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Building Bridges – Fulfilling the Potential for Gas in the 21st Century

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Chairman of the Committee of Managing Directors,
Royal Dutch/Shell Group

UK

June 3, 2003

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SIR PHILIP WATTS has been Chairman of The "Shell" Transport and Trading Company p.l.c. and of the Committee of Managing Directors of the Royal Dutch/Shell Group since July 2001. He has been a managing director of Shell Transport and a Group managing director since 1997.

His functional and geographical responsibilities as a Group managing director are: Finance, Human Resources, Legal, the International Directorate, Strategic Planning, Sustainable Development and External Affairs, and the United States.

He joined Shell in 1969 and worked in Indonesia, the UK, Norway and the Netherlands. In 1991 he went to Lagos as Chairman and Managing Director of the Shell Petroleum Development Company of Nigeria, returning to The Hague as Regional Co-ordinator Europe in 1994. From the beginning of 1996 until becoming a managing director, he was director of Planning, Environment and External Affairs for Shell International in London.

Sir Philip was born in 1945 in Leicestershire, England. He graduated from Leeds University with a BSc in Physics and an MSc in Geophysics. In between these two degrees he taught in a secondary school in Sierra Leone for two years. He is married and has a daughter, a son and two grandchildren. His interests include reading and gardening. He is chairman of the World Business Council for Sustainable Development and of the UK chapter of the International Chamber of Commerce.

Sir Philip was knighted in the 2003 New Year's Honours list. He was appointed KCMG in recognition of his services to business and to the World Business Council for Sustainable Development.

Gas is a fuel with great potential. It offers many competitive advantages including abundance, cleanliness and flexibility. Expanding the use of gas is also the best medium term response to the threat of climate change. However, there are considerable challenges in building the markets for gas and the systems to deliver it over increasing distances to those markets. Gas projects require significant financial, technological and commercial strengths as well as a high degree of co-operation between governments and business. Over the past thirty years, the gas industry has shown, whether through pipeline projects or the development of LNG, that it can respond effectively to those challenges and keep up with growing customer demand. A number of projects, such as the recently announced Sakhalin 2 investment, illustrate the work that is now underway to ensure that gas fulfils its potential across the world and successfully meets the future energy challenges of increased demand and the need for cleaner fuels.

Few disagree about the great potential for natural gas in the 21st century. It has many competitive advantages: abundance, costs, cleanliness, lower carbon intensity, flexibility. Expanding the use of gas is the best medium-term response to the threat of climate change. It has the potential to become the most important fuel for the next generation.

But this success is not pre-ordained. We shouldn't underestimate the challenges of building markets and delivering secure, economic supplies over increasing distances.

Major gas developments require uncommon financial, technological, managerial and commercial strengths, as well as a high-degree of cooperation among governments and businesses.

The Sakhalin 2 project launched by Shell, Mitsui and Mitsubishi two weeks ago is an example of the scale of challenges involved. I will say more about this important project later

I believe we need to treat the next two decades as a window of opportunity to demonstrate that gas can fulfil its potential. It will require all our skills. I will use the metaphor of building bridges.

Gas developments have much in common with the beginning of the railway age in Britain as engineers like Robert Stephenson and Isambard Kingdom Brunel struggled to carry the railway tracks over waterways. Progress depended on their creativity and courage; their engineering genius and project management; their business skills in raising funds; forging partnerships and obtaining approvals. I believe very similar skills are required to develop major gas supply projects.

Bridges and gas projects share other characteristics as well. They depend on cooperation, bring people together and stimulate economic progress. I think this is captured in the fine picture by the early nineteenth century master print-maker Hiroshige showing busy traffic across the Okazaki bridge on the Tokaido road. And Japan continues its proud tradition of bridge building. The Akashi Kaikyo suspension bridge near Kobe is the world's longest and also a thing of beauty.

Finally, there is another characteristic that bridges and gas schemes must share they must both be strong in every element along their length. What happens when this isn't the case was recorded by a famously bad Scottish poet writing 120 years ago about the infamous Tay Bridge disaster 'the central girders with a crash gave way, and down went the train and passengers into the Tay'. Gas customers equally depend on us to create sound and secure supply schemes. Fortunately, this industry has a record of doing so.

Enduring bridges

Over 30 years the Brunei LNG scheme has delivered more than 4,000 LNG cargoes to our customers in Japan and is still expanding its output. Like other gas schemes the success of Brunei LNG rests on strong and lasting relationships with the government and people of Brunei Darussalam, among partners in the venture, and with our customers here in

"Gas has the potential to become the most important fuel for the next generation"

Japan and Korea.

Here in Japan gas currently only supplies about 12 per cent of its energy needs but there are an increasing range of sources which could increase that share not least Sakhalin from 2007. In the same 30 year period, the LNG industry as a whole has achieved a remarkable success. *(Figure 1)* Sales have more than doubled since 1990. I am very proud that Shell is involved in projects supplying 40% of the world's LNG. We believe that this fuel will play an increasingly important role in energy supplies and are determined to retain our leadership.

But gas is not just LNG. The development of pipeline infrastructures is equally important. The development of the European transmission system following the discovery of Groningen is a major achievement and an indication of what will be required as we develop major new gas markets. The infrastructure continued to expand to bring supplies from the North Sea, and from Algeria, Norway and Russia.

The capabilities required of those involved in this industry were apparent early. The Royal Dutch/Shell annual reports for 1967 recorded the first returns from the Groningen development eight years after the field was discovered and $700 million had been spent on development. I look back on the excitement of being involved in the North Sea and in Norway when we discovered the giant Troll gas field. Fortunately, there are still many equally exciting challenges for those joining our industry today.

Bridges over troubled water

Looking forward, we need to build our bridges over troubled or at least highly uncertain waters. The well-known Paul Simon song talked about 'when times get rough'. I fear that describes our own times today.

And we must be prepared for growing geopolitical turbulence and economic volatility in an increasingly interdependent and changeful world which represent a particular challenge for an industry with our timescales, investment requirements and dependence on international cooperation.

The world economic outlook remains fragile with few signs of improvement and significant remaining risks. Uncertainty is exacerbated by massive shifts in patterns of energy demand. The United States, Canada and Western Europe presently consume around half the world's energy while Asia-Pacific takes a quarter. *(Figure 2)* Those positions are likely to be reversed over the next 50 years as overall energy demand grows two or three times.

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The composition of energy supplies is also changing. World gas demand seems set to continue growing strongly. The world could be consuming more gas than oil by 2025. *(Figure 3)* That would mean very large incremental growth providing two to three times more gas over the next 30 years than we have in the period since 1970. It would also mean delivering much more gas across borders and over much longer distances. Indigenous supplies now meet 80% of demand. By 2030 it could be less than half as pipeline imports double and LNG supplies grow five times. *(Figure 4)*

We should not underestimate the challenges involved or the need for an environment which supports the necessary very large and long-term investments. But there are other challenges, including responding to environmental concerns. We gain nothing other than distrust by trying to minimise these challenges. Rather we need to lead the search for solutions. But that doesn't mean accepting facile suggestions about moving rapidly away from using fossil fuels to rely on renewable forms of energy.

First, it is highly misleading to lump all fossil fuels together whatever the source and technology used. For example, using gas to generate power in combined cycle turbines produces far less carbon dioxide than burning coal and none of the sulphur dioxide emissions. *(Figure 5)*

Second, renewables will not offer a quick fix. They have great long-term potential although that depends on overcoming significant technological, economic and environmental challenges. And we can do much now to push them forward, as we are doing in Shell. But it will be many years before they can play a significant role in meeting expanding energy needs. By contrast, increasing gas use is the best immediate way of improving air quality and limiting carbon dioxide emissions.

"Renewables will not offer a quick fix."

I highlighted the development of

European gas supplies. This means that Europe produces about 7% less carbon dioxide today than would have been the case if it relied on more coal and oil. And, as I will discuss later, gas can also be a source of ultra-clean liquid fuels to reduce emissions from vehicles. Of course, nuclear energy can produce electricity without carbon emissions. We must always keep an open mind about the future. But I suspect that people everywhere are becoming less inclined to accept the risks they perceive in nuclear power in a troubled world.

Bridges for customers

The starting point for going forward must always be our customers working closely with them to meet their requirements for secure, safe, clean, convenient and economic energy.

Different markets have different needs and dynamics. Three major gas markets North America, Europe and Asia-Pacific will account for two-thirds of demand growth. Let me say a few words about each.

Asia-Pacific gas demand is growing very fast and there is a high dependency on imports so customers are concerned about security and diversity of supply, as well as price. *(Figure 6)* I believe that LNG will continue to play a major role in meeting the region's needs as demand expands both in the traditional LNG importers and emerging markets. There is no shortage of supply potential from new plants and expansions. And I have no doubt this will continue to be underpinned by the long-term purchase agreements which have enabled this diverse, robust and increasingly competitive supply system to develop.

The Sakhalin 2 project both increases diversity and offers unique competitive advantages particularly from its closeness to market. It is gratifying to see that long-standing customers such as Tokyo Gas and Tokyo Electric share our assessment of this competitiveness. Other negotiations are well advanced and we expect the first train to be committed to the Japanese market.

China is determined to reduce its reliance on burning coal for economic as well as environmental reasons. Gas consumption could increase seven times over the next 20 years. The West-East pipeline is the backbone of a distribution system which will require very large capital investment. The priority is to make the most of the country's indigenous resources. We are pleased to be involved in this. But LNG imports and in due course pipeline supplies will also play a vital role. The developing relationship between CNOOC and the North West Shelf Project following the first LNG sales contract is an important marker for the future.

India is another huge potential market. I believe the construction of our LNG terminal at Hazira in Gujarat which will start up next year will help to develop it.

Let me turn to the United States, where rising demand and limited potential to raise domestic supply will mean an increasing role for imports, particularly LNG.

Supplies will be attracted by current higher prices and the size, flexibility and liquidity of the US market. New access points are important. However, expanding the four existing terminals could provide 30 million tonnes per annum of capacity a quarter of present worldwide sales.

We are securing our own import capacity in the US and in Mexico for both Atlantic and Pacific supplies as well as pursuing the potential for an offshore terminal in the Gulf of Mexico.

The European market is characterised by liberalisation, growth, restructuring and increasing import dependency. Greater efficiencies and technological advances should enable European domestic production to remain steady for the next two decades. But increasing imports both pipeline and LNG will be needed to meet demand. I believe it is now recognised that fiscal conditions and market arrangements must support the long-term investment in developing supplies.

Europe is well placed to import gas from the major sources in Russia and the Middle East. But, with increasing demand everywhere, there will be competition for those resources. The Sakhalin development opens the way for Russian gas supplies to Pacific markets.

Finally, there is much speculation about the development of a global spot market for LNG. But I don't lie awake at night worrying about it for I have no doubt that major infrastructure developments will

"There is no shortage of supply potential from new plants and expansions."

"I have no doubt that major infrastructure developments will continue to be based on long-term contracts for the foreseeable future."

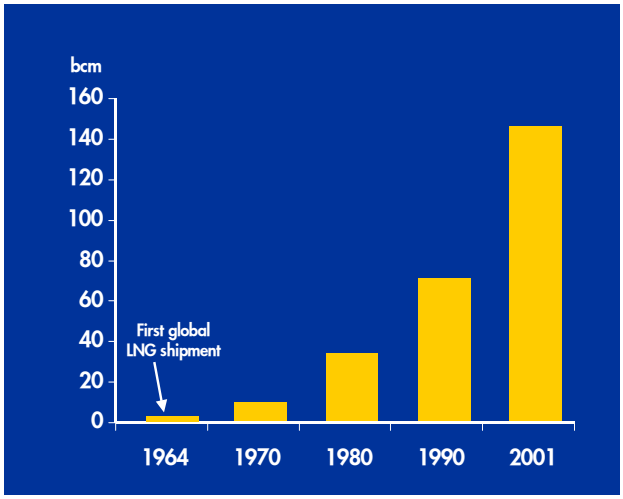

Figure 1—Growth of the LNG trade, 1964-2001

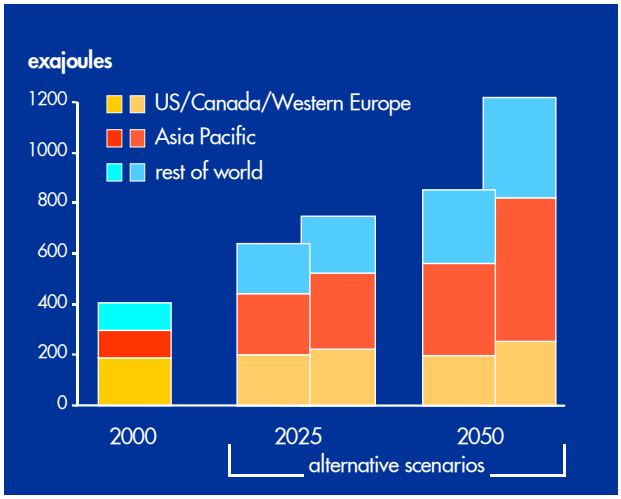

Figure 2—Shell scenarios: world energy demand growth

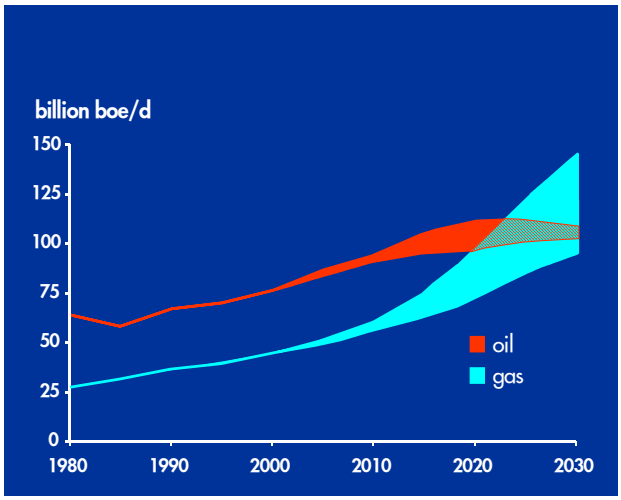

Figure 3—Gas: the fuel of the 21st century

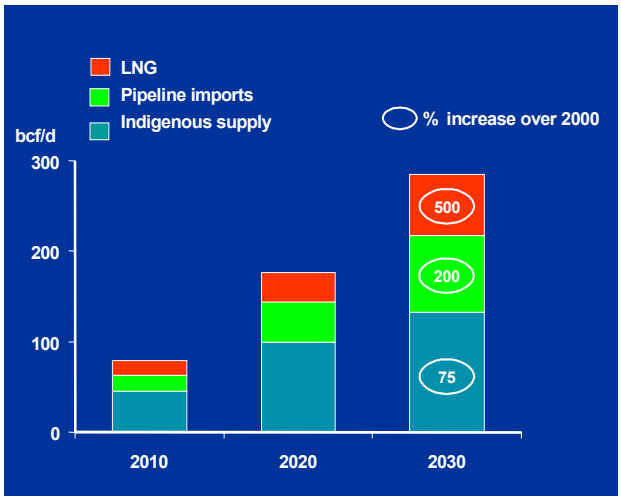

Figure 4—World gas demand growth

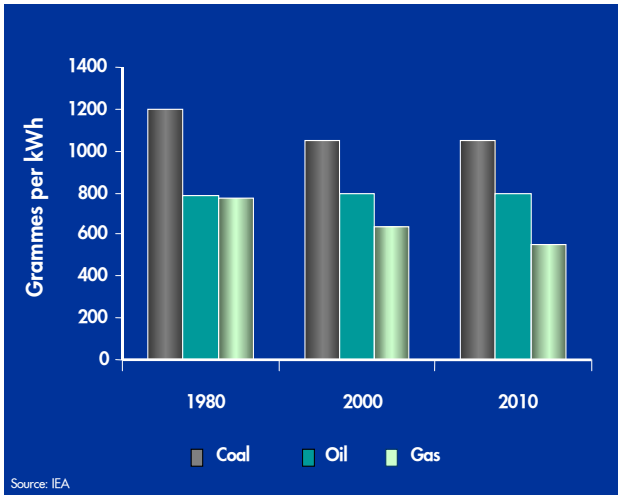

Figure 5—Gas vs. coal emissions

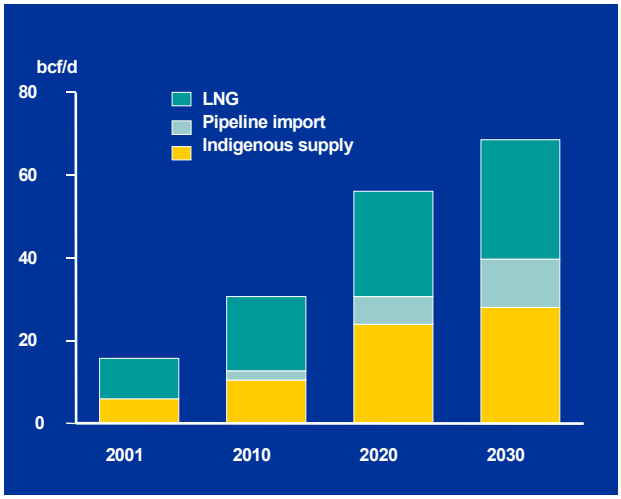

Figure 6—Asia-Pacific gas demand

continue to be based on long-term contracts for the foreseeable future.

But that is different from adding value for ourselves, our customers and our partners by optimising global trade through swaps and diversions. Our knowledge of markets and supplies and access to shipping gives us particular capabilities in this area. And these are increasingly valuable by allowing us to provide an enhanced service to our customers which goes beyond simple supply.

Bridging challenges

What is needed is to build these bridges and create successful gas supplies in challenging conditions. I believe this starts with governments not business with their vision of the benefits of developing gas markets and supplies, of the contribution international companies can make, and of the conditions necessary for enabling investment. The vision of the Russian government has been vital in making possible the Sakhalin development. But what do companies that aspire to contribute need?

If the customers provide the dynamic, the foundation is surely the technical skills to find the gas, develop the infrastructure, and operate the system. In the nature of petroleum geology this is often in very difficult conditions as in Sakhalin where production takes place in water frozen for half the year. And you need to do so more efficiently than your many competitors.

One of our strengths in Shell is the experience gained in designing and managing a unique range of projects over many years. This includes seven new trains delivered over the past three years with another three in hand before Sakhalin. This has given us the ability to extend technical boundaries, at 4.8 million tonnes each of the two Sakhalin trains will be among the largest constructed and to continually drive down costs. For example, the unit capex for the fourth and fifth Nigerian trains now under construction will be half that of the first two trains completed in 1999.

An imperative of project management is maintaining high safety and environmental standards, as well as responding to the needs of local communities. Sakhalin Energy is well aware of its responsibilities for the unique and diverse environment onshore and offshore Sakhalin Island. It is working hard to manage the impact of this huge project within the stringent environmental standards adopted by the Russian Federation. I have no doubt that being seen to have strong principles and a commitment to sustainable development is an essential requirement for being accepted to operate such developments.

This technical and operating experience must go with great financial strength and resilience to invest in projects of such scale and duration Sakhalin 2 is probably the largest single oil and gas investment decision ever taken. And bringing such schemes to the investment stage requires substantial pre-investment.

Finally, it requires the commercial expertise and creativity to secure long-term contracts in highly competitive markets. Being trusted to deliver is a vital asset. All this depends on the quality and experience of your people.

I referred to the benefits of our experience. Of course, merely doing things does little to build organisational capabilities. That requires a constant focus on capturing, sharing, maintaining and developing the lessons from that experience.

Bridges to development

Gas trade and the development of gas infrastructure stimulate economic progress in exporting and importing countries.

Let me focus briefly on the Sakhalin 2 development, which will provide major benefits to Russian industry and their partners, the people of Sakhalin, and in government revenues. Sakhalin Energy aims to maximise the role of Russian contractors in the project and promotes joint ventures between them and international specialists. A consortium of Chiyoda and Toyo Engineering from Japan with KhinEnergo and Nipigaspererabotka from Russia has won a contract worth about $2.5 billion to build the LNG plant. This is just one of a wave of contracts to be awarded. Russian industry should undertake about 70% of the work over the lifetime of the project.

On Sakhalin where the company now

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employs 600 people the project will create over 2,000 new, long-term jobs and up to 15,000 construction jobs. Experience shows that such major, long-term developments provide many other industrial and service opportunities over time. Sakhalin Energy is also contributing to the island's development including a $300 million project to improve infrastructure. The aim is to deliver long-term benefits to the community by emphasising the principles of sustainable development. The project should generate some $45 billion in revenues for the Russian state.

I believe it will be seen as a major economic breakthrough for the Russian Far East as part of the expanding economy of the region. Benefits come at both ends of the gas supply bridge. As my European examples showed, developing gas transmission infrastructure is a major enterprise. In China, the West-East pipeline is costing some $4 billion to construct. And delivering reliable and economic gas supplies to coastal areas will be an important economic boost, as will providing access to markets for the gas reserves in the Tarim basin.

There are other benefits. I mentioned the developing link between CNOOC and the North West Shelf. The venture will be building two new tankers for the Guangdong supply in Chinese yards, the first LNG tankers to be built there.

Bridges to the future

Gas has a vital role in meeting pressing energy challenges. Gas to Liquids technology, in particular, has the potential to provide the ultra-clean transportation fuels needed to meet tightening fuel specifications. GTL complements LNG as a competitive way of commercialising stranded gas resources with the important benefit that a much larger market can more easily absorb new production.

With the experience from our pioneering Shell Middle Distillate Synthesis plant in Bintulu we are developing plans to build much larger, second generation plants with a focus on the Middle East. And we are working to develop markets for the fuel which can be blended with regular diesel or used directly. Pure GTL products could also provide the basis for advanced engine designs. We are already selling a GTL/diesel blend in Thailand and have recently launched a major trial with Volkswagen in Berlin. Other trials are also planned in Tokyo, London and California.

For alternative fuels such as GTL to be developed successfully there must be close co-operation between governments, and both the automotive and energy industries. Looking further forward, gas and the gas supply infrastructure could also have an important role in the development of hydrogen power.

Bridges of people

Business is often characterised as being only about cut-throat competition. I don't think we would have a gas industry on that basis. Competition drives progress. But business equally requires cooperation nowhere more so than in developing gas supplies. I referred to the web of relationships which have sustained the Brunei LNG project over the past 30 years.

Similar relationships make possible the Sakhalin development with government and people, with our partners and contractors, and with our customers here in Japan and in due course elsewhere. And that is the hallmark of our LNG business – an ability to build successful relationships in very diverse projects across a wide variety of places and cultures.

Please indulge me if I also mention relationships within Shell. Developing projects of this magnitude and complexity requires sustained effort by many people from all over the world applying diverse skills and contributing to collective capabilities. I believe our record of success is a testament to the inherent strength of the organisation. Of course, the same is true for other gas developments elsewhere.

I think that natural gas has the potential to make a remarkable contribution to meeting the world's energy needs. Realising that potential will involve great challenges testing the capabilities of all of us as well as our ability to work together.

I also believe in a troubled and divided world that this ability to cooperate productively across frontiers has value beyond its utility. I believe it is an example of the human relationships which enrich our world.

I am proud to be part of an industry that truly does build bridges to a better world.

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