC publishing its Consolidated Financial statements and it is available in public domain. However, the 2006 Annual Report does not communicate about its ERM initiative.

Furthermore, QP's subsidiaries did not have an ERM framework; however, QP's joint venture entities (ex: Qatar Gas, Ras Gas) has an independent ERM framework being pursued. The reason for such an initiative is to align risk appetite of the various shareholders in the JV.

Upstream Petro-strategies

Offshore and Onshore Development Campaign

- **Field Development & Expansion:** Qatar Petroleum's strategy of conducting hydrocarbon exploration and new projects is through EPSA and DPSA concluded with major international oil and gas companies. Recent agreements include the following:
    a) Germany's Wintershall, a wholly-owned subsidiary of BASF, has acquired a 40% share and operatorship for Block 3 offshore Qatar. This was signed in Nov 2008.
    b) Denmark's Maersk group in 2005 reached a field development plan agreement with QP, under which the company intends to more than double the production capacity at the al Shaheen field from 240,000b/d in 2006 to 525,000b/d by late 2009. When completed, Qatar would have more than 1.1mn b/d of productive capacity, compared with the current estimate of 0.9mn b/d (crude only).
    c) Japan's Cosmo Oil has come to an agreement with Qatar to develop a new offshore oil field in the south-eastern part of the country. The field is expected to produce 3,000b/d of crude oil from 2010.
- **Long-term Gas Purchase Agreements:** A long-awaited gas export deal linking Qatar with energy-hungry China was finalised in April 2008 by Qatargas, Royal Dutch Shell and PetroChina. The three parties have signed binding sales and purchase agreements that will lead to the long-term supply of gas in the form of LNG from Qatar to the rapidly growing Chinese market.
- **De-bottlenecking projects:** Qatargas has been de-bottlenecking its facilities to raise processing capacity to 12.6bcm, completing the project at the end of 2006. Qatargas signed an agreement in July 2004 with Gas Natural of Spain for the sale of the incremental volume over a period of 20 years.
- **Asian market focus:** August 2006 saw India's Petronet LNG sign an agreement with RasGas covering an additional 2.5mn tpa of Qatari gas, raising the total contract volume to 10mn tpa. The additional LNG is expected to start flowing

from the third quarter of 2009, according to the Indian importer. Furthermore, Japan's Marubeni Corporation in April 2007 signed an agreement with Qatar to purchase 1mn tpa of LNG from the Qatargas IV project from 2010. Qatar has said that most of the 77mn tpa of LNG capacity it will have by 2010 is now sold out. Some flexibility remains, however, as existing supply contracts allow for the diversion of cargoes from one customer to another if needed. The Gulf emirate is planning to launch a ***traded LNG contract***, the first of its kind, at IMEX, an energy exchange which was due to open in late-2007 but has been delayed.

- Qatar Gas IV LNG JV: July 2007 saw a signing ceremony take place between QP and Shell for the Qatargas IV LNG ***joint venture***. When the project was first announced in 2005, cost estimates were around $6bn-7bn. Qatar's Energy Minister, Abdullah Al-Attiyah, has now said that the total cost of the project, including shipping services, will be around $8bn. Start-up is scheduled for late 2010. The Qatargas IV project, which is 70% owned by Qatar and 30% by Shell, will produce 14.5bcm.

Downstream Petro-strategies

Export of Refined products, LNG and Petrochemicals

The country's policy of economic diversification has led to a surge in investment in projects for the export of LNG and petrochemicals. An estimated total of $10bn has been invested in the Qatar oil industry in the past decade. ***The government expects to earn more per barrel of crude oil produced if it can export refined products and petrochemicals***, as well as creating private sector jobs.

- Expansion of refining capacity: Its refining capacity at Umm Said has been expanded to 200,000b/d, according to the end-2007 Oil & Gas Journal survey. Current oil consumption averages around 114,000b/d, so substantial volumes of refined products are available for export.

- **Building strategic alliance across MENA region:** Italy's Eni and Qatar Petroleum have signed a MoU. Under the agreement, the companies are looking to pursue ***'opportunities of mutual interest'*** in Qatar, the Mediterranean basin and North Africa, as well as jointly pursuing projects in the petrochemical industry and power generation.
- **Enhancing condensate recovery to feed Petrochemical ventures:** Qatar plans to more than double its output of condensate by 2012, dramatically increasing its liquids volumes. The ultra-light form of oil is produced in association with gas, representing a valuable by-product. Production is forecast to rise to 700,000b/d from 250,000b/d in 2006, according to Ali Hassan Al-Sidiqqui, director of downstream ventures at QP. The output will all come from the North Field, he said. ***The condensate volumes will be particularly useful in meeting the needs of the Middle Eastern region's expanding petrochemicals industry***, as the light oil can be refined more cheaply and rapidly into naphtha feedstock for ethylene crackers.

Expansion of refining capacity

Qatar's sole refinery has increased capacity from 57,500b/d to 200,000b/d. QP is also building another refinery, which will have the capacity to run 146,000b/d of condensate. QP is considering a possible ***third refinery*** with capacity of 200,000b/d, although no final decisions have been made on the project. The eventual further expansion of refining capacity provides increased long-term export potential, but no change is expected during the forecast period.

- **Downstream Investment in Asia:** Qatar Petroleum International will look at investing in refineries in the energy-hungry markets of India and China, as well as building LNG terminals in Europe and across the Atlantic in the US.
- **World's largest fleet of LNG carriers:** The government is planning a massive expansion of its refinery capacity. Qatar expects to earn more per barrel of crude oil produced if it can export refined products and petrochemicals, as well as creating private sector jobs. In Q305, the government announced plans to acquire

90 LNG transportation ships, potentially giving it the world's largest fleet of LNG carriers and granting US group GE a contract to build five more LNG trains.

- **LPG Marketing:** In May 2006, the country stated that it aims to increase its crude oil production capacity by 300,000b/d by 2009, from the current 800,000b/d. The firm is also reportedly planning to set up an LPG marketing arm.

Ventures by other players in Qatar

- **Royal Dutch Shell's Pearl GTL:** Pearl GTL is the company's largest foreign investment, and when completed in 2010, it will be the world's biggest plant of its kind. Qatar's oil products capacity has been enlarged from 2007 as the $1bn Sasol Oryx GTL project entered production, providing some 34,000b/d of high-quality diesel fuel and naphtha largely aimed at the export market. Sasol has announced plans to treble the capacity of the site, potentially taking it to more than 100,000b/d. Later, the bigger Shell-operated Pearl GTL plant will enlarge still further Qatar's products export capabilities. It will produce 140,000b/d of ultra-clean diesel, naphtha etc, with the first train due onstream by end-2009.
- **Palm GTL:** In February 2007, ExxonMobil announced that it had cancelled its planned Palm GTL project due to rising costs. The Palm project was originally slated to produce 154,000b/d of liquids for export, although estimated costs soared from $7bn to $15bn, according to industry estimates.

5.5 The Saudi Arabian Oil Industry

Overview of the Business Value Chain

National Oil Company in the Kingdom

The main government vehicle is Saudi ARAMCO, which accounts for virtually all oil and gas production and owns refineries either outright or through JVs with IOCs. Foreign companies also participate in petrochemicals JVs with state-owned Saudi Basic Industries Corporation (SABIC). IOC upstream involvement is now increasing, due to initiative to develop gas fields using groupings of foreign operators. State-controlled oil company Saudi ARAMCO, the world's largest oil company in terms of crude oil reserves and production, is in the enviable position of holding a near monopoly over oil exploration and production (E&P) in Saudi Arabia.

The Kingdom (including half of the Saudi-Kuwaiti Neutral Zone) contains 264.2bn bbl of proven oil reserves (according to the June 2008 BP Statistical Review of World Energy), representing one-quarter of the world total. The country may contain up to 1,000bn bbl of ultimately recoverable oil. Sustainable productive capacity is in excess of 10.60mn b/d, with recent crude output averaging 9.45mn b/d (June 2008).

Arabian Oil and the formation of OPEC

Saudi Arabia's assets include the world's largest onshore and offshore oilfields. Revenues generated through the export of ARAMCO crude oil production constitute over half of total Saudi government revenues, and have helped transform the country from, as one observer has noted, "a third world country in an inhospitable desert region, to one that is on the threshold of joining the ranks of developed nations" (Source: Unknown).

The incorporation of Saudi ARAMCO on November 13, 1988, was largely a cosmetic operation, performed in order to remove the final legal attachments of the Arabian American Oil Company (ARAMCO) to the original US Company, registered in Delaware on January 31, 1944. However, the history of the ARAMCO concession, upon which the company's fortune has been forged, dates back to the early 1930s.

In 1932, Standard Oil (California) (SOCAL), now known as Chevron, obtained permission from the King to conduct a geological survey in the eastern parts of the Saudi Peninsula. In 1933, the California Arabian Standard Oil Company (Casoc) was formed to manage operations within the concession on behalf of Socal and by 1939 the concessions included Saudi Arabia's share of its Neutral Zone. However, before any crude oil was discovered in its new Saudi concession, Socal was already experiencing problems in marketing its growing Bahraini oil production. Socal opted for the quickest solution to this problem, which was to merge operations with a company that owned marketing facilities near the source of production, but that was short of crude (i.e., the current BAPCO). In 1936 Socal struck a deal with the Texas Company, now known as Texaco. The new joint venture was named Caltex and was charged with managing all of Texaco's marketing assets from the Middle East to the Pacific. As a part of the deal, Texaco was given half ownership of Casoc.

Contd. in next page...

In April 2004, officials from Saudi Arabia's oil industry announced that the Kingdom's previous estimate of 261bn bbl of recoverable petroleum has more than trebled, to

1,200bn bbl. The country's oil minister announced during the recent World Petroleum Congress that Saudi Arabia would soon be able to boost proved reserves of 264bn bbl by a further 200bn. While the country's ultimate potential may indeed be well above current industry estimates, there has been little change to the recognised third-party reserves assessment of 264.2bn bbl (BP Statistical Review or World Energy June 2008). Gas reserves of an estimated 7,170bcm are forecast by various analysts to increase to 7,500bcm by the end of the forecast period, assuming that the current IOC-linked exploration initiatives are successful. However, in spite of spare capacity, ***combined Saudi crude oil and gas liquids output is expected to remain broadly under OPEC guidelines.***

Domestically, ARAMCO operates ***five wholly-owned refineries*** and has ***two JVs with IOCs*** giving it an installed capacity of over 1.7mn b/d. The Kingdom as a whole has refining capacity of over 2mn b/d, according to the Oil & Gas Journal, at the following refining facilities:

- ***Ras Tanura (550,000b/d)***
- ***Rabigh (400,000b/d)***
- ***Yanbu (235,000b/d)***
- ***Jeddah (88,000b/d)***
- ***Riyadh (120,000b/d)***
- ***Samref (400,000b/d)*** a 50:50 JV with ExxonMobil
- ***Sasref (300,000b/d)*** a 50:50 JV with R/D Shell

ARAMCO's major storage terminals are located in Duba, Yanbu, Rabigh, Jiddah, and Jaizan on the Red Sea, and in Ju'aymah and Ras Tanura on the Arabian Gulf.

Contd...

When oil was stuck in the Dammam Dome, in 1938, the oil was piped from the well to the makeshift port of al-Khobar and from there was transported by sea to the Bahrain refinery (i.e., current BAPCO). In 1944, Casoc was renamed the Arabian American Oil Company.

Both ARAMCO's and Saudi Arabia's revenues increased dramatically during this period as a result of the expansion of crude oil exports and of rising posted prices. Like ARAMCO, Saudi Arabia ploughed these revenues into the development of infrastructure. As Saudi Arabia was overwhelmingly dependent on oil for revenues, it was vitally important that revenue stability was achieved to foster long-term development plans. Unlike the ARAMCO partners, however, the Saudi government had no influence on the two factors, production and price, that determined their revenues. The struggle for control, or the participation issue, emerged strongly in the 1960s. The struggle for corporate control of ARAMCO was the key driver for the formation of OPEC. As it turned out, the formation of OPEC was to be decisive in the battle for control of ARAMCO.

Oil and Gas assets

For Saudi Arabia, oil was in 2007 the dominant fuel, accounting for 59.2% of primary energy demand (PED), followed by gas at 40.8%. State-owned There is no foreign involvement in the upstream oil segment, although IOCs could have a role in future gas field development and are major players in refining and petrochemicals.

Saudi ARAMCO's Oil reserves and its operations are vast. The group accounts for almost the entire oil output of the world's largest crude oil producer, with Saudi Arabian total liquids production exceeding 10.4mn b/d in 2007 (according to the BP Statistical Review of World Energy, June 2008). Saudi ARAMCO itself produced 8.5mn b/d of crude in 2007, according to company data, and put its crude oil and condensate reserves at 259.9bn bbl. The BP Review puts the Kingdom's total proven reserves at 264.2bn bbl at end-2007. The company is not responsible for oil production from the Neutral Zone between Saudi Arabia and Kuwait. ARAMCO accounts for all of Saudi Arabia's gas distribution and the bulk of its refining capacity.

More than 60% of Saudi oil reserves are ***light grades***, with the remainder being medium or heavy. There are more than 100 producing or discovered fields, but at least half the Kingdom's oil reserves are contained in only eight fields, including the Ghawar field, with estimated remaining reserves of 70bn bbl.

Nawaf Obaid, head of the Saudi National Security Assessment Project, used a November 2006 address to the New America Foundation to state that oil production capacity will reach 12.5mn b/d by March 2009, with 1.9mn b/d of new capacity in the Khurais (1.2mn b/d), Nuayyim (100,000b/d), Shaybah (200,000b/d) and Khursaniyah (500,000b/d) fields brought forward from original plans. Furthermore, a further 600,000b/d from Shaybah and the Neutral Zone that is shared 50:50 with Kuwait will be on line in 2010, and a final 900,000b/d - this time of Arab Heavy crude, rather than the light and extra light elsewhere - will be available in 2011, bringing total capacity to 13.5mn b/d.

Saudi ARAMCO's Gas reserves comprise of proven natural gas reserves and are estimated at 7,170bcm, ranking the country fourth in the world after Russia, Iran and Qatar. Almost two-thirds of Saudi Arabia's currently proven gas reserves consist of associated gas, mainly from the onshore Ghawar oil field and the offshore Safaniya and Zuluf fields. The Ghawar oil field alone accounts for a third of the total gas reserves. However, only 15% of Saudi Arabia has been 'adequately explored for gas', according to ARAMCO's Vice-President for New Business Development, Khalid al-Falih.

Saudi Arabia has eight refineries, with combined end-2007 crude distillation capacity of around 2.10mn b/d. A new, 200,000b/d fractionation unit at the Ras Tanura refinery was completed in August 2003. Also slated for upgrading is the Rabigh refinery on the Red Sea coast. Plans call for boosting capacity at Rabigh, Saudi Arabia's largest domestic refinery, to 400,000b/d, as well as upgrading the refinery's product slate away from low-value heavy products towards gasoline and kerosene at an estimated cost of US$3-4bn. Two major oil refinery deals have been stuck recently, with Total of France and US-based ConocoPhillips, for end-decade state-of-the-art facilities in Saudi Arabia.

Business Value Chain

Saudi ARAMCO's operations span the globe and the energy industry. ***The world leader in crude oil production***, Saudi ARAMCO also owns and operates an extensive network of refining and distribution facilities, and is responsible for the gas processing and transportation installations that fuel Saudi Arabia's industrial sector. An array of international subsidiaries and joint ventures, including one of the ***world's largest and newest fleet of supertankers***, deliver crude oil and refined products to customers worldwide.

ARAMCO's Business Value Chain comprises of the following activities as the group is actively involved in every step of the oil and gas industry.

- **Exploration:** Exploration focuses on finding oil and gas fields hidden deep underground.

- **Oil Operations:** Oil Fields & Reserves, Production Facilities and Reservoir Management Technology.
- **Gas Operations:** Gas Reserves, Gas Production, Gas Processing, NGL Liquids Recovery, NGL Processing and owns the Master Gas System (MGS).
- **Refining & Distribution:** World-class domestic refineries stretching from the Arabian Gulf to the Red Sea maintain a reliable supply of more than a million barrels per day of products to meet the needs of domestic and international markets. For Supply and Distribution, a broad network of bulk plants and air-fueling units in the Kingdom supplies thousands of bulk customers with products ranging from gasoline and jet fuel to fuel oil and liquefied petroleum gas.
- **Shipping:** Saudi ARAMCO sails one of the world's largest fleets of crude carriers and operates terminals which service more than 10 tankers per day. (Vela International Marine Limited, a wholly owned subsidiary, was established in 1984 with four ships. It has grown to include 21 VLCCs and seven product vessels.)

The above business processes are further supported by typical corporate business processes (Finance, IT, HR, Administration, Legal etc) to maximize organizational performance. Other corporate functions include International Operations, Tech & Innovations, Projects, R & D and Environment & Safety.

In addition to its largely domestic quest for vertical integration, the oil company pursued joint ventures to extend its geographic reach into North America, Asia, and Europe.

Economy

With oil revenues making up around 90% of total Saudi export earnings, up to 80% of state revenues, and at least 44% of the country's GDP, ***Saudi Arabia's economy remains despite attempts at diversification, dependent on oil.*** Saudi Arabia holds the world's largest hydrocarbon reserves, reflected in its oil-dominated economy; the hydrocarbons sector accounts for 63 per cent of GDP and 75% of government revenue. Booming oil prices mean that a record budget surplus, 9.4% higher that forecast, of $77.3bn was

recorded for 2006, this was at that same time that spending reached an all-time high of $105bn. The budget for future expenditure puts an emphasis on education and training (2007 MEED report).

Key revenue lines

Saudi ARAMCO is wholly responsible for oil and liquids production, forecast to rise from 10.41mn b/d in 2007 to 11.78mn b/d by 2012. Between 2007 and 2018. Business Monitor International forecast an increase in Saudi oil production of 29.7%, with volumes rising steadily to 13.5mn b/d by the end of the 10-year forecast period. According to Business Monitor International, Gas production should reach 96.2bcm by 2012, up from 75.9bcm in 2007. Consumption will match the trend, leaving Saudi with no import requirement or export potential during the period. Gas production is expected to rise from 76bcm to 117bcm by the end of the forecast period 2007 – 2018.

Corporate Ethos

Strategic Direction

Saudi ARMACO's ***business direction*** is "Reliability, Responsibility and a Passion to Provide - Energy to the World, Reliable Supply, Environmental Stewardship, Global Partnership, Social Responsibility, and High-Tech Vision"

The following ***ten corporate values*** have been the guiding principles by which Saudi ARAMCO has achieved extraordinary success.

1) **EXCELLENCE:** We pursue excellence in everything we do.
2) **HUMAN RESOURCES:** We encourage continuous learning and strive to develop our people to their highest potential.
3) **FAIRNESS AND INTEGRITY:** We strive for fairness and adhere to the highest ethical standards.

4) **TEAMWORK:** We support each other and work together to achieve our business objectives successfully.
5) **SAFETY:** We strive to maintain the highest levels of safety, security, health and environmental standards.
6) **RESPONSIVENESS:** We are responsive to the expectations of the government and our customers.
7) **STEWARDSHIP:** We are proud of our company and are committed to preserving its assets and resources.
8) **TRUST:** We place authority where responsibility lies.
9) **ACCOUNTABILITY:** We are accountable for our actions.
10) **CITIZENSHIP:** We support our communities and serve as a role model for others.

Compliance to various Management Systems

Concern for the ***environment*** is one of Saudi ARAMCO's basic responsibilities and a long-standing company commitment. The Environment Protection Department provides leadership on environmental issues and ensures that the company operates in an environmentally responsible manner.

Of parallel importance is the commitment to ***safety***. The Loss Prevention Department's mission is to ensure the safety of Saudi ARAMCO employees and the public, as well as company assets, by identifying ***hazards***, by controlling risks and by educating and motivating company personnel and their families to work and live safely.

Corporate Governance Framework

Organizational Structure – Board of Directors, Management & Internal Auditors

Saudi ARAMCO places its hopes and aspirations in the hands of 51,000 people from 66 different countries. Without their daily contributions the company would not be the

premier supplier of energy that it is today. Saudi ARAMCO is an integrated global energy enterprise. The company markets and exports crude oil, petroleum products, natural gas liquids and sulfur. It also ships crude oil worldwide through an affiliated company and participates in petroleum refining and marketing activities at home and abroad. Its overseas affiliates are in the United States, Egypt, the Philippines, the Republic of Korea and Japan.

Saudi Aramco's subsidiaries span the globe, with offices in Houston, Washington, New York, London, Leiden, Dubai, Singapore, Beijing, Hong Kong, Tokyo and Seoul.

Saudi ARAMCO reports to its owner, the Saudi Arabian Government, through the ***Supreme Council for Petroleum and Minerals Affairs***, chaired by the Custodian of the Two Holy Mosques, The King of Saudi Arabia. The Supreme Council for Petroleum and Minerals Affairs sets the company's broadest policy and objectives. Its members are drawn from the government and the private sector.

To accomplish its mission, Saudi ARAMCO is organized into key business areas, each headed by a member of corporate management. Furthermore, According to 2007 Arab News, the reconstitution of the board of directors aims at benefiting from the talent and expertise of leading personalities.

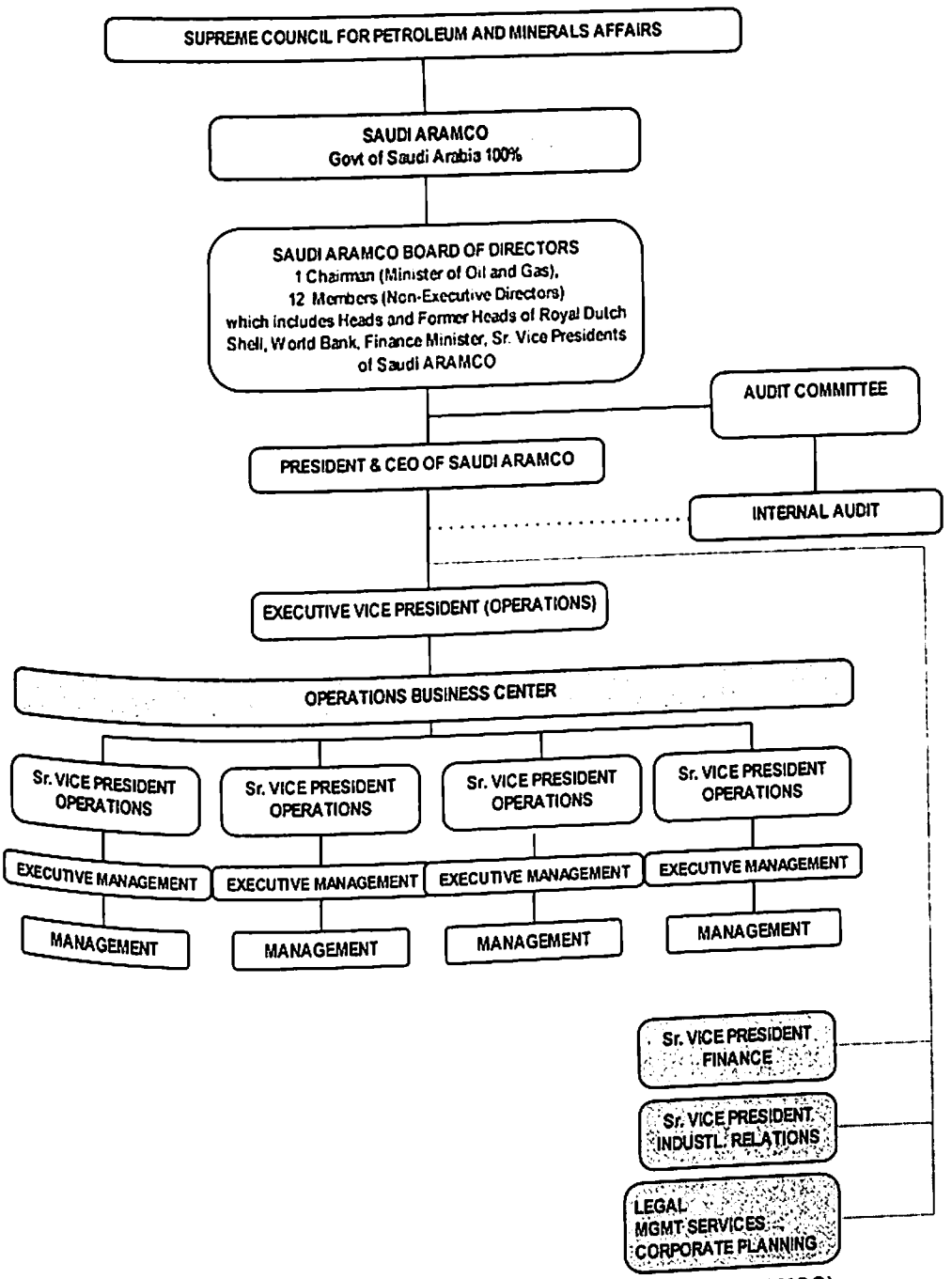

Fig. 5.7, Organizational Structure at BAPCO (Source: SAUDI ARAMCO)

Fig. 5.7 illustrates ARAMCO's organizational structure to elucidate the corporate governance framework within the entity. Saudi ARAMCO's Board of Directors, chaired by The Minister of Petroleum and Mineral Resources, is responsible for high-level planning, budgeting and project decisions. The company's president is the chief executive officer. Saudi ARAMCO is primarily divided into ***six business lines***. Four of these business lines, Exploration & Producing; Refining, Marketing & International; Engineering & Project Management; and Operations Services; from the Operations Business Center headed by the Executive Vice President, Operations. The remaining

business lines Finance, and Industrial Relations, report directly to the President and Chief Executive Officer.

Initiative in Enterprise Risk Management

ERM function and processes

ARAMCO has embraced an ERM system that was implemented since 2005 only for the financial reporting controls. The entity has both an ***ERM process*** and an ***ERM function*** is yet to be established; however the reference model is the COSO ERM Framework. The entity is still working to have a comprehensive framework across the business value chain. Being a huge oil entity the greatest challenge in implementation stated is the 'Lack of integration and uniformity'. At the time the interview was conducted, the Executive Management is considering to introduce further modifications to the existing ERM system as a short term (3 years) business priority. Furthermore, ARAMCO has not set out its ***ERM policies and procedures*** in place.

ERM Governance

ARAMCO's risk governance is ensured by a team of senior executives. The ***Risk Committee*** is not yet appointed by the Board of Directors however the entity has an Audit Committee appointed by the Board of Directors. There is no ***Corporate Risk Register*** in place. The Internal Audit function derives its authority from the Board of Directors and it is not fully clear if the findings of the ERM team are utilized by the Internal Audit for preparing the Internal Audit Plan. However, Internal Audit intends to utilize the Corporate Risk Register in future.

ARAMCO as a NOC does not publish its Annual Report along with its Financial Statements. ARAMCO communicates its achievements through its ***Annual Review***, however it does not communicate about its ERM initiative.

Upstream Petro-strategies

Offshore and Onshore Development Campaign

ARAMCO as a state controlled company has preferential access to the world's largest crude oil reserves and it also means that ARAMCO has to expand the country's oil capacity almost single-handedly. ***Financially, ARAMCO is in a strong position to meet this challenge.*** ARAMCO has a ***swathe of other upstream projects in the pipeline.*** While its output and reserves are second to none, it alone is charged with increasing Saudi Arabia's oil capacity, although it does get assistance from partnerships with IOCs in a number of natural gas and refinery developments. ARAMCO's ongoing investment requirement remains, as it will do for the foreseeable future, substantial.

- **Exploration in the Empty Quarter (Rub Al-Khali):** Saudi Arabia in April 2008 granted a contract extension to a JV drilling in the Kingdom's Rub Al-Khali desert, known as the Empty Quarter. The South Rub al-Khali (SRAK) JV between state-controlled Saudi ARAMCO and Royal Dutch Shell has been exploring for gas over a 210,000sq km area since 2003, so far to no avail. The contract, which was due to expire in January 2009, will now be extended for an 18-month period to allow further exploration wells to be drilled. Three previous wells have produced no discoveries. The consortium has been aiming to sell 5.2bcm per annum to the Ministry starting in 2009. Total has withdrawn from the SRAK scheme. Failure to find gas has been cited as the basis for the move. Three wells drilled on the prospect's acreage have come up dry.
- **Oil field development plans:** The recent total upward revision of ARAMCO's investment plan includes some $65bn that will be ***investing in projects already in progress***, including the Khursaniyah, Abu Hadriya and Fadhili oil fields near the city of Jubail on Saudi Arabia's Persian Gulf coast. ARAMCO plans to increase oil output capacity to 12mn b/d by end-2009.
- **Capacity expansions Projects:** Oil Minister Ali Al-Naimi has also suggested that the Kingdom is considering a second phase of upstream capacity expansions, which could potentially take capacity to 15mn b/d after the phase one target of 12.5mn b/d is reached at end-2009. However, a key proviso was that there should

be clear signs of long-term demand for the extra volumes. The Minister suggested that each of these capacity expansions could be completed within three years of project sanction. The key projects are:

a) Zuluf (Arab Medium) - 900,000b/d
b) Safaniyah (Arab Heavy) - 700,000b/d
c) Berri (Arab Extra Light) - 300,000b/d
d) Khurais (Arab Light) - 300,000b/d
e) Shaybah (Arab Extra Light) Phase 3 - 255,000b/d

The Khursaniyah programme, which will also produce more than 3bcm per annum of gas, will develop production facilities for the onshore Khursaniyah, Abu Hadriya and Fadhili oil fields near the city of Jubail on Saudi Arabia's Persian Gulf coast. It was announced in September 2008 that production at the Khursaniyah oil field has started. By end Q109 the field is expected to be producing 300,000b/d of crude oil. At full capacity the field may produce as much as 500,000b/d of crude, plus 300,000b/d of NGL. Saudi ARAMCO said in June 2008 that its $10bn Khurais oil field development is on schedule to be completed by June 2009, despite speculation that the project's start-up would be delayed.

New consortiums in Gas Explorations: IOC upstream involvement is now increasing, due to initiative to develop gas fields using groupings of foreign operators. Deals have been signed with Royal Dutch Shell, Total, Eni, Repsol YPF, Lukoil and Sinopec. According to statements made by ARAMCO, the five-year plan will radically increase the rate of exploration and includes the drilling of 307 new development wells, including 67 exploratory wells primarily in non-associated offshore formations. Also according to ARAMCO, exploration and development will also commence in non-producing areas such the Red Sea and the Nafud basin, north of Riyadh.

Downstream Petro-strategies

Major investment programme

Saudi ARAMCO announced plans in May 2008 to invest $129bn in new energy projects over the next five years, focusing investment on the expansion of its crude oil, natural gas, refining and petrochemical capacity. Khalid Al-Falih, executive vice president of operations at ARAMCO, told Reuters that $70bn of the total had been earmarked for international and domestic JVs, leaving around $59bn for projects led solely by ARAMCO. The figure of $129bn represents an increase of nearly $40bn on the previous official estimate of investment which stood at $90bn. Falih said ***ARAMCO is focusing on downstream capacity development, believing that this area offers the greatest potential for future growth***. The investment programme includes refinery projects in the US and China, a second phase of development at the Rabigh refinery and petrochemicals complex, and a giant petrochemicals plant at Ras Tanura to be built by US multinational Dow Chemical.

- **Rabigh integrated refinery and petrochemicals complex:** In 2006 Saudi ARAMCO and Japan's Sumitomo Chemical broke ground on the $9.8bn Rabigh Refining and Petrochemical JV. Rabigh will be upgraded to 825,000b/d (from 400,000b/d), while shifting the product mix towards gasoline and kerosene, and integrating the site with a new petrochemicals plant.
- **Catering for Asian demand:** The Saudi ARAMCO development plan calls for $20bn of investment to increase domestic refining capacity to more than 3mn b/d and international holdings by at least 1-2mn b/d by 2011, particularly in an effort to meet the requirements of the fast-growing Asian market.
- **JVs with IOCs for constructing new refineries:** The Conoco and Total deals are two important steps in a process aimed at increasing the Kingdom's refining output by as much as 60% over the next five years. ARAMCO and the third-biggest US oil firm ConocoPhillips in 2006 signed a deal for a second new refinery in the Kingdom, in the wake of French major Total's similar arrangement earlier in the year. The Conoco venture is aimed at building a plant with

400,000b/d capacity at Yanbu on the Red Sea coast. It will create petroleum products for export to the US, European and Asian markets.

- **New refinery at Jizan:** Saudi Arabia's Ministry of Petroleum and Mineral Resources announced in October 2008 that the licensing process for the construction of a 250,000-400,000b/d refinery in the country's south-western province of Jizan is on schedule and will not be delayed further. The completion deadline for the refinery, which was originally set at 2013, has already been pushed back to 2015.
- **Operational excellence in facing the environmental challenge:** According to Abdallah Jumah, chief executive of Saudi ARAMCO, speaking at an energy conference in Feb 2008, ARAMCO will spend $90bn over the next five years in upstream & downstream projects globally, including $1bn on environmental initiatives such as ***low sulphur fuels***.

5.6 The United Arab Emirates Oil Industry

Overview of the Business Value Chain

National Oil Company in the Emirates

The main government vehicle is ***Abu Dhabi National Oil Company (ADNOC)***, which dominates the Abu Dhabi upstream oil sector and UAE in general. It accounts for over 50% of the UAE's oil production and 36% of UAE's refining capacity. It operates as part of JVs with IOCs. Other major state companies are downstream participants ***Emarat*** and ***ENOC***. IOC upstream involvement is extensive, and set to rise as more Abu Dhabi upstream projects are offered. Foreign groups are active in oil production, gas exports, lubricants supply and petrochemicals schemes. ADNOC is an integrated oil company established in 1971 by the emirate of Abu Dhabi, the site of 94% of the county's crude reserves. The company and its subsidiaries are responsible for the E&P of oil and gas, providing support services to the hydrocarbons industry, the operation of oil refineries and gas processing facilities, chemicals and petrochemicals plants and the storage and distribution of refined products. The emirate is aiming to increase total crude output from 2.3mn b/d to 3mn b/d in 2008.

Oil and the distinctive growth of UAE

The United Arab Emirates is a federation of seven states established in 1971 by what were then called the Trucial states, on gaining their independence from the UK. They are Abu Dhabi, Dubai, Ajman, Fujayrah, Ra's al-Khayma, Sharjah and Umm al-Qaywayn. The states maintain a high level of autonomy but the UAE as a whole is governed by the Supreme Council of Rulers, composed of the seven emirs, who appoint a prime minister and cabinet.

Abu Dhabi was a latecomer to the Middle Eastern oil industry, only beginning its production in 1962. The search for oil had begun nearly 30 years earlier, however. As elsewhere in the Middle East, this search was in the hands of foreign oil interests organized in a consortium.

During the late 1960s there was growing resentment in Abu Dhabi, as elsewhere in the Middle East, of foreign ownership of oil resources, and especially the consortium system. The government concluded a 50-50 profit-sharing agreement with existing consortiums. Following the formation of the Organization of Petroleum Exporting Countries (OPEC), Abu Dhabi followed the general policy of requesting participation in the foreign oil companies active in its territory. Abu Dhabi was distinctive among the OPEC members in the gulf in retaining the former concessionaire companies as equity holders in the operating enterprises. It did not, as elsewhere, seek to remove foreign ownership entirely. ADNOC, therefore, developed as a holding company with an intricate web of majority and minority equity stakes in other producing companies. The government was motivated in this strategy by a desire to pursue production and exploration as energetically as possible. As part of this aim, from the 1960s various new concessions were granted to mostly independent oil companies in areas relinquished by previous consortiums, all of which included provisions for ADNOC to have the option to take up to 60 % interest in successful ventures.

Contd. in next page...

Offshore oil and gas fields in the emirate are operated by ***Abu Dhabi Marine Operating Company (ADMOC)***, which is jointly owned by ADNOC (60%), BP (14.6%), Total (13.3%) and JODCO (12%). ADMOC is the second main producer next to ADNOC. The company's

main assets are the Umm Shaif and Zakum oilfields, with the latter ranked among the 10 largest fields in the world. Onshore oil exploration is managed by the ***Abu Dhabi Company for Onshore Oil Operations (ADCO)***, which is jointly owned by ADNOC (60%), while BP, Shell, Total and ExxonMobil each hold 9.5% stakes and Portugal's Partex owns the remaining 2%.

ADNOC Group subsidiary ***Abu Dhabi Oil Refining Company (Takreer)*** operates two refineries:

- ***Ruwais refinery*** (capacity 145,000b/d) which produces light products chiefly for export to Japan and India. An upgrade project to expand capacity to 500,000b/d was completed in 2005, including refits of existing units and expansion of units for production of unleaded gasoline and low-sulphur fuel oil. Fuel oil from Ruwais is sold as bunkers by ADNOC and also used for domestic electric power generation.
- ***Umm Al Nar refinery*** (capacity 90,000b/d), since its construction in 1976, the plant has undergone de-bottlenecking as well as a recent expansion from its original name plate capacity of 88,000b/d.

Abu Dhabi Gas Industries Ltd (GASCO) is responsible for processing associated and non-associated gas from the Emirate's onshore oil production, with production in excess of 40.8bcm of gas, 140,000b/d of condensate and 4,000 tonnes of sulphur. It is jointly owned by ADNOC, Total, Shell and Partex. Gas is supplied to around 20 customers including power plants, ADNOC's group companies and the entire Ruwais industrial estate.

...Contd.

ADNOC established subsidiary companies specialized in the various sectors of the oil industry. Abu Dhabi created companies to take over the marketing and gas liquefaction businesses. ADNOC was also anxious that Abu Dhabi should have its own refinery capacity. ADNOC's first oil refinery-situated at Umm Al Nar, opened in 1976, and in 1981 the company opened a second refinery at Ruwais. These plants made the UAE self-sufficient in refined petroleum products, with a surplus to export. ADNOC also further diversified overseas, again favoring joint venture and mixed ownership structures (Said Zahlan, 1998; MEED Report).

Under the UAE's constitution, ***each emirate controls its own oil production and resource development.*** Although Abu Dhabi joined OPEC in 1967 (four years before the UAE was formed), Dubai does not consider itself part of OPEC or bound by its quotas. More than half of Abu Dhabi's oil production is generated by state-owned ADNOC.

Dubai Petroleum Company (DPC) is the main upstream operator in Dubai, representing a JV between the government and US-based ConocoPhillips. The state-owned ***Dubai Natural Gas Company (DUGAS)*** is responsible for processing natural gas produced in Dubai's offshore oil fields as well as the gas piped from Sharjah.

IOCs from Japan, France, the UK and others own up to 40% of the energy sector in Abu Dhabi, the only Gulf oil producer to have retained foreign partners on a production sharing basis. ***ADNOC holds the majority stake in all upstream oil ventures*** and is currently planning a limited further opening of oil production to foreign firms.

The ***UAE is a member of OPEC*** and it has recently (December 2007) been producing 2.48mn b/d, against sustainable productive capacity of 2.75mn b/d. The UAE is expected to have capacity of up to 2.89mn b/d by the end of 2008. ***There are also significant volumes of gas liquids that are exempt from OPEC quotas.*** ADNOC has stated that the company is seeking to produce ***4mn b/d by 2015***. Foreign Minister Sheikh Abdullah bin Zayed al-Nahyan announced in April 2007 that UAE oil production capacity will increase to ***5mn b/d by 2014***, increasing the UAE's profile in the Gulf region.

Oil and Gas assets

The collection of states that forms the UAE has proven oil reserves estimated at 97.8bn bbl (BP Statistical Review of World Energy, June 2007), or nearly 10% of the world total. The same total is recorded in the December 2007 Oil & Gas Journal survey. It also houses ***the world's fifth largest natural gas reserves*** at 6,061bcm and exports significant amounts of LNG to Japan. Abu Dhabi dominates the UAE oil and gas sector, with 94% of its oil (over 92bn bbl). Dubai contains just 4bn bbl of reserves, followed by Sharjah and Ras al-Khaimah, with 1.5bn and 100mn bbl respectively.

UAE has ***five operational refineries*** providing capacity of approximately 781,000b/d. UAE oil consumption is estimated at 422,000b/d, while its gas demand of 44.8bcm falls short of production at 52bcm.

Although the UAE holds the world's fifth largest natural gas reserves, with 6.6tcm at end-2006 (according to the BP Statistical Review of World Energy, June 2007) ***most of the gas is sour***. The high levels of sulphur in the gas make it more challenging and costly to develop owing to its corrosive nature, which means it requires special handling and infrastructure. The gas in the Shah Field has a content of around 30% hydrogen sulphide, which is highly toxic, making production much more testing and expensive than conventional gas development.

However, Business Monitor International estimates that the ***UAE's proven oil reserves will slip gradually over the period to 2011/12***, dropping to 93.6bn bbl. Exploration and development activity is now on the rise, but may not be sufficient to maintain the current reserves position while delivering rising output. However, analysts see scope for some expansion of gas reserves, perhaps to 6,220bcm over the next five years.

Business Value Chain

ADNOC proved itself one of the better managed state oil companies. ***ADNOC is one of the ten largest oil companies in the world.*** The state-owned enterprise is engaged in all phases of the oil industry. It has a ***complex and intricate holding company structure*** involving equity links with large Western oil enterprises. Unlike other NOCs, ADNOC's business value chain comprises of the following major processes which are catered through 14 subsidiary companies.

- **Exploration and Production of Oil & Gas** is catered by Abu Dhabi Company for Oil Operations (ADCO), Abu Dhabi Marine Operating Company (ADMA-OPCO), and, Zakum Development Company (ZADCO).
- **Exploration and Production Services** is catered by National Drilling Company (NDC), ESNAAD, and, Abu Dhabi Petroleum Ports Operating Company (IRSHAD).

- **Oil and Gas Processing** is catered by Abu Dhabi Gas Industries Limited (GASCO), Abu Dhabi Gas Liquefaction Company Limited (ADGAS), and, Abu Dhabi Oil Refining Company (TAKREER).
- **Chemicals and Petrochemicals** is catered by Ruwais Fertilizer Industries (FERTIL), and, Abu Dhabi Polymers Company Limited (BOROUGE).
- **Maritime Transportation** is catered by Abu Dhabi National Tanker Company (ADNATCO), and, National Gas Shipping Company (NGSCO).
- **Refined Products Distribution** is catered by ADNOC Distribution.

According to reports in 1999 Institutional Investor, ADNOC proved itself one of the better managed state oil companies. The strategy of alliances with Western oil companies gave it ***access to skills and technologies that would have been hard to generate internally***. Abu Dhabi's huge oil reserves also placed ADNOC in a powerful competitive position. In terms of sheer production capacity, ADNOC in 1990 had entered the ranks of the world's ten largest oil companies, with a sustainable output of around one million barrels per day, and sufficiently large oil reserves to enable it to keep operating for more than 100 years at 1990 production levels.

Economy

There is a large economic imbalance between Adu Dhabi and Dubai, and the five poorer northern emirates. Important domestic issues for the emirates are the development of these five and the heavy reliance on expatriate labour.

Abu Dhabi accounts for 90% of UAE oil and gas production, having more than 90,000 million barrels of recoverable crude and the world's fifth largest deposits of natural gas. It has been the lead contributor to the federal budget and has helped with development projects in the other emirates. The UAE economy is heavily dependent on oil and on foreign labour, especially in the private sector where 96% are expatriates. An ***Emiratisation drive*** is in progress, which has been successful in some sectors. In the oil and gas sector, ADNOC is planning a large investment in EPC projects to raise its

sustainable oil capacity and upgrade its hydrocarbon infrastructure. Without any major hydrocarbon reserves, ***the five northern emirates have traditionally been dependent on the federal government, and by extension Abu Dhabi***, for upgrading their infrastructure. However they are trying to increase private sector involvement (2007 MEED Report).

Key revenue lines

The latest UAE Oil & Gas Report from Business Monitor International forecasts that the country will account for 4.24% of Middle Eastern (ME) regional oil demand by 2012, while providing 11.40% of supply. Between 2007 and 2018, we are forecasting an increase in UAE oil production of 35.6%, with volumes rising steadily to 4.0mn b/d by the end of the 10-year forecast period. ***Seventy percent of the total annual production of ADNOC's refined products is exported.***

Gas production is expected to rise from 52bcm to 110bcm by the end of the period. With 2007-2018 demand growth of 98%, this provides export potential rising from 7bcm to 21bcm over the period.

Corporate Ethos

Strategic Direction

The sole objective of ADNOC is ***'Empowering the nation for generations to come'.*** These are translated through 14 specialist subsidiaries or directorates which have their unique business mission, vision and values established.

Compliance to various Management Systems

ADNOC is committed to sustainable development, ensuring a harmonious balance between people's needs and Earth's resources. ADNOC further states that its track record in ***Health, Environment and Safety (HSE)*** sets the standard for the rest of the Arabian Gulf.

ADNOC and its Group Companies aspire to achieve an HSE performance that is exemplary in the Middle East and African Region. Over the past years ADNOC and its Group Companies have worked hard to promote HSE best practices and to improve its HSE performance in all aspects.

Group HSE Risk Management Guidelines were introduced in 2000. Since then, hundreds of risk and hazard management studies have been executed, resulting in improved technical integrity work programmes, and improved design standards and procedures. Studies have also been conducted to identify workplace hazards and develop effective steps to manage risk. The Group's HSEMS Guidelines are aligned with ISO and OHSAS standards for HSE management systems.

Corporate Governance Framework

Organizational Structure – Board of Directors, Management & Internal Auditors

The ***Supreme Petroleum Council (SPC)***, chaired by the President of the UAE and Ruler of Abu Dhabi. SPC formulates and oversees the implementation of Abu Dhabi petroleum policies.

Over the past three decades, ADNOC has expanded its business activities, enhanced its competitive position and managed to become one of the world's leading oil companies with substantial business interests in upstream and downstream activities, including transportation, shipping, marketing and distribution. ADNOC has 14 subsidiary companies working in the various fields of the oil, gas and petrochemical industry as well as crude oil and gas transport and services.

In Oct 1998, ADNOC implements new organizational structure to meet its future ambitious plans and it is an ***integrated company***. ADNOC as a holding company is

divided into 14 directorates i.e., the subsidiaries, which comprise specific industry areas within the holding company. ***The holding company's management is itself answerable to the UAE's Supreme Petroleum Council.***

Fig. 5.8 illustrates ADNOC's organizational structure to elucidate the corporate governance framework within the entity.

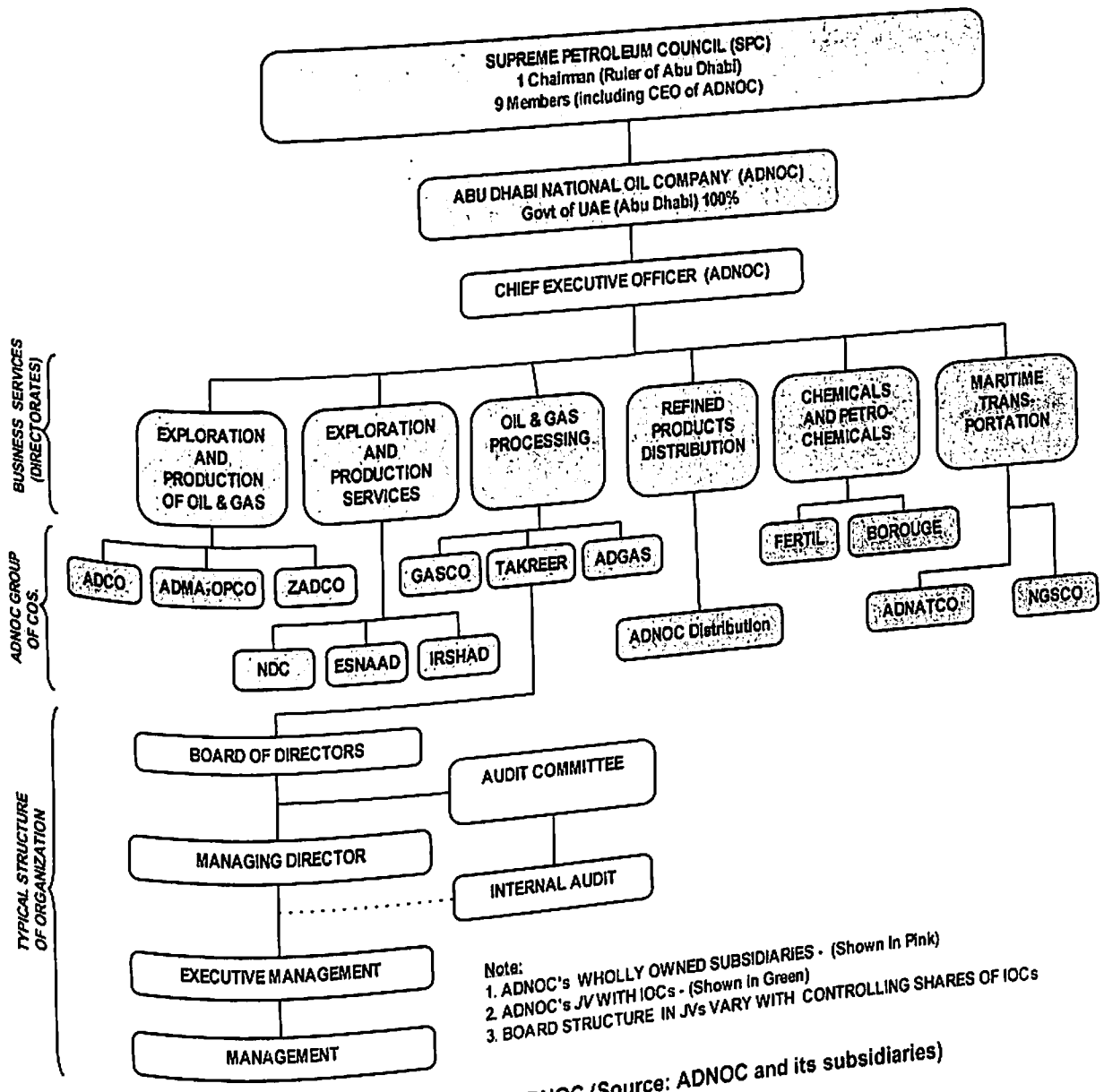

Fig. 5.8, Organizational Structure at ADNOC (Source: ADNOC and its subsidiaries)

Initiative in Enterprise Risk Management

A detailed ***Enterprise Risk Management Study*** was conducted during 2006 to identify high level risks that could have detrimental impact on ADNOC's ability to generate value for its stakeholders in its various subsidiaries and joint ventures.

ERM function and processes

The entity has an ***ERM process*** but the ***ERM function*** is not clear as there was no information supporting this issue, however the reference model being pursued is the COSO ERM Framework.

ADNOC does not have established ***ERM policies and procedures*** in place.

ERM Governance

ARAMCO's risk governance is ensured by a ***Risk Committee*** in place fully appointed by the Board of Directors, just as the Audit Committee is also appointed by the Board of Directors. The Internal Audit function derives its authority from the Board of Directors and partially utilizes the findings of the Risk Committee. There is a ***Corporate Risk Register*** in place, but there is no clear indication as to whether Internal Audit Plan would be derived from the Corporate Risk Register in future.

There is no clear information on the Risk Committee and its members. Furthermore, no formal publication of the awareness and implementation is available in public domain.

ADNOC as a NOC does not publish its ***Annual Report*** along with Financial Statements. However, the Annual Report does not communicate about its ERM initiative. Furthermore, QP's subsidiaries did not have an ERM framework; however, QP's joint venture entities (ex: Qatar Gas, Ras Gas) has an independent ERM framework being pursued. The reason for such an initiative is to align risk appetite of the various shareholders in the JV.

Some of the subsidiary companies (ex: GASCO) have an Enterprise Risk Management System in place.

Upstream Petro-strategies

Offshore and Onshore Development Campaign

There are several projects either on the cards or underway to upgrade infrastructure at existing oil fields, leading to a boost in capacity. Some analysts state that ADNOC should see solid rather than spectacular growth over coming years, with a number of IOC-partnered gas projects planned.

- **Reforming the concessions system:** The UAE is considering revising its system of oil and gas concessions ***to spur technological development and introduce more competition into its upstream segment***. Once state oil firm ADNOC has concluded its sour gas licensing round with IOCs, it is expected that the company will focus on reforming the concessions system as it seeks to boost production capacity. Although the concessions are not due to expire until 2014 at the earliest, it is expected that renegotiations will begin early.
- **Onshore oil field development:** Growth in the UAE comes from Abu Dhabi, where ***investment at onshore fields feeding the Murban crude stream is bearing fruit***. Murban's capacity, which stood at 1.2mn b/d in 2005, is expected to average 1.58mn b/d in 2008. ***Longer-term expansion from Abu Dhabi is likely to shift offshore***, to the Upper Zakum and Umm Shaif fields. The impact of these projects is likely to be felt only at the end of the forecast period of these projects.
- **Offshore oil field development:** The offshore oil and gas production unit of ADNOC is aiming to boost oil production by two-thirds to 1mn b/d by 2019. Earlier plans to boost capacity to 4mn b/d by 2010 now look extremely optimistic. ADNOC brought in ExxonMobil in June 2004 as a strategic partner in the development of the Upper Zakum field, with a 28% ownership stake. ExxonMobil is set to undertake a programme of upgrades to the Upper Zakum field to raise its capacity from the current 550,000b/d to 750,000b/d by 2008, and to 1.2mn b/d by 2010.
- **Oil field upgradation projects:** Several projects to upgrade infrastructure at existing oil fields are on the cards or under way. There is a $300mn project to increase the capacity of the onshore Bu Hasa field. ***The goal is to increase***

capacity to 480,000b/d. A gas re-injection project is also planned for the onshore Bab field, which is expected to increase capacity to 350,000b/d. Upgrades planned for the onshore Asab field should boost capacity from 280,000b/d to 310,000b/d. These projects are part of an overall goal of raising the UAE's production capacity to 3.5mn b/d by 2010, a target that is considered achievable. ADNOC will spend $10bn on field developments, according to media sources in June 2007.

- **Onshore Gas Development:** Overall UAE gas consumption is forecast to reach 62.9bcm by 2012. Production of gas is on the rise, with 85bcm achievable by 2012 - providing exports of 22.1bcm. The Thamama formation in Abu Dhabi is the third phase of the Onshore Gas Development (OGD) to bring 12.4bcm of gas from the Thamama F reservoir at the Bab field by 2008. Shell and ExxonMobil are also involved in technical studies for gas development at Shah and Bu Hasa respectively.
- **Development of Sour Reserves (Shah Gas Reserve):** According to French oil company Total, UAE's sour gas reserves, which national operator ADNOC plans to develop in a JV with IOCs, are only estimated to produce 10.2bcm per annum, a third of the original estimate of 31bcm. Although some of the largest IOCs, including BP, ConocoPhillips and Total, have confirmed their interest in bidding for the project, it remains to be seen whether their enthusiasm will diminish due to the apparently much lower production levels.

Other Initiatives include ***Replacing ageing LNG trains*** in its ageing LNG trains at Das Island with one mega-train, at the Abu Dhabi Gas Liquefaction Company (ADGAS) - a JV between ADNOC, Japan's Mitsui, and oil majors BP and Total. The other major long term 2013 objective is the ***construction of its $1bn LNG storage facility*** will begin in early 2008. The Dubai Multi Commodities Centre (DMCC) hopes that the facility, which will be located at Techno Park in Dubai, will be used to ***launch an LNG derivatives market.***

Downstream Petro-strategies

Major Expansion Projects & Contracts

- **Construction of integrated refinery and petrochemical plant:** Downstream, Takreer plans to double capacity at the Ruwais refinery, adding an additional 417,000b/d to the existing 400,000b/d of capacity. Jasem Ali Al-Sayegh, the general manager of ADNOC's refining unit Takreer, has said that the engineering and design study for the expansion should be completed by end-2008 or Q109. The planned completion date is 2013, although this was acknowledged as ambitious. Once expanded, Ruwais will be integrated with a petrochemicals complex and a new oil lubricants plant, which is currently being built by Takreer with Finland's Neste and Austria's OMV, and is due onstream in 2012. As well as providing for 1.1mn tpa of feedstock supply to the nearby Borough petrochemicals plant, new units at Ruwais will allow the company to reduce the sulphur content in its diesel, which along with gasoline makes up around 35% of Takreer's output.
- **Construction of New Refinery:** Abu Dhabi's investment arm IPIC and ConocoPhillips signed a deal in 2006 for a new refinery with 500,000b/d capability. Conoco pulled out in 2007 citing rising costs and IPIC announced in March 2008 that the plant's capacity would be reduced to less than 200,000b/d.
- **Other investment initiative:** Quality Energy Petro Holding International, which is owned by a member of Abu Dhabi's al-Otaiba family, plans to build a $13bn oil refinery in the UAE and seek Iranian crude as feedstock. This would dramatically increase the refining capacity of the emirates, as well as strengthening links with Iran. Quality Energy intends to build a 500,000b/d complex with the government of Russia's Chelyabinsk region, in which the company plans to invest $100bn between now and 2012, according to Chairman Adil al-Otaiba.

----------END OF CHAPTER-5----------