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# Resources and resourcefulness *

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Let me start by commending your conference theme. Longer-term oil supply will require a balance between 'old' and 'new' oil: between
– increasingly difficult oil from mature areas;
– frontier oil; and
– optimum production from major resource holders.
A key to this balance is technology – under which I include technical, managerial and financial/commercial expertise. In my first two categories – mature areas and frontier provinces – technology can reduce inherently high-cost oil. In the third – the major resource holders – it can help make affordable the increased production that will be needed. In doing so, technology could catalyse greater co-operation in the oil industry: between the resources of the major hydrocarbon holders, and the resourcefulness – if one might call it that – of the private industry.

If I had a criticism of the title of this conference, it would be the absence of the word 'gas'. In a sense, gas *is* 'the new oil', and most of our companies see much of our growth in gas. But there are important differences. Prospects for gas exports depend on developments in the major markets of North America, Europe and the Far East, mainly Japan, each of which behaves in a different way. In general, commercial and environmental factors should favour gas growth, but there is no global gas price, other than its varying link to oil. And although two areas – the former Soviet Union and Iran – hold over half the world total of reserves, the international markets still remain largely regional and bilateral. For many projects, such issues as reliability and pricing will be the deciding factors once an adequate reserve base exists. And in this the challenges of the gas industry are the same as those for oil – ensuring that we, as commercial organisations, can develop and bring the reserves to market at the price levels we might expect.

Consider for a moment the economic background against which our industry must work. For some years post-1986, there were still those who encouraged themselves with the thought that prices would kick up in the early to mid-1990s. By now we have surprisingly uniform agreement on the outlook, if not on the objective – from analysts, oil companies, producers and consumers. That outlook is for oil prices at least to the end of the decade in the range we have seen since 1986. A sombre outlook for producers. But let us bear in mind that when the sages of the world unite to agree that something is inevitable, it often does not happen!

You are all familiar with the arguments. Over the rest of this decade, OECD economies should recover slowly, but oil demand will grow only sluggishly. In the developing countries of Asia, even if economic growth slows somewhat from recent high levels, oil demand will continue to climb. Growth in China in particular is likely to be significant, and possibly in the Indian subcontinent also. Parts of Latin America may also grow rapidly. In the countries of the former Soviet Union, demand is likely to continue to decline through economic restructuring and efficiency improvements, but there should be a return to growth in East Europe.

Although the rate of growth in oil demand varies from scenario to scenario, considerable growth is present in all, driven by the non-OECD countries. Overall, one might envisage an average increase of 1.5 per cent a year in world oil demand, to some 73 million b/d in the year 2000.

Now, supply. OPEC's share of world production fell from 50% in 1973 to 30% in 1985. The increases in oil prices post-1973, together with concerns over stability of supply, stimulated significant volumes of much higher-cost non-OPEC oil. This development of what were then frontier areas, such as the North

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Sea and the North Slope, was driven by private sector technology and capital denied an outlet in many OPEC areas. OPEC's share now stands at some 40%. In volume terms, OPEC's increase since 1985 is over 9 million b/d. Again in most scenarios one sees a continued increase in the call on OPEC, with non-OPEC fairly flat.

In spite of this increased call on OPEC, overcapacity seems set to stay – exacerbated by the expansion in hand in almost every OPEC country. Much of this will be in place by 1996, bringing excess OPEC production capacity – even excluding Iraq – to some 4 to 5 million b/d.

At present, oil prices are essentially determined by market perceptions, not by marginal economics or producer power. In spite of the ongoing conditions of over-supply, the market appears to keep prices within a fairly narrow range – a floor of around $ 15 at which there are expectations of increased OPEC cohesion and a ceiling of around $ 20, perhaps based on some perception of an economically sustainable maximum from a consuming country viewpoint.

Many organisations are now making forecasts and plans based on this range – a real-terms Brent price of $ 18 (in 1993 dollars) is fairly common, a change towards conservatism when compared to the last few years, and not a bad fit to history since 1986. But are we being conservative enough? Does the market think in real terms? There is, to say the least, cause for concern. Real-terms prices this year are the lowest since 1973. I believe that much of the upstream industry can live with a future in a world with Brent prices in the region of $ 18 in 1993 dollars, although development in some of the higher-cost areas of the North Sea, for example, may be affected. But if we see a price steady in nominal dollars, the impact of future operating costs, particularly in areas where operating costs are already high, will become critical.

What might change? As we all know, over half the world's proven oil reserves are in just four countries – Saudi Arabia, Iran, Iraq and Kuwait. Four more – Abu Dhabi, Venezuela, Mexico and the CIS – hold another quarter. Into the next century, the increases in production will come mainly from these countries, a fact which may at least begin to affect the market perceptions which govern the oil price.

In contrast, the first category I want to consider today – the mature areas of the USA and Europe – hold a minor – and falling – share. This has inevitably been reflected in production, as easy oil gives way to more difficult, and therefore expensive, reserves. This decline is likely to continue, its speed dictated by costs. Cost pressures in the industry are continually upward, and will not go away. With a flat oil price ceiling, we must reduce the cost base, both capital and operating.

Another wave of creative application of technology, similar to that which followed the oil price collapse in 1986, can prolong production from existing fields, enable new developments to go ahead, and allow access with minimum intrusion to prospective new areas. In turn, governments in mature areas will need to take note of the changing realities of oil economics, and be prepared to adjust fiscal regimes in the interests of maximising recovery. I believe they will do this, since the alternative is rapidly diminishing domestic production.

In addition to increased cost-effectiveness, new technology must deliver environmental and safety benefits. These objectives are not incompatible: slim hole drilling, for example, involves less cost, less waste and less space. Lightweight platforms, often unmanned, mean less materials consumed, fewer people at risk and lower operating costs. Nothing less than the highest environmental commitment and assurance of technical integrity and reliability will be sufficient if governments are to lift restrictions on prospective but environmentally sensitive areas.

Let me now turn to my second category: frontier oil, in which I also include frontier activity in established areas. In recent years, frontier production has been sufficient to offset declines in mature areas. Today's opportunities are perhaps wider than at any time since the end of the 1960s, but location, technical complexity, distance from market and lack of existing infrastructure combine to make many of these difficult and high-cost. The question is: can development be made viable at current prices? Clearly, much will depend on governments setting fiscal structures that can accommodate the costs, and still leave sufficient incentive for companies to justify these high-risk investments. This is not a question of subsidy: it is a matter of maximising value. Negotiations will involve the closest scrutiny – by both parties – of capital requirements, budgets and potential revenues, and ever more emphasis on costs and margins. However, the prospect of developing their own resources should be sufficient spur to encourage agreement.

Unlike mature areas, there is no existing infrastructure for piggy-backing; but there is the compensating advantage that projects can be planned from scratch, using the newest thinking and taking into account cur-

rent – and future – environmental and safety requirements.

An important area of frontier activity will be deep water. Here, technology has already made great strides. Concrete platforms are being built for water depths of over 300 m, steel platforms are already producing in over 400 m, a subsea well in Brazil produces in 781 m, the Auger tension leg platform in over 800 m in the US Gulf of Mexico is due onstream next year, and Mars will follow in almost 900 m. Such developments are at the leading edge of technology; but perhaps an even greater challenge will be to managerial and business skills, to bring them into production on schedule and within budget. Some of the earlier examples I have quoted could not be built in today's economic climate.

Finally, let us consider the major resource holders. Most of the incremental 10 million b/d call on OPEC by the year 2000 would come from the Middle East members. Of the other major resource holders, Mexico could add over half a million b/d, depending on the availability of domestic investment and the acceptability of that from overseas. Only the CIS shows declining oil output, although with some recovery expected by the end of the decade.

But although the longer-term demand prospect must be encouraging, these countries will need major investment to increase production to meet demand. Into the next century, the five major Gulf producers alone will need to invest up to $ 35 billion a year – comparable with likely expenditure during the 1990s for the whole Upstream industry.

At least the money should be available. Capital investment in the oil industry in the 1990s is likely to be only some 2% of the world total, compared with some 3.5% in the 1980s. Although oil's share may climb again to 3% early next century, this should not cause problems, certainly for the Upstream. However, projects will vary in attractiveness in competing for investment funds. The lesson of the past is that finance and technology flows relentlessly towards opportunities, not to the lowest-cost production. Capital is always scarce for investments likely to offer poor returns.

The position of the major resource holders has changed dramatically since the early 1980s. Many already face severe competition for funds from many pressing development priorities. In some cases, investment merely to maintain the oil infrastructure has been lacking, resulting in some reservoirs not being managed to best effect, and even suffering potentially permanent damage.

Increasing production requires both application of technology in day-to-day efforts to increase production from existing fields, and major long-term projects, with their managerial and technological challenges.

So, where will the capacity be added? In a world of rational economics, capacity would be added in the lowest-cost areas. The bulk would be in the major resource holders of the Gulf OPEC members. But the higher-cost producers both in OPEC and in non-OPEC developing countries will want their share of the cake. These often have the greatest population pressures and severe shortages of funds for major developments. Because of their need both for capital for major developments and technology to reduce the cost of producing their higher-cost resources, they will be more likely to form alliances with the international oil industry.

Such alliances are not new. Indonesia, Nigeria and Gabon, all OPEC members, have long had profitable and stable arrangements with the international oil industry to develop their resources, which tend to be distributed in very large numbers of clastic reservoirs. These are unlike those of the Middle Eastern OPEC members, whose reserves are in highly productive and often massive carbonate reservoirs, with correspondingly lower costs.

This trend is continuing: North African OPEC producers Libya and Algeria, as well as countries such as Venezuela, plus of course the non-OPEC countries of the former Soviet Union – Russia, Kazakhstan, Azerbaijan – all are turning to a greater or lesser extent to the international industry.

In the competition for market share in an oversupplied market, the international suppliers of technology and capital are thus likely to be called upon to redress the balance between the very large low-cost producers, and the smaller but significant producers whose resources are higher-cost. Think of the successful and productive alliances forged over recent years to mutual benefit in Oman, Yemen and Syria.

But the call on the international oil industry may not be limited to the higher-cost producers. Even a major low-cost producer such as Saudi Arabia might choose that route if it were convinced that the cost-reducing technology or increases in ultimate recovery generated through reservoir management techniques were sufficiently attractive to overcome the political barriers to international industry involvement and to remunerate all parties adequately.

What are the barriers? They lie half-buried and almost forgotten, but still there, in many countries and organisations. Historical and emotional barriers, perhaps best summed up by the mirror-image words 'exploitation' and 'expropriation'.

Sovereignty is the key, and I believe has long been fully acknowledged and accepted by the international industry. Likewise, there is full recognition of the need for local industry involvement. However, acceptable international arbitration arrangements are essential for major investments. Production Sharing Contracts, now very often the industry preference, were once a source of concern because the investor had no rights to the assets. I believe that we are no longer concerned about asset ownership, and have long since accepted only limited lifting rights to produced oil. In fact, provided that there is a mechanism for an adequate financial return, rights to oil are not important.

However, on the industry side there are also limits and sensitivities. Experience has shown that a service arrangement based on the supply of skilled manpower or a cost-plus arrangement does not give the company an adequate reward and incentive. To maintain our technological base, we seek opportunities for risk/reward and performance/reward investment. I also believe that few companies would be prepared to accept an arrangement completely disconnected from oil price – so many of our industry costs are indirectly related to the price of oil. But the forms of agreement are very varied. The financial and fiscal arrangements under which Shell companies operate in for example Australia, Brunei, Malaysia, Oman, Syria, Nigeria, the UK and the Netherlands are all completely different, but each can be satisfactory in its own way.

The new arrangements proposed by Venezuela for reactivating fields and related exploration are different again. The company clearly acts as a contractor in producing hydrocarbons, but its reward is ingeniously linked to its technical performance and there is an indexation to oil price. The arrangement shows how agreements can be crafted to acknowledge the realities of legal and political sensitivities.

When seeking technology, to what sort of international company should a major resource holder turn? Is it not possible for a major state company whose parent government has access to sufficient funds to do the job itself, using the off-the-shelf technology available from the service industry? This is certainly one solution, and in some cases it has been very effective. The deep water oil of the Campos Basin, the light hydrocarbons of the El Furrial trend and the light Palaeozoic hydrocarbons of Saudi Arabia are examples of some of the most significant new plays of the past decade discovered and developed, or being developed, by Petrobras, Petroléos de Venezuela SA and Saudi Aramco without involvement of international oil companies.

For the counter argument, I believe one has to turn to the North Sea, or to the North Slope of Alaska, or the Gulf of Mexico. It's hard to imagine that such developments could have been handled by a state company. In these areas one sees a great variety of companies, large and small, competing and co-operating, learning from one another, with a very rapid spread of any successful initiative or technique. The situation is far from static – the successful grow and the laggards wither. The service companies have a vital role to play in this, and are an important mechanism in the diffusion of technology throughout the industry. No single company or organisation has all the answers, and to entrust one's industry to one company alone, state or private, is to run the risk of complacency, stagnation and inefficiency. In providing a benchmark against which to judge performance and productivity, the presence of international competition is a powerful stimulus to domestic industry.

To provide full value, the foreign investor must be able to offer much more: not just a vague promise of 'technical services', or indeed the essential services of the service contracting industry, but an integrated package of financial, technological and managerial skills, specifically targeted at adding value to each individual opportunity on offer. To put it more bluntly: if he cannot increase the size of the cake, no-one is going to offer him a slice.

That is the benefit that the international oil and gas industry brings – wide experience in reservoir development and management in an endless variety of environments, and equally wide experience in developing major international gas projects and the related markets, as well as a system geared to picking up the learning points from one area and transferring them rapidly to another. Within my own organisation, we see people as the key to this. While keeping a basis of common high standards, we are broadening our recruitment of technical professional staff before putting them through a high-quality training and development process.

Part of the contribution of an international company to the economy of a country is the development of a cadre of national staff. In our case, we try to ensure that these staff have had the opportunity to broaden their experience by working in different countries; for

example, in our upstream operations almost 900 non-Dutch and non-British staff, of over 40 nationalities, are working outside their own countries. In this way, staff develop confidence in their own abilities on an international scale, while at the same time contributing from their own experience. I believe that companies with truly international staff are more likely to be able to adapt flexibly. Equally important, organisations and companies have an opportunity to refresh themselves and ventilate their thinking.

Rotation of staff internationally is one of the most powerful methods of disseminating technology. Another, of course, is conferences like this. We will no doubt be hearing of many fascinating technological advances and insights over these coming three days. All will have a role to play, later if not sooner, in the identification and assessment of oil and gas opportunities – in enabling the size and value of the cake to be measured and increased. Their full benefit will only come through integration with other technological advances across the exploration and production business. The winners will be those that apply technology, not in terms of isolated breakthroughs, but across a broad, advancing front – holding back the pressure of increasing costs, and helping to ensure the continued supply of world energy.