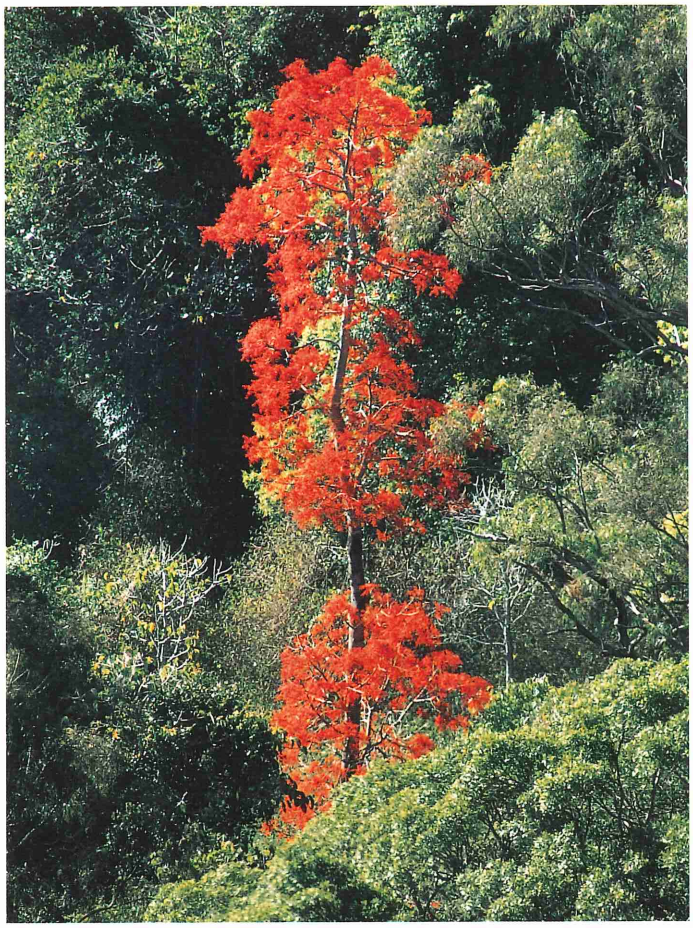
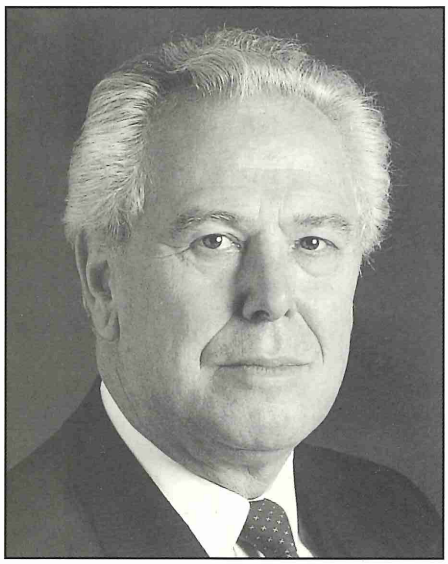


Sustainable development – the challenge for energy

Business and the Environment Programme,
Cambridge
April 17, 1997

• JOHN JENNINGS •

Chairman of
The "Shell" Transport & Trading Company
and a Group managing director of the
Royal Dutch/Shell Group



John Jennings was appointed chairman of The "Shell" Transport and Trading Company, p.l.c. in July 1993. He has been a Group managing director of the Royal Dutch/Shell Group of Companies since July 1987 and became vice-chairman of the Committee of Managing Directors from July 1993. As a Group managing director his spheres of interest are Canada, East and Australasia, Exploration and Production, and Grants and Charitable Donations.

In 1961 Mr Jennings began his overseas service with the Group in the Netherlands which was followed by appointments as wellsite geologist, Oman; exploration activities, Australia; area geologist for Southern Africa, located in The Hague; chief geologist, Shell UK Exploration and Production, London. He spent one year (1970/71) as a Sloan Fellow at the London Business School and subsequently worked as: exploration manager, and later technical manager, Petroleum Development Limited (Oman); general manager and chief representative, Shell Group of Companies in Turkey; managing director, Shell UK Exploration and Production, London; and Group Exploration and Production coordinator, Shell Internationale Petroleum Maatschappij, The Hague.

Mr Jennings was born in Worcestershire, UK in 1937. In 1958 he graduated in geology from Birmingham University, was awarded a Shell research studentship and obtained his PhD in geology at Edinburgh University in 1961. In 1985 he was made Commander of the Order of the British Empire and in 1989 Commandeur de l'Ordre National du Mérite in Gabon. In 1992 he was made a Fellow of the Royal Society of Edinburgh.

The vision of sustainable development has three essential pillars – wealth creation, social development and environmental sustainability. The primary function of business is in the economic sphere, meeting people's needs and creating the wealth which raises living standards. They must do so in a way which is both environmentally and socially acceptable. As well as providing tax revenues to fund state infrastructure and welfare programmes, multinationals also play an important role in spreading essential skills. Some companies provide significant direct social support.

Securing sustainable energy supplies is central to the challenge of sustainable development. Fossil fuels will play an essential part in this, particularly in meeting rising energy demand in developing countries over the next few decades. Using such fuels more efficiently and reducing their environmental impact will be a continuing thrust. Energy markets will evolve and diversify through the normal competitive processes.

Shell companies contribute to the pursuit of sustainable development – recognising that all parts of society have a role to play in achieving this goal. They see it as a shared journey of continual change, as understanding and capabilities improve. However, it will involve fundamental choices for society in balancing different objectives.

The goal of sustainable development – defined by the Brundtland Commission as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' – has become a compelling vision for the 21st century.

It has three essential pillars – wealth creation, social development and environmental sustainability. In her foreword to *Our Common Future* Mrs Brundtland argued: 'What is needed now is a new era of economic growth – growth that is forceful and at the same time socially and environmentally sustainable.'

Today, I will offer a perspective on this vision from the standpoint of a multinational energy business. Much of what I will say concerns the challenge of meeting growing energy needs in a sustainable way. It is also about how Shell companies are grappling with the concept of sustainable development and how they can fulfil their commitment to it. This is not because we claim a special wisdom in this area – but rather as an example of how a large, long-established enterprise, which aspires to be both commercially successful and socially responsible, is tackling the challenge of making its contribution to sustainable development.

In discussing this I will use some of the scenarios Shell planners have developed to help us think about the future. These do not, of course, attempt to forecast how the world will turn out. That is impossible. We can rely only on one thing – that the future will surprise us. It won't merely be a continuation of the past. However, we can identify some of the principal forces that may shape it.

Let me start with wealth creation – where we are now and what are the prospects for the future.

Development, as most of us understand it, means economic growth to raise living standards. Since the mid-19th century, spreading industrialisation has made this possible. World economic output grew more than elevenfold between then and 1960. But the benefits were almost wholly restricted to those in Western industrialised countries – who enjoyed an unprecedented rise in living standards (*see chart 1 overleaf*).

Expanding population has, of course, been the other transforming characteristic of the modern world. In 1850 there were around one billion* human beings. Half way through this century there were twice that number. Today, there are six times as many.

This growth has been far from uniform. Since 1960 the population of the developed world has increased by only some 1% a

* *billion = one thousand million*

year. In the developing world as a whole it has been twice that. But in some countries, particularly in Africa, it has been much faster *(see chart 2)*. The population of Nigeria, for example, has grown by nearly 3% a year – from some 42 million people in 1960 to an estimated 110 million today.

Fortunately, strong economic growth has continued in the second half of this century – and has been much more widely spread *(see chart 3)*: Despite rising populations, developing countries are achieving average real per capita income growth of around 3.5% a year. Their growth has accelerated as that of developed countries has slowed.

Many now seek to challenge the benefits of economic growth. However, the UN Development Programme rightly reminds us: 'The developing countries have in 30 years achieved progress in human development that took industrial countries more than 100 years. Living standards for hundreds of millions have risen.'*

Unfortunately, not everybody shares in this increasing wealth – even in countries that are advancing. A tenth of the world's population lives in what are called least developed countries', mainly in Africa. They have been getting poorer, as population expansion has outpaced economic growth.

Countries with expanding populations inevitably have a high proportion of young people and great difficulty in providing them with worthwhile occupations. With no obvious prospects – but with CNN to show them others' affluence – they are a powerful force for instability, challenging traditional institutions which are incapable of meeting their expectations. I believe that such chronic structural unemployment is one of the most fundamental challenges facing society. Jobs simply cannot be created fast enough to keep the expanding workforce employed.

Looking to the future, global population growth seems to be slowing. But there may still be approaching eight billion of us by 2020, and maybe 10 billion by the middle of next century.

Fortunately, there are good grounds for optimism about continuing overall economic progress – driven by economic liberalisation, technological advance and spreading skills. Shell scenarios suggest that global output could grow threefold – on a purchasing power parity basis – over the next 25 years *(see chart 4)*. Living standards for most of the world's people should continue to rise.

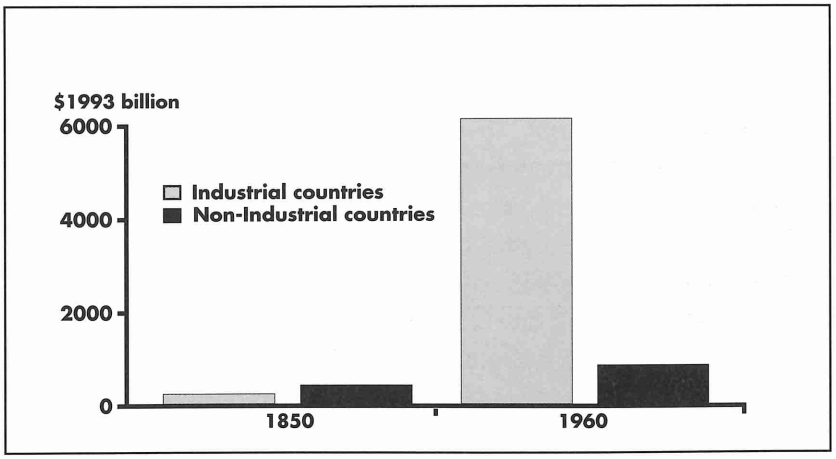


Chart 1: *World economic output 1850-1960*

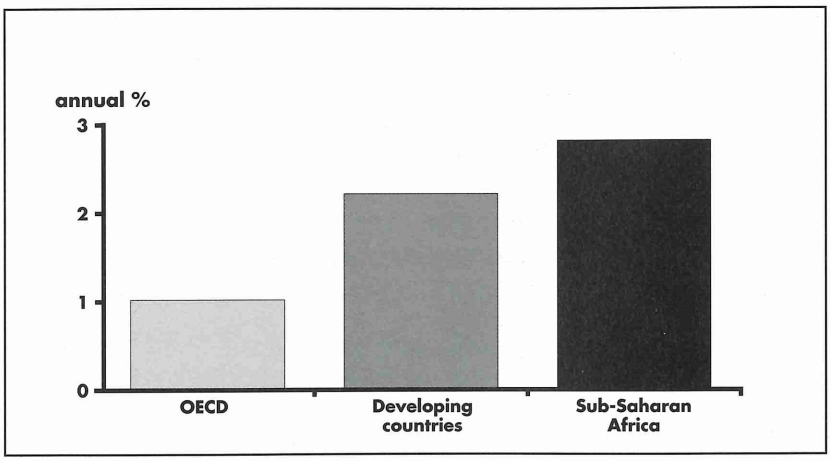


Chart 2: *Population growth rates 1960-93*

* *UNDP Human Development Report 1996*

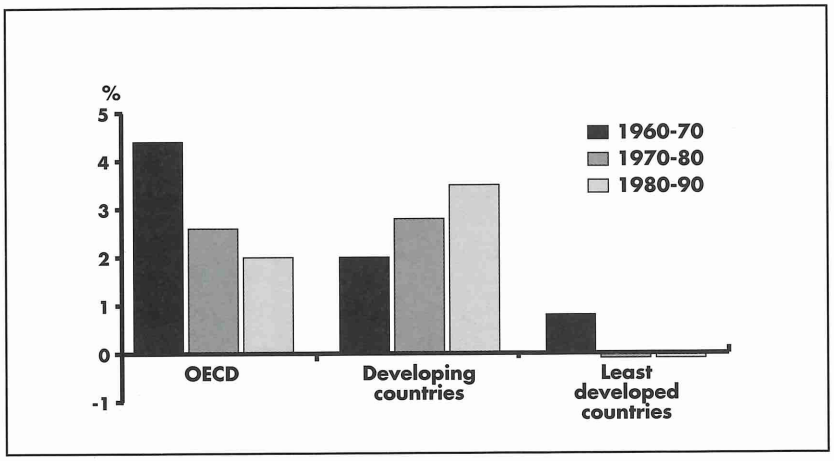


Chart 3: Real per capita income growth 1960-90

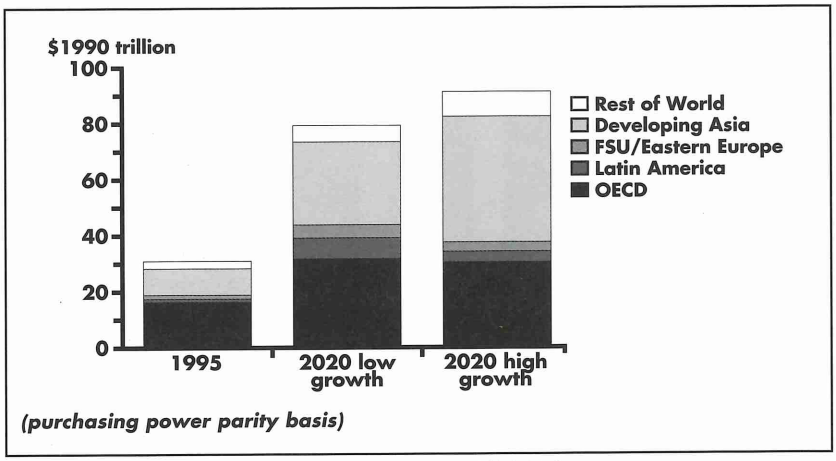


Chart 4: Shell scenarios – world output 1995-2020

However, raising living standards in the poorest countries – with the fastest growing populations – is a formidable challenge. At present rates the populations of many African countries will double again before 2020. It is questionable whether traditional approaches to development can succeed in such a context. I believe that the definition of development will evolve as time passes – rebalancing spiritual and moral concerns with material aspirations.

But to come back to the present, let me turn now to the role of commercial enterprises. How can they contribute to sustainable development? Their primary role must be in the economic sphere – providing essential goods and services and creating wealth through employment, and the payment of taxes and dividends, in a continuing process of innovation and investment. To do this they must remain profitable – to fund investment for the future and to provide a return to those who supply their capital.

The tax revenues which flow from business are the life blood governments use to fund infrastructure and welfare – the schools, hospitals and social programmes which raise living standards and support the human development on which economic progress depends. Shell companies, for example, paid some $50 billion in corporate and sales taxes last year.

Multinationals also play another vital role in human development – disseminating technical, commercial and managerial skills. This is particularly important in the developing world – where such skills are in short supply and essential for development.

Shell companies are major, long-term investors in developing countries. Their operations are largely run by nationals of those countries and depend on their skills. Naturally, they put a great deal of effort into developing these. One important way in which this comes about is as a result of the movement of people between different Shell companies. At any time some 5,000 people of 60 different nationalities are working outside their home countries – gaining and passing on experience.

Skills development is not restricted to the relatively small number of Shell staff. A very much larger number of people learn new skills from being involved in operations as contractors and suppliers. Shell companies depend on the quality of their work and support the development of their skills.

I think the importance of managerial expertise to economic development is often neglected. In my experience, it is not the ability to build, say, a hospital that may be lacking in developing countries. Rather it is the ability to ensure thereafter that it is properly maintained, equipped, supplied, staffed and managed. Sustained management is the essence of successful business and multinationals play an important role in disseminating it.

Beyond their businesses, many companies contribute to the community through social investment programmes. These can be very important in poor countries – although there is always a problem in deciding the appropriate limits to commercial responsibilities.

Shell Nigeria, for example, has been supporting communities in its operational areas since the 1960s. These include an agricultural extension scheme which has directly helped perhaps half a million farmers over the past 30 years. The company has also provided thousands of educational scholarships over that period – 2,600 secondary school pupils and 550 university students were supported last year. Since 1985, it has built over 200 classroom blocks. It is setting up a network of rural health centres – seven have been completed since 1995 – as well as refurbishing and equipping government clinics.

Important though these efforts are, they can only have a very limited impact on the millions of people who live in the Niger Delta. Rural communities there – like those elsewhere in Nigeria – lack basic amenities. Population growth is putting increasing pressure on land, and on educational and employment opportunities. It is not surprising that people seek a greater share of the revenues from the oil produced in the their midst – some 90% of which goes to the state. Nor that they should look to the company – more visible than a distant government – to meet their grievances. Shell Nigeria has argued publicly that these areas should receive a greater share of revenue.

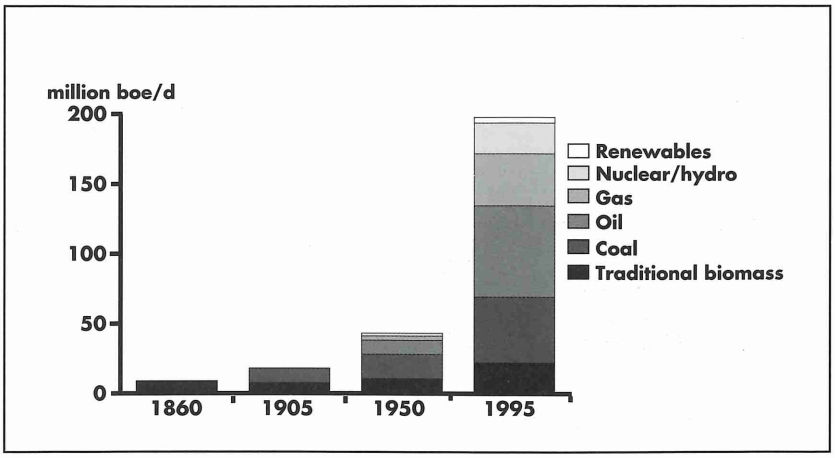


Chart 5: *World energy supplies 1860-1995*

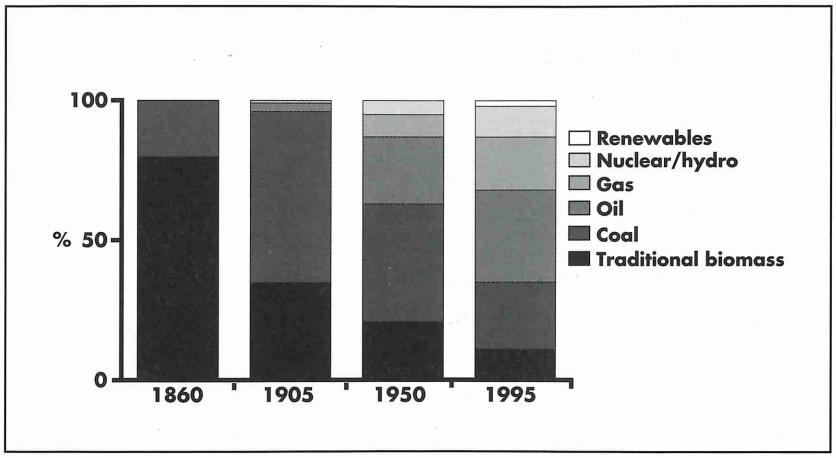


Chart 6: *World energy supplies 1860-1995 (% share)*

People who work in business have the same concern for those in need as anybody else – but there are no easy ways of resolving such conflicting obligations, demands and sympathies. In approaching the inevitable dilemmas and complexities of their businesses, Shell companies are guided by a framework of general principles.

These were first published over 20 years ago and are based on enduring values – honesty, integrity and respect for people. However, they are living principles

[1] UNDP Human Development Report 1996

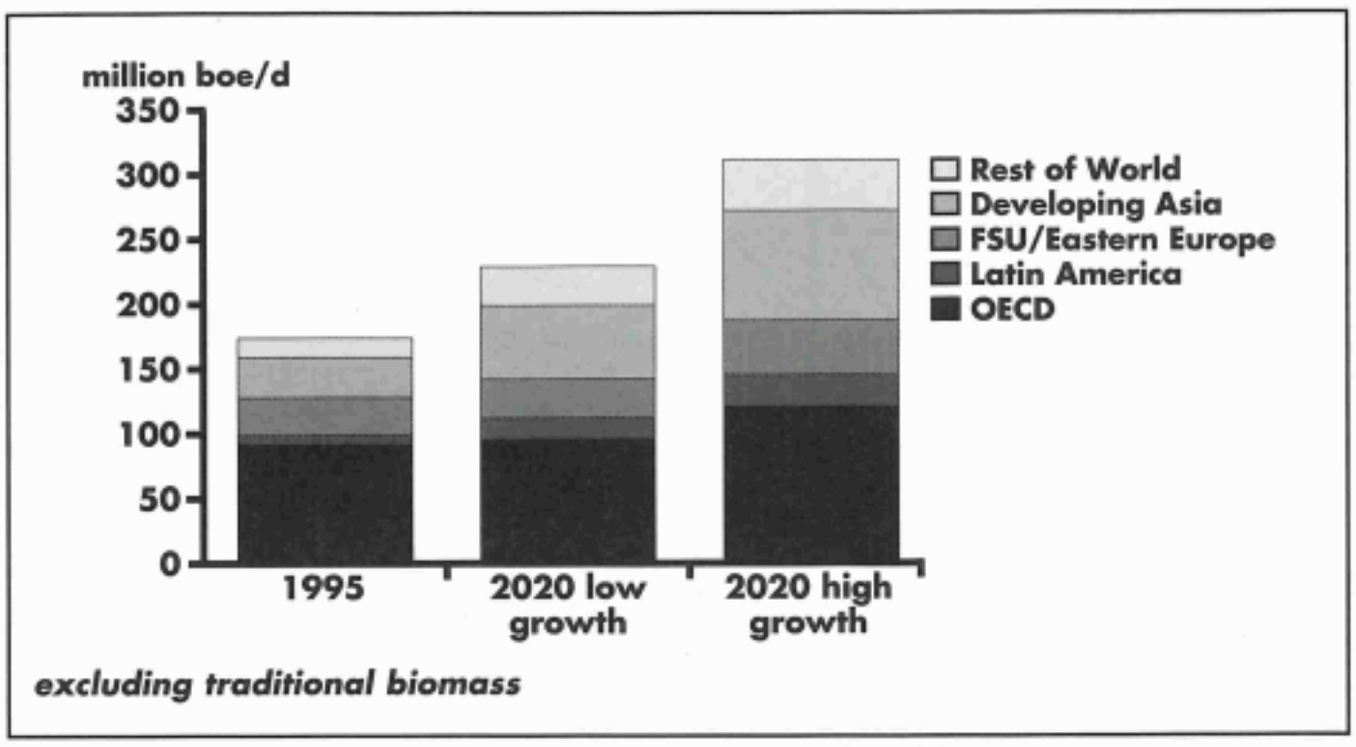


Chart 7: *Shell scenarios – world energy demand 1995-2020*

– periodically reviewed in light of changing circumstances and expectations. The latest edition explicitly recognises Shell companies' responsibility to express support for fundamental human rights and affirms their right to speak out on matters affecting the community, where they can make a contribution.

So let me now turn to energy supplies which are central to the pursuit of sustainable development. As the Brundtland Report pointed out: 'Energy is necessary for daily survival. Future development crucially depends on its long term availability in increasing quantities from sources that are dependable, safe and environmentally sound.'

Not surprisingly there has been a huge increase in the need for energy since the mid-19th century – when the world consumed perhaps six million barrels of oil equivalent a day, mostly wood. Over the next century demand rose by some 2% a year to reach 40 million boe/d. In the second half of this century, however, it has grown much more quickly – by some 3.5% a year – and, including traditional sources such as wood, we now consume nearly 200 million boe/d *(see charts 5 & 6)*.

Energy demand in industrialised countries rose rapidly during the post war boom but growth has slowed since the 1970s. However, the energy needs of developing countries have been growing by some 4.5% a year for the past 20 years – more than doubling in that period.

Energy use per capita has risen from an average of some four barrels of oil equivalent a year in 1900 to 13 today. But that conceals huge variations – in the developed world we each now consume some 40 boe a year.

The composition of energy supplies has also changed. By early this century coal provided two-thirds of the world's energy. It remained the major fuel until the 1960s and still provides nearly a quarter of our energy. Oil provides a third – although its share has fallen since the 1970s. Gas – which has significant environmental and efficiency advantages – is increasingly important and now meets a fifth of energy needs.

Looking forward, continuing population growth and economic development will require increasing supplies of energy. Shell scenarios suggest that energy demand could rise by three-quarters by 2020 *(see chart 7)*. In that timescale, the bulk of this growing demand will have to be met by fossil fuels. There is simply no practical alternative in this timeframe.

This represents a challenge to the notion of environmental sustainability. As consumption of fossil fuels has grown we have increasingly become aware that – while they deliver great benefits – they have many drawbacks. Indeed, I have little doubt that – with enormous supplies of energy available in nature – future historians will see our present means of meeting our energy needs as a primitive phase.

The process of extracting and transporting fossil fuels carries risks. Burning these fuels creates emissions which can contaminate the air we breath. And, in recent years, we have begun to appreciate the potential impact on the earth's climate system of the carbon dioxide emitted to the atmosphere when we burn them.

There is a logical scientific argument that climate must be affected by increasing concentrations of atmospheric carbon dioxide. However, as a geologist, I am well aware of the natural variability of

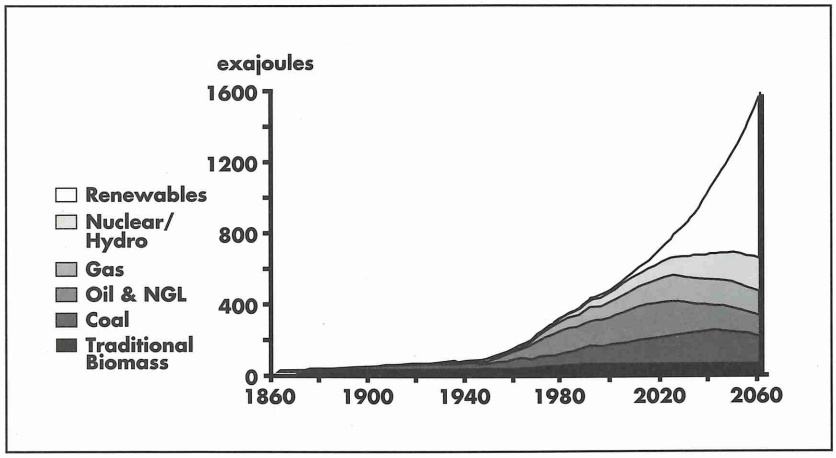


Chart 8: *Shell scenarios: Sustained Growth 1860-2060*

climate – within historical periods as well as geological timescales. Man-made carbon dioxide is only a small fraction of the flux in natural systems. I believe that we are still not in a position to know whether any effect will be good, bad or indifferent, whether it will be lasting, or whether the earth's natural processes will restore stability.

That said, given the risks and uncertainties, it is clearly prudent to:

- develop alternative ways of economically generating energy,
- learn to use energy more efficiently, and
- reduce the environmental impact of producing and burning fossil fuels.

But what is the most effective way to progress towards these goals – without inhibiting the essential economic and social pillars of sustainable development? Let me take each of them in turn.

Shell planners have developed two long-term energy scenarios to explore the possible development of alternative energy sources and increasing energy efficiency over the first half of next century.

One long-range scenario, which we call *Sustained Growth*, describes a world in which there are continuing abundant energy supplies at competitive prices *(see chart 8)*. Average per capita energy consumption would nearly double by 2060 – to approximately Japanese levels today. Renewables would obtain a growing share of the increasing market.

How plausible is this?

If we look back we can see that oil consumption grew by nearly 10% a year between 1870 and 1950 – first for heating and lighting, then for shipping (Winston Churchill famously switched the Royal Navy from coal to oil just before the First World War), and then for motor transport. The real price of oil at the end of this period was less than a quarter of what it was at the beginning.

New renewable sources of energy – wind, biomass and solar power – are already established in niche markets. Looking ahead, we can expect them to become increasingly competitive as they follow the normal learning curve of technological development – with falling costs as output increases and suppliers respond to competitive pressures and opportunities.

The second scenario, *Dematerialisation*, envisages a rather different world in which new technologies, systems and lifestyles would deliver continuing improvements in energy efficiency so that average per capita consumption rises by only some 15% by 2060 – say to Italian levels in 1970 *(see chart 9)*. This would require achieving a sustained 2% annual reduction in energy intensity – the amount of energy required per unit of economic growth.

Increasing energy efficiency is a normal part of industrialisation. In the United States, for example, energy intensity has fallen by some 1% a year over the past century. There are good grounds for believing that we may soon be able to make faster progress – as the result of increasing government and commercial focus on this goal, technological advance, market reform, the switch from manufacturing to service industries, and lifestyle changes.

Technological advances are enabling increasing energy efficiency in many areas from indus-

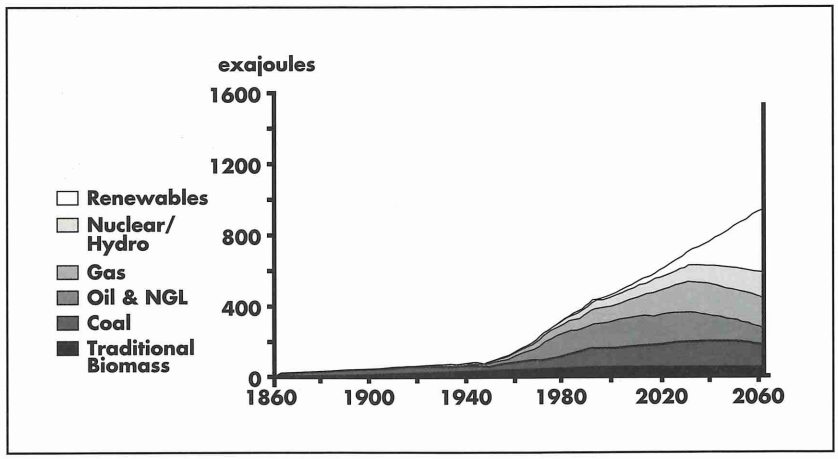


Chart 9: *Shell scenarios: Dematerialisation 1860-2060*

trial processes to building construction, including:

- government backed projects in the United States and Germany to develop cars with more than twice the fuel efficiency of today's average,
- striking improvements in the resource and energy efficiency of oil and gas production,
- significant increases in power generating efficiency as a result of the introduction of combined cycle gas turbines,
- the potential for Information Technology to save energy by changing lifestyles is gradually being appreciated.

Nor should we underestimate the importance of market reform. We can see this most spectacularly in the former Soviet Union where there was previously gross waste of energy – which had no value in a system without markets. For example, often the only way to regulate the temperature in centrally heated apartment blocks was to open the windows. That is, of course, only one example of the waste of resources and environmental damage inherent in centrally-planned economies.

Energy markets in many countries are still distorted in ways that increase demand and inhibit efficiency.

One thing that will, in due course, profoundly influence these changes is the limits to fossil fuel resources. In the early 1970s, the Club of Rome articulated concerns about the imminent exhaustion of these and other natural resources. This was misplaced. Despite rapid growth in consumption, proved reserves have risen – in the case of gas to three times the 1970 level.

But fossil fuel resources are certainly finite – although reserves are an economic as well as a geological concept, reflecting changing technological capabilities and market conditions. Resource limitations are unlikely to affect global markets for some time. However, declining production in consuming countries, such as the United States, may have a profound impact on attitudes to energy use much sooner.

At present there is surplus oil production capacity – primarily in the Middle East. But, as major consuming countries increasingly have to rely on imports, supplies will tighten. I believe this will lead to growing emphasis on supply security and on policy measures to ensure diversity of energy sources.

Moreover, as fossil fuel resources decline they inevitably become more difficult and potentially costly to produce. We are now, for example, looking for oil and gas in water more than two kilometres deep.

Will pressures on demand and limitations of supply lead to higher energy prices? I believe it would be very unwise to plan on a significant increase in the real price of energy. Prices will be constrained by competition from alternative fuels and energy saving methods. We can expect energy markets to become much more diversified as the 21st century progresses.

In either scenario, demand for fossil fuels is likely to grow rapidly for at least the next quarter of a century. By 2020, consumption of gas could have nearly doubled, that of oil risen by two-thirds and that of coal risen by a half *(see chart 10)*. Oil supplies may peak within the first half of the century. However, gas and coal resources are more abundant and supplies could continue to grow for considerably longer. China and India have major coal reserves and are

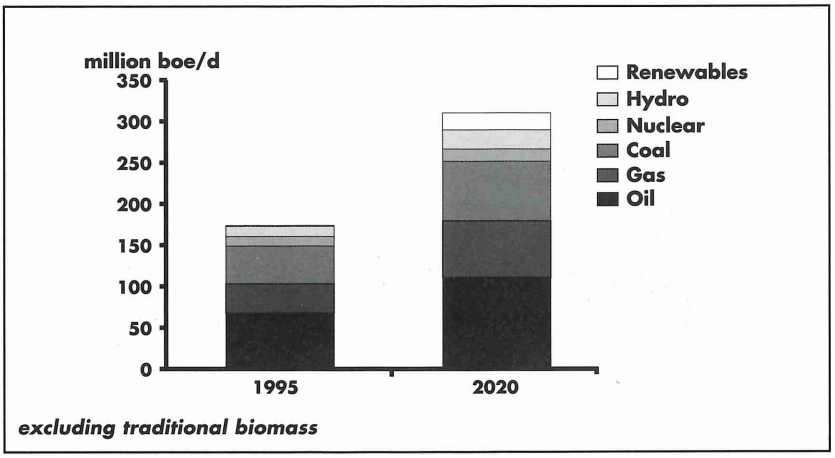


Chart 10: *Shell scenarios: energy fuel shares 1995-2020 (high growth)*

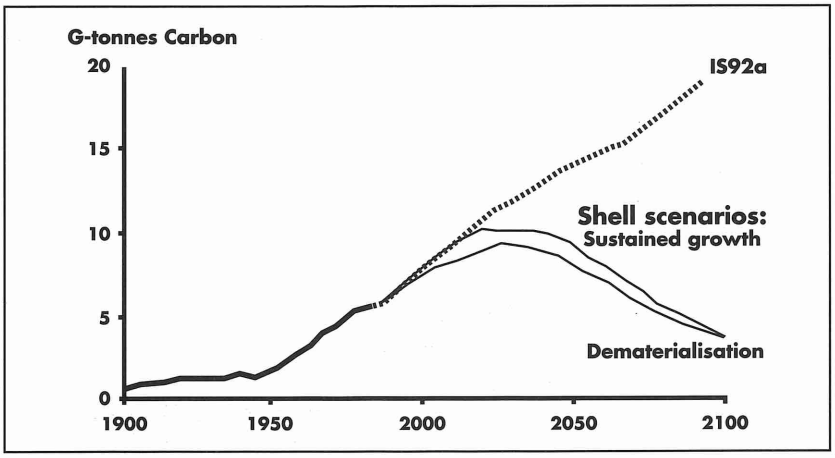


Chart 11: *Shell scenarios – carbon dioxide emissions from fossil fuels 1900-2100*

bound to use these. Moreover the development ofclean coal technologies' should reduce the environmental impact of its use.

Among alternative sources, expanding nuclear power would solve the problem of carbon dioxide and other emissions. But this depends on achieving public acceptability and finding safe ways of dealing with nuclear waste.

I mentioned the growing competitiveness of renewable energy sources. These now account for less than 1% of energy supplies. This could grow to more than 5% by 2020 – faster expansion than oil achieved a century ago, although the amounts of energy involved would be very much greater. It is possible to conceive, as in our*Sustained Growth*' scenario, that they could be providing half the world's energy by mid-century.

These changes will obviously have a significant impact on emissions of man-made carbon dioxide into the atmosphere. Suggestions that emissions from fossil fuels could continue growing at current rates throughout next century – such as the International Panel on Climate Change'sbusiness as usual' scenario – are unrealistic and do not take into account the inevitable evolution of energy markets. Shell scenarios suggest that emissions would peak by the middle of next century and return to today's levels by the end of it *(see chart 11)*. Of course, this is by no means certain – but it is more plausible than continuing expansion. I am pleased to say that Shell planners are contributing to work to develop new IPCC scenarios.

Given the continuing role that fossil fuels must play in supplying the world's energy needs, it is essential to reduce the environmental impact of their production, distribution, manufacture and use.

This is not a new aim. The 1969 Shell Transport annual report, for example, discussed work by Shell companies to improve ways of dealing with oil spills, reduce the sulphur content of products, and cut vehicle exhaust emissions. It recorded that a Group managing director had taken responsibility for overseeing these efforts.

Much has been achieved since then. Let me focus on those areas mentioned in the 1969 report.

Better ship design, more reliable marine plant and higher operating standards – in which Shell companies have played an important role – have significantly reduced world tanker accidents. In the 1970s tankers were responsible for some 24 major spills a year world-wide. In the

1980s the average was nine and there has been continuing improvement *(see chart 12)*. Comprehensive international systems for dealing with spills have been set up.

Sulphur in oil products has been reduced considerably. For example, the sulphur level in Western European automotive diesel is now a tenth of that in the 1960s *(chart 13)*. There has been a similar downward trend for other fuels. This has occurred despite continuing economic pressures on European refineries – and has been accompanied by a reduction in sulphur emissions from refinery stacks.

Lower sulphur levels in fuels help to reduce vehicle exhaust emissions. With increasing road transport, these are understandably a matter of public concern. However, the extent to which advances in engine design, and fuel and lubricant technology are reducing such emissions is insufficiently appreciated.

The recent collaborative European Auto-Oil research programme – carried out by the two industries together with the European Commission – showed that existing measures will ensure that some pollutants meet desired air quality standards. Additional steps are needed for other pollutants and are the subject of proposed European legislation – including a further reduction in automotive diesel and gasoline sulphur levels *(chart 14)*. We support this legislation.

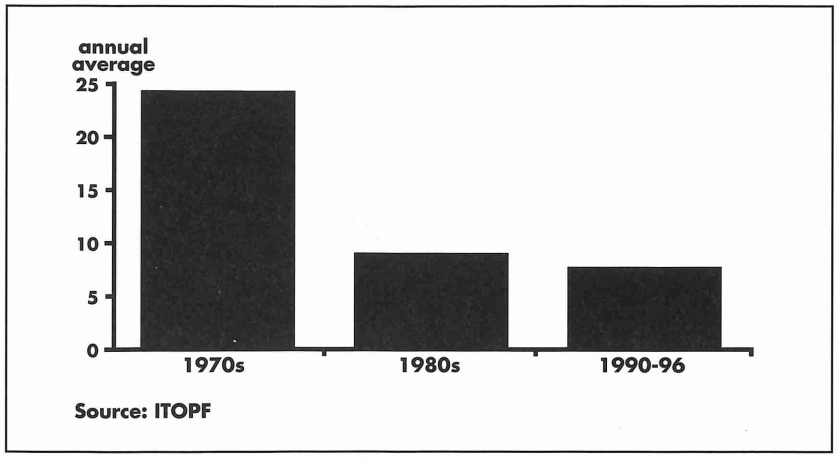


Chart 12: *World tanker spills 1970-95 (greater than 7,000 tonnes)*

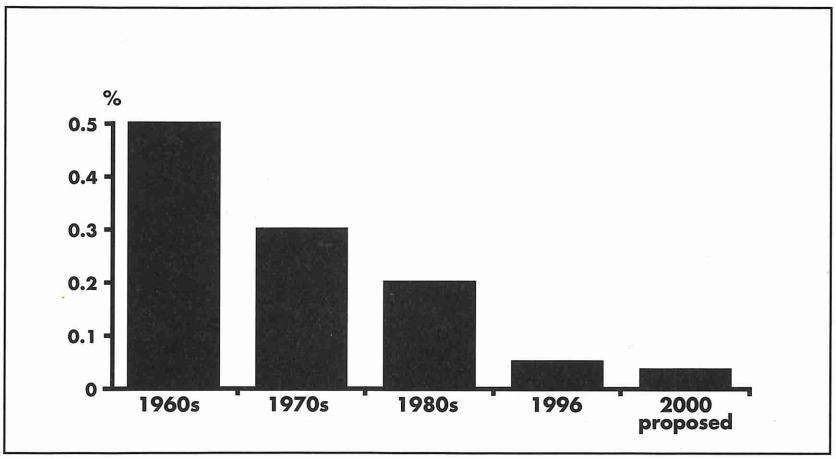


Chart 13: *Western Europe – automotive diesel sulphur limits 1960-2000*

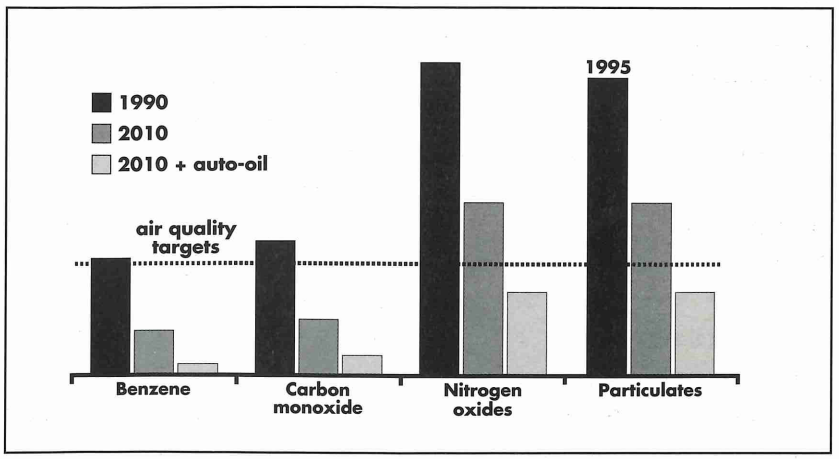


Chart 14: *Western Europe – air quality 1990-2010*

Shell companies have been committed to continuous improvement in their health, safety and environmental (HSE) performance for many years, and have policies, procedures and systems to enable them to achieve this. These are constantly being developed and we have recently published a revised Group HSE Commitment and Policy. One aspect of this is greater emphasis on procedures designed to ensure that commitments are being met in all Shell companies' operations.

However, this world-wide commitment does not mean identical standards around the world at any one time. It is important to understand why. Environmental improvement depends on continuing change. Plant built some time ago is bound to have poorer environmental performance than the most recent. It is both economic and environmental nonsense to suggest that the old must be abandoned every time we make an improvement. There is an inevitable catching up process.

Like everybody else, Shell companies have to prioritise their efforts:

- dealing first with the most pressing problems and greatest risks,
- putting their investment where it can have the most impact, and
- planning to achieve the best long-term results.

These will always vary from operation to operation depending on the particular conditions. They must also be a matter for national regulators who rightly insist on deciding local environmental needs and expenditure priorities. The environmental solutions chosen by affluent western countries may not be appropriate for those with more pressing development needs. Remember, poverty is one of the major causes of environmental degradation.

In saying this, I do not seek to excuse sloppy operating standards anywhere.

Business is, and must always be, subject to regulation. As a businessman, and as a citizen, I certainly don't believe in what might be called unfettered mercantilism – which could be immensely destructive. Indeed, I am concerned that the distinction between the roles and responsibilities of government and business is already being blurred, particularly in the developing world. I think it is a dangerous course for society to believe that unrepresentative business organisations should make fundamental choices on its behalf.

What is crucial is how business is regulated. Society's interest is in achieving the maximum progress towards environmental and social goals without inhibiting the capacity of business to deliver the economic benefits on which both ultimately depend – without wealth creation there can be no development as the world defines it.

One problem in charting this difficult course is the limit to our scientific knowledge. This is inherent in science. As we learn more about something we inevitably reveal new mysteries. We have to learn to cope with changing uncertainty – which requires neither burying our heads in the sand, nor leaping without thought to dramatic conclusions. Rather it requires a careful, flexible approach able to respond to changing understanding – recognising and coping with remaining uncertainties.

I suggest that in most cases this is best achieved by flexible regulatory systems which are responsive to specific business pressures and timetables – or utilise market processes – rather than prescriptive, blanket rules. A regulatory system which encourages business to evolve is more likely to achieve sustained improvement than one which requires abrupt shifts.

Markets encourage widespread experimentation. Competition decides which ideas succeed – in an evolutionarysurvival of the fittest' – until something better comes along. Competitive pressures encourage the essential learning process of increasing productivity.

Of course, governments will sometimes interfere in markets in pursuit of political policy goals. But we have surely learned from recent history that they must do so very carefully. Distorting markets can very easily have perverse effects and create long-term problems that are difficult to correct – as, for instance, with subsidised fuel in many developing countries or coal mining in Germany.

The latest edition of the Royal Dutch/Shell Group *Statement of General Business Principles* and the new Group HSE *Commitment and Policy* state Shell companies' commitment to contribute to sustainable development. We recognise that all sections of society have a role to play in achieving this goal. We see it as a shared journey of continual change, as understanding and capabilities improve. But we also believe it will involve a continual challenge, and fundamental choices for society in balancing different objectives.

Making a commitment to contribute to sustainable development does not, of course, mean an abrupt change in business activities. As I have discussed, the concept encompasses things that Shell companies have done for a long time. But they are committed to taking sustainability into account in all their future business plans and decision-making processes.

To sum up, I have discussed the three pillars of sustainable development. The primary function of business enterprise is in the economic sphere – meeting people's needs and creating the wealth which raises living standards. However, they must do so in a way which is both environmentally and socially acceptable. As well as the tax revenues which fund state infrastructure and welfare programmes, multinationals play an important role in spreading essential skills. In some cases, companies also provide significant direct social support.

Securing sustainable energy supplies is central to the challenge of sustainable development. Fossil fuels will play an essential part in this, particularly in meeting rising energy demand in developing countries over the next few decades. Using such fuels more efficiently and reducing their environmental impact will be a continuing thrust. Energy markets will also evolve and diversify through the normal competitive processes – as well, no doubt, as specific policy measures. However, in framing such measures, society will have to cope with a ceaselessly dynamic situation – with changing scientific understanding, technical capabilities, market pressures and political concerns.

I believe that a major barrier to progress is the unproductive confrontation which springs from a feeling of 'them' and 'us' – the notion that business is an obstacle to be overcome rather than a partner to be worked with. If society is to achieve sustainable development there must be a symbiosis between the wealth creating part and the rest of society. This will not happen if society acts as if creating its wealth is the problem – rather than essential for the achievement of its goals.

I don't in fact believe that society as a whole does think like that. After all the millions who work in business are part of society – with the same hopes and fears for the world as everyone else. But perhaps C P Snow's 'two cultures' still do exist – in the gulf between business people and those who contribute in other ways, as much as between scientists and artists, the rational and the spiritual, the philosophic ideal and the pragmatic action. We must find ways of bridging that gulf.

I take comfort from the fact these issues have generated much lively debate all over the world. It is a privilege to have the opportunity to make a small contribution to that debate here today.

This publication is one of a range published by Group External Affairs, SI, Shell Centre, London SE1 7NA, England, covering aspects of the oil, gas, coal and chemicals businesses. For further copies, and for details of other titles available in English or as translations, please contact the External Affairs department of your local Shell company. Alternatively, write to the above address or fax 0171-934 5555 (London) quoting department reference PXX, or telephone 0171-934 5293.

Printed in England by Vitesse 15179/4.97/10m

• Recent Speeches •

Contributing to a sustainable future –
the Royal Dutch/Shell Group
in the global economy
Cor Herkströter

•

Charting a course –
preparing for the oil and gas
business of the 21st Century
Maarten van den Bergh

•

Dealing with contradictory expectations
the dilemas facing multinationals
Cor Herkströter

•

Winners and losers –
meeting the upstream challenges
of the 21st Century
Mark Moody-Stuart

•

Getting past sound bites –
science, industry and the environment
John Jennings

•

A continuing contribution –
oil and gas in the 21st Century
Cor Herkströter

•