
# The Promotion and Licensing of Petroleum Prospective Acreage

**Michael A.G. Bunter**

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# Foreword

Attracting foreign investment into the upstream oil and gas sector (exploration and production) has been a matter of importance for host governments for the last hundred and fifty years or so. Of most concern to the host nation-states, to their populace and to their politically-literate classes are the issues of sovereignty over the petroleum resource (oil and gas) and of devising a pricing mechanism that accurately values access to the resource. Additional issues concern the distribution of short-and long-term economic benefits to all of the participants in the investment process and also the risks associated with exploration including the rise and fall of oil prices and the competition between various countries (i.e. the owners of an uncertain resource in the ground requiring great effort to identify and extract). The promotion and licensing of petroleum prospective acreage is therefore a matter not only for the expert in petroleum geology, economics, finance, law and taxation, but also for the political adviser competent in assessing somewhat intangible benefits to the nation over the long term. Licensing concerns itself not only with the securing of an agreement good for both sides in the negotiations in the short term but also with the securing of an equitable distribution of mutual benefit in the very much longer term. The licensing adviser has to be aware of the natural concerns of the citizens of the host country not only with securing a fair deal between government and the foreign investor, but also the necessity of ensuring that the deal that has been negotiated is sustainable through change of government and that is demonstrably free of accusations of corruption and partiality. Moreover it has to be one that has been secured in a climate of transparency, openness

and to the highest standards of professionalism and adherence to sound international ethical practice.

Most books on the subject of licensing focus on the contract between a multinational oil company and a host government. However it must be said there is much more to the process than merely a prolonged episode of hard and skilful negotiations which results in a legally well-drafted contract at the end. No! The game starts much earlier than that when a government, as owner of the resource, has to consider, as any owner of a product with an uncertain market, how to convey it to its purchasers, to publicise it, to promote investment in what is often seen as a very problematic and risky political and security environment.

Over the last twenty-five years, a set of good practice in international petroleum investment promotion has emerged. These take into account the influence of OPEC, of the New International Economic Order polity of the 1970s, the fifty or so World Bank petroleum exploration promotion project loans, but also more recent changes such as economic liberalisation and privatisation in the global economy and the new emphasis on sustainable development and human rights of the indigenous people living close to the generally remote oil and gas acreage that is offered for exploration and development.

To date there has not been a systematic, informed and comprehensive handbook or manual that describes this state of the art. (There have been some incomplete attempts in the 1980s by the Petroleum Finance Company; some technical papers by World Bank staff; a lot of not formally written up and published internal corporate and consultancy firm knowledge; several books on international and comparative petroleum law, Ernest Smith et. al, International Petroleum Transactions, 2000; Taverne and Gao in this series, but none of them deal with the full sequence of the petroleum investment promotion process from the beginning to the end, incorporating the practical and theoretical expertise of the petroleum geologist, petroleum economist, petroleum accountant and petroleum lawyer. This is in effect what Mike Bunter's book does. Given the gap I have perceived for a long time, I have encouraged him and I am absolutely delighted to see such an important book come out in the end. His book is, as the reader will see, based on decades of advisory services to government agencies in this field. He is no apologist for either companies or governments and brings a well informed, practice-based, but also critical perspective unwilling to accept conventional wisdom at its face value, to bear on the subject. When I started my professional career as UN adviser in minerals, and later petroleum law in 1981, such a book was badly needed. I and my clients, would have greatly benefited from such a book.

What a pleasure and source of professional contentment for me and our professional community in the international petroleum companies, government agencies, international organisations and professional firms (law,

accountancy, consulting, geology, engineering) it is, to be sure, that Mike Bunter has been able to put the sum of his life experience into this remarkable effort.

**Thomas W. Wälde**
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# Preface

This book results from the experience, over a number of years, of the author in a number of countries of the world, in conducting licensing rounds of petroleum prospective acreage for host governments. The countries concerned were in Europe, Africa and in some of the constituent republics of the former Soviet Union. This work explains the processes of promotion and licensing from the point of view of the two main protagonists: government and the international oil companies. The book originated as a set of course notes for a series of lectures given by the author at the Centre for Energy, Petroleum, Minerals Law and Policy at the University of Dundee. The contents of the course notes have been expanded into this book.

## Acknowledgements

I should like to thank Professor Thomas Waelde for reviewing my manuscript, and without whose valuable suggestions, constructive criticisms and vigorous encouragement this book would not have been published.

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## Dedication

This book is dedicated to June, my wife, who supported me financially in the writing of it. She urged me to write the book, she typed the manuscript and she saw the work through its numerous revisions.

# Introduction

Any economic development which has a tendency to extend beyond mere subsistence farming will require a supply of energy to provide light and heat. Early man employed lamps of animal fat and fires of wood for this purpose. Later, between three and four thousand years ago in Wales, he discovered workable deposits of coal and these ensured a sustained supply of heat and light which enabled the production of bronze to establish itself as one of the first industrial processes (Dyson, 2000).

As long ago as the third and fourth centuries BC were found bitumens and liquid crude oil in the Middle East. As a result, thriving economies, based on petroleum, sprang up in the Arabian Gulf. The world's first war over oil was fought in 88BC when Antiochus XII of Greece attacked the oil-rich Kingdom of Nabatea to capture its bitumen and oil reserves.

In 1844 the modern oil industry established itself first at Baku, on the western shore of the Caspian Sea (Figure 1). Baku is the capital of the now independent Republic of Azerbaijan (Salt, 2000) and there the world's first mechanically-drilled wells were spudded at the Bibi-Eibat field. Oil seepages and mud volcanoes had been known in this region for millennia and the great monotheistic Zoroastrian religion had found its early inspiration near the eternal fires. There had been hand dug wells at the Baku oil fields since long before where crude oil was refined to paraffin for the local markets.

In 1828 Northern Azerbaijan had been ceded by the Shah of Persia to the Russian Empire by the Treaty of Turkmanchai. By the 1840s Baku was very much a Russian colonial frontier town of some eight thousand souls; within fifty years it would be home to nearly two hundred and fifty thousand. The

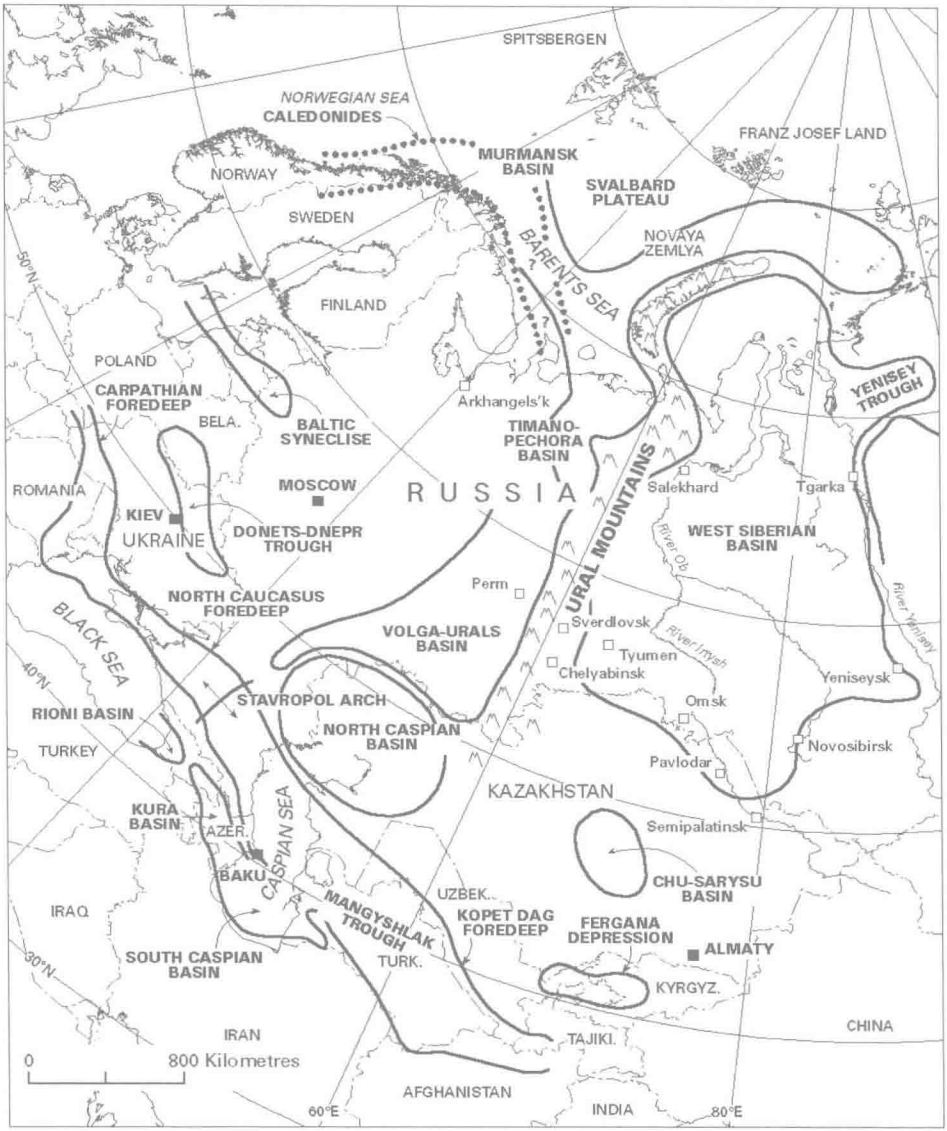


**Figure 1** Petroleum basins of the former USSR
after Meyerhoff, A.A., 1975 in The Trek of the Oil Finders, ed. Owen, copyright AAPG, 1975, reprinted by permission of the American Association of Petroleum Geologists, Tulsa, Oklahoma, USA, whose permission is required for further use.

area surrounding Bibi Eibat is still attractive for exploration for oil and gas to this day. On 31 October 1997, one hundred and fifty years after the first oil was seriously exploited there, the Bibi Eibat, Buzovniy, Kala and Mashtagia fields were formally offered by international tender for rehabilitation by the State Oil Company of the Azerbaijan Republic, SOCAR (Anon, 1998). Where else can this claim be made?

In the Russian Azerbaijan of the 1840s an essentially colonial situation prevailed. Ownership of the mineral resources of the land was vested in the Crown, the Tsar himself. Acting with his authority local officials awarded rights to drill for and extract petroleum under what is now known as the 'Contract System' (Williams & Meyers, 1997, page 214). Initially, under this system the government granted exclusive rights for the exploitation of a specific plot of land for a period of only four years. The contract could be revoked at any time and there was no preferential right to renew. Because of its short contractual term such a system clearly favoured efforts to maximise production and so overproduction and waste were inadvertently encouraged. Later some security of tenure was introduced. Plots awarded under the Contract System were quite small, between one and four hectares in areal extent and were allocated by an auction system (Bunter, 2001)[1]

A levy on production was actually offered by the tenderer during the Russian auction as a bid; naturally enough it was paid to the local government after award. Some of these levies were as great as forty percent of production although actual measurement of production rates must have been a problem for the authorities of the time. After a primitive refining process Baku paraffin (kerosene) was shipped to other parts of the empire and to western Europe. . . . in this manner a new international trade had been born although the early production of oil totalled only some seventy five barrels a day.

What was it about Baku that made it attractive for oil explorers? Why were there oil seepages at the surface? Why was commercial production to be found at Baku? Russian and foreign entrepreneurs and technical men began to ask themselves these and other questions ... Were there other places nearby that were equally attractive for the early oil prospectors? Attention soon shifted across the Caspian Sea to the Cheleken peninsula located on its eastern shore in Russian Turkmenistan. Soon discoveries were made at Cheleken, too, and it was obvious that the oil industry was going to become important in Russian commerce. The world's first oil men came to Russia to participate in the new bounty and also to learn about the new technology and to see if the lessons that they learnt there could be applied so as to find oil elsewhere. (Natural gas was not yet a useful product; nor for that matter was the motor spirit fraction, petrol (gasoline), which was merely a waste product of the refining process).

Early exploration had been successful at Baku because surface seepages of

[1] Under the metric system a hectare is one hundredth of a square kilometre or in English measure 2.471 acres.

oil and gas had revealed that an active 'petroleum system' existed.[2] Were there other areas of seepage that might repay investigation? Oil men soon located the Carpathian foredeep as another potentially attractive area (figure one). There were obvious seeps of oil and gas which polluted the land but that was not all: the rocks exposed at the surface were intensely folded just as they were at Baku. Drilling commenced in Poland in 1854 (Bunter, 2001) and in Romania in 1857 (Moody, 1956) on tracts of land leased from local landowners. (In both countries mineral rights were vested in the freeholder of the land.) By 1859 Romania had sixty seven percent of world crude oil output. In the next fifty years the oil industry was to expand from Eurasia into southeast Asia and the Americas. In the next section of this introduction I shall show how these geographically separated areas are in fact linked geologically to each other.

From its inception in Russia until the beginning of the twentieth century the so-called 'oil industry' was not an industry at all but rather a commerce of somewhat modest dimensions. By the year 1900 Russia annual production was only 75.8 million barrels and in the United States somewhat less (Table 1). That is to say all of Russia (mainly Baku) was producing just over two hundred thousand barrels a day, about a tenth of current North Sea production from the U.K. sector only. The oil business had not yet become an industry but it was certainly a substantial trade.

What was this commerce in oil worth? We do have some ideas about world oil price trends since the 1860s. Petroleum economists have shown that in real

**Table 1** World Gross Annual Petroleum Production, Late Nineteenth and Early Twentieth Centuries, After Owen, 1975 & Yergin, 1991

| | *Gross annual production in millions of barrels, rounded* | | | |
|---|---|---|---|---|
| *Country* | *1880s* | *1890s* | *1900s* | *1910* |
| Russia | 10.8–23.0 | 34.6 | 75.8 | 70 |
| United States | 30.2 | 54.3 | 63.6 | 209.6 |
| Europe, mainly Romania | ? | 1.3 | 4.3 | 23.5 |
| Burma, mainly | ? | 0.2 | 1.9 | 7.9 |
| Mexico | | – | – | 3.6 |
| Netherlands East Indies (Indonesia) | | – | 2.2 | 11.0 |

[2] In a 'working petroleum system' a mature source rock generates and expels hydrocarbons. These migrate into a reservoir, which is sealed by a cap-rock and folded into a trap. Science allows the explorationist to seek for commercial reserves in such an attractive area.

1992 terms world oil prices have stayed relatively constant at about $15.00/barrel from the year 1860 until the present day. Technology has changed, having a tendency to drive down costs but the real price of a barrel of oil remains virtually constant.

New technology was able to make a profound attack upon the costs of delivering the new product to market. For example in January 1866 the expense of delivering a barrel of crude oil from Pithole, Pennsylvania to refineries in New York was $10.40. By 1884 the pipeline tariff of $0.45 had reduced the cost of transportation from Pennsylvania to New York (Owen, 1975).

Our early commerce in petroleum was valuable but not that valuable when compared against the other major extractive industries of the day in gold, silver, diamonds, coal, iron, tungsten, manganese, copper, nitrates, phosphates and the like. It was not until the European invention of the internal combustion engine in the late nineteenth century that the oil trade was to become an industry.

## The world of oil and the meaning of petroleum prospectivity

It is only now with the advent of modern geological techniques that we can fully understand why certain areas of the world are more likely to be attractive for petroleum exploration than others. The advance of plate tectonics in the 1960s and 70s and the use of satellite photography in the 1970s and 80s allowed petroleum geologists to assess more fully the most attractive areas of the world for petroleum exploration and to understand just why they are so rich in hydrocarbons. In petroleum jargon we say that a more technically attractive area is more **prospective**.[3] It has the potential to contain within it a working petroleum system. We could say that it is prospective in technical terms only that is, ignoring other factors such as the area's political development, its contractual and legal stability or the level of state taxation. We would be most unwise to do so, however for the modern oil man, the term prospectivity embraces four quite separate concepts: technical, legal/contractual, fiscal and geopolitical. We have discussed technical prospectivity in its connection with a working petroleum system. Contractual/legal prospectivity implies some respect for the rule of law in the host country. Fiscal prospectivity

[3] A prospect has been defined as an area that is a potential site of mineral deposits, based on preliminary exploration (Gary et al, 1973). From this it follows that a technically prospective area is one potentially capable of hosting prospects, (surely we should add 'of economic significance'). In the petroleum sector we should refine this definition of prospect to 'a geophysically defined area, as yet untested by the drill, but capable of hosting commercial quantities of hydrocarbons'.

allows the oil company to make money on the deal. Geopolitical prospectivity is nowadays linked to the notion of the political risk although it is more than that as we shall come to see.

Where are the technically most prospective areas to be found? We can identify them most readily by inspection of the levels of reserves at the different countries of the world (Table 2). At the top of this table stands five countries, all neighbours of each other and each surrounding the Arabian/Persian Gulf: Saudi Arabia, Iraq, Kuwait, Abu Dhabi and Iran. Next come Venezuela and Mexico, neighbours of each other and neighbours also of the U.S.A. Elsewhere great reserves of petroleum are found in China, Indonesia, India and the circum-North Sea countries. A technical question now arises. Is there a common thread to these prospective areas? How might these highly attractive areas be related to each other? Is there a geological connection at all between them?

All of the world's great oil-producing areas are located in the so-called Tethyan and Boreal geological 'realms' with the exceptions of the major oil

**Table 2** World Black Oil Reserves, After Campbell, 1995

| Country | Reported remaining reserves MMMSTBO[1,2] |
|---|---|
| Saudi Arabia | 258.7 |
| Iraq | 100.0 |
| Kuwait | 94.0 |
| Abu Dhabi | 92.2 |
| Iran | 89.3 |
| Venezuela | 64.5 |
| Former Soviet Union | 57.0 |
| Mexico | 50.8 |
| China | 24.0 |
| U.S.A. | 23.0 |
| Libya | 22.8 |
| Nigeria | 17.9 |
| Norway | 9.4 |
| Algeria | 9.2 |
| Indonesia | 5.8 |
| India | 5.8 |
| Canada | 5.0 |
| Oman | 4.8 |
| United Kingdom | 4.5 |
| Brazil | 4.0 |

[1] Excludes gas and condensate as oil equivalent
[2] Probably understates reserves that may be found in Angola

basins of Nigeria, Peru and Angola. In the two great Tethyan and Boreal realms, throughout geological time, conditions were particularly favourable for the accumulation of great thickness of reservoir, source-rock and cap-rock.[4] These provide three of the 'ingredients' necessary for oil accumulation; so rich are these realms that indeed no less that ninety one percent of the world's oil reserves are to be found within them.

This then is some of the meaning of the phrase 'technical prospectivity' ... prospective areas are largely to be found within the Tethyan and Boreal realms and rather more rarely outside. In Chapter 2 I shall define the word prospectivity with more rigour. The most prospective realms have to a great degree already been explored. For this reason we are able to come to certain conclusions about future prospectivity. One of these is that we can be sure that oil and gas are waning assets with a finite life.

In a virtually unknown little book published in 1964 A.F. Fox, the Head of the Geological and Geophysical Division of the Kuwait Oil Company (then owned by BP/Gulf), showed that world oil production would peak in the year 2000 with a maximum world daily production of about seventy two million barrels. It is now the year 2001 and daily world production is just under eighty million barrels. The writing is 'on the wall' for all of us and unless we find new reserves, at present production rates we shall run out (of black oil, not gas) within a quite finite time. To an extent probably unrecognised the world energy trade is vitally dependent on oil and gas. Sixty percent of world energy is provided by hydrocarbons and without them the prosperity of the world would collapse. The remainder comes from coal (twenty five percent), nuclear, and hydroelectric; the renewables (wind, solar, tidal, biomass) are a long way last.

Some oil experts are sufficiently alarmed by the imminent decrease of world oil supplies that they have produced a number of warnings. One such eloquent Cassandra is Campbell (1995) who has pointed out that science allows us to calculate world oil reserves at the proven level with some certainty. Campbell himself has estimated that ultimate recovery (if we add in undiscovered reserves) lies between 1.65 and 1.70 trillion barrels of oil. (The United States Geological Survey has estimated 2.3 trillion barrels). Campbell felt that many published reserves estimates had a political content: for example OPEC oil production quotas are struck on the basis of proven reserves. Optimistic views of world reserves can be used by politicians to sell their electorates on the notion of an ever-expanding economy. Campbell therefore felt that remaining world reserves at the proven level are probably no more than 0.75 trillion barrels with about the same amount already produced. Peak production in any basin comes close to the mid-point of depletion and by the year 2005 only eight nations will not yet have reached their mid-points: Saudi Arabia, Iraq,

[4] The Tethyan realm runs from Middle America eastwards through North Africa, the Middle East and down towards Indonesia. The Boreal realm lies to the north of the Tethyan realm and includes the northern North Sea and the gas and oil-rich area of Siberia.

Iran, Kuwait, Yemen, Sharjah and the Phillippines (It is fair to point out that, at the time when Campbell was writing, the recent huge discovery in the Kazakstan sector of the Caspian Sea, at the Kashagan prospect, had not yet been made (DeLuca, 2000).

Campbell then stated two propositions in the form of equations:

Ultimate recovery minus cumulative production = remaining producible oil
1700bn b – 738bn b = 962bn b
Ultimate recovery minus the discovered = the undiscovered
1700bn b – 1485bn b = 215bn b

Remaining producible oil is all that there is, and it is subject to a natural depletion pattern. The physics of the reservoirs will primarily determine the future production profile. On the basis of these propositions, Campbell concludes that by the turn of the century, a few countries, in the Middle East, with large volumes of remaining oil and low depletion rates, will control the world's oil supply. By around 2020, however, they too will reach their depletion mid-point and production will start to decline, irrespective of politics or economics.[5]

Many have scoffed at Campbell's predictions. They point out that exploration in the ultra deep water has only just started and that moreover, the results have been most encouraging. Campbell is not arguing with this point of view: he simply states that there is a finite amount of oil and that we are using it at an ever-increasing rate. Some years ago the great American geophysicist M. King Hubbert used a bell-shaped curve to predict that U.S. 'lower 48' production would peak in 1970 (Hubbert, 1967; Linden, 1998). At the time and later too his views were denounced as scientifically incorrect but nonetheless lower 48 production DID peak in 1970 and has now declined from 11 million barrels per day to about seven. Hubbert was right and the detractors were wrong. Moreover present depletion rates may be unsustainable on environmental grounds (Macdonald, 2000). Whilst a reduction in present world oil production would cause the rate of decline of reserves to moderate this only puts off the evil day of ultimate depletion further into the future.

Other experts have taken their warnings directly to the Government. Roger Bentley of Reading University and David Fleming of the Lean Economy Initiative met officials of the Department of Trade and Industry on 23 May 2000 (Atkinson, 2000). Perhaps not unexpectedly Dr. Fleming was to state after the meeting ... 'our group was not persuaded that the response was remotely adequate to the fuel problem now looming'.

What this means is that, world wide, acreage which may be thought to be

[5] If one were to ask the average citizen which are the world's largest oil and gas companies they would probably reply Shell or Esso or BP. The truth is that remaining world oil and gas reserves are largely controlled by state oil corporations.

prospective for hydrocarbon exploration will be increasingly hard to find. Most areas of the world are now intensely explored. For new prospective areas the price of entry will rise and with this there will be increasing demands on the capital available for exploration and production. This capital is only available from the International Oil Companies, IOCs, who alone are capable of delivering the volumes of crude needed by the world economy. Some estimates have placed this volume at 130,000,000 barrels/day in the year 2030 as against today's world production rate of about 77,000,000 barrels/day. The capital requirements of the international oil and gas industry are forecast to be 1.365 trillion dollars, in the ten years 1996 — 2005, the high case according to Price Waterhouse/Petroleum Finance Company (1996). Even if the predicted demand is incorrect, one thing is certain: hydrocarbons are a finite resource, not renewable and so will inevitably deplete sooner or later. Indeed some of the oldest of the world's producing areas, such as Texas, are depleting at an alarming rate (Wastell, 2000).

It is fair to say that not all hold to the alarmist views of Campbell. Sheikh Yamani, formerly Minister of Petroleum of the Kingdom of Saudi Arabia believes that, far from running out of oil, the price will crash within five years. Yamani believes that new technologies such as fuel cells and over-production in the Arabian Gulf and in the new petroleum provinces of the Caspian Sea will shortly reduce the world demand for crude oil (Brandreth, 2000). He has recently repeated his warnings in the British newspapers (Barker, 2000; Morgan and Islam, 2001).

Reports of the ultra-giant Kashagan discovery in the Kazakstan sector of the Caspian Sea may support Yamani's thesis. This large feature, known in the shallow waters of the northern Caspian for many years but only recently drilled by the OKIOC consortium, is rumoured to have reserves ranging up to 60 billion barrels of oil (Macalister, 2000). Others as knowledgeable as Sheikh Yamani take a quite different view. Lord Browne, the much-respected Chief Executive of British Petroleum predicts that world oil demand will rise by two per cent per annum for the next ten years to reach peak demand of ninety million barrels a day (Warner, 2001).

Before I move on to Chapter 1 of this manual I want to add to our understanding of the word prospectivity by adding three important definitions needed for our forthcoming discussions. These definitions concern promotion, licensing, and the licensing round.

## *Promotion (a definition)*

The **promotion** of petroleum prospective acreage consists of the identification by the rights-holder (usually government) of the potential investment value of prospective acreage in the national territory for the purposes of petroleum exploration and production, E and P. This is then followed by the sub-division