Introduction

Shell welcomes the opportunity to contribute to the Performance and Innovation Unit's (PIU) consultation on the UK's long-term energy objectives.

As a major developer of UK primary energy sources and actor in the wider energy scene, Shell companies have expertise relevant to the PIU review. Our activities in the UK include Shell U.K. Exploration and Production which from its North Sea activities accounts for around 19% of the UK's oil and 23% of its gas production; Shell U.K. Oil Products Limited, which is responsible for 15% of the UK's refined oil and petrochemicals products and operates a major UK refinery; Shell Gas Direct, an industrial and commercial gas supplier and Shell Gas, which provides Liquid Petroleum Gas (LPG) to industrial, commercial and domestic customers and to motorists. Shell International Renewables, a global business, with a focus on offshore wind in the UK, and Shell Hydrogen are investing in future technologies for applications globally and in the UK. Shell Global Solutions is a network of technology companies located around the world, including Cheshire Innovation Park, which not only supports Shell's global oil and gas businesses but whose unique skills and experience are also available on the open market.

Energy Policy

We agree with the objectives and challenges for the UK's energy policy set out in the PIU's background paper. Namely, to ensure diverse and sustainable supplies of energy at competitive prices; to promote fair and competitive energy markets, to reduce the impact on the environment and secure the sustainable use of natural resources; and to promote energy efficiency in all sectors of the economy.

We hope that the Energy Review will provide a clear policy framework for making choices between what can be conflicting policy objectives, so that both regulators and those participating in the energy market have as much predictability as possible in the policy environment in which long-term investment decisions are made. Government also has a unique role in managing

the expectations of populations and in educating them about the choices and implications entailed in policy decisions.

Long-term changes in energy supply and use will be impacted by three key factors, which illustrate the uncertainty inherent over time in energy, and the extent to which forces outside Government control are important:

- **Social priorities, such as any consumer preference for cleaner energy**
- **Technology, offering improvements in convenience for consumers**
- **Resource scarcity (real or perceived)**

The Energy Review begins with the standpoint that markets are the most efficient means of determining energy supply and delivering energy at affordable prices. Government policy and regulation should focus where there is market failure or where balancing is required between conflicting objectives. Government needs to take full account of international developments, in markets and networks, the impacts of technology, access to resources and of policy from other competent bodies.

To minimise negative impacts once a given policy direction is adopted, especially where there are conflicting objectives, least cost solutions will be found by the market. Measures should be selected to address specific problems, taking account of the adverse affects certain solutions can have. For example, carbon intensity rather than energy use per se, should be targeted if CO2 emissions are of primary concern.

Managing potential conflict with environmental objectives

We support the objective of emissions reduction and believe prudent precautionary measures to limit greenhouse gas emissions are needed now, even though there is still much scientific uncertainty about global climate change. This is why Shell has established targets for cutting its greenhouse gas emissions[1]

[1] The Royal Dutch/Shell Group will cut the emissions of greenhouse gases from its global operations by more than 10 percent by 2002 compared with 1990 levels. In the longer term, Shell aims to exceed the Kyoto emissions reduction targets through the decade to 2010. Actions to meet these targets include: considering the effect of a possible carbon cost in our investment decisions for new projects that could

and is undertaking a number of activities to meet these targets and contribute to the wider debate.

The likelihood of gas becoming more important in the energy mix as a "bridging fuel" to potentially emissions-free energy sources in the long term should be welcomed, given its environmental and other benefits. Gas has already delivered significant C02 savings as its market share has grown in the electricity generation sector. While, longer term, renewables may offer an emissions-free alternative to fossil fuels, phasing out fossil fuels completely by 2050 is unlikely since it would require a major change in consumer behaviour and/or major reductions in the cost of renewables. Advances in technology to 2050 are unlikely to resolve other issues such as energy storage, required to provide totally secure energy from intermittent renewable sources, and a reduction of the footprint of renewable plants necessary to replace fossil fuels to an acceptable size.

Advances in carbon sequestration technology (CO2 sequestrated at source) may dramatically alter the debate about the environmental impact of fossil fuels, and Shell is developing this technology both in-house and through international research in partnership with other companies (the Carbon Capture Project).

Competitive markets continue to be the best way in which to drive innovation for environmental benefit. For example, advances in fossil fuel technologies in power generation and in the automotive sector, are delivering better energy efficiency and fewer emissions. Nonetheless, there will be instances where time-limited intervention is required to maintain a level playing field for emerging technologies, or pump-priming to help their introduction in the early stages.

On current growth rates and with current policies, the Government's target of 10GW for CHP will not be met. Given the Government's environmental policy

---

produce emissions over 100,000 tonnes a year of CO2; an internal emissions trading system (STEPS) covering over 30% of the Group's total CO2 and CH4 emissions; expanding our support for research into climate change and its impacts, and including sponsorship of research by MIT on this subject.

objectives, additional support for CHP may need to be considered if it is to be competitive with other sources of electricity generation.

The Government should continue to encourage market-based emissions reduction schemes, which are the best way to meet environmental objectives since they promote the most cost-effective reductions in emissions, with least negative impact on society. As well as having its own internal emissions trading scheme, Shell is supportive of national and international trading initiatives.

Energy efficiency including for the domestic sector remains an important issue. The main barrier to improved domestic energy efficiency is the low share of total costs of most household budgets that energy comprises, coupled with the large benefits obtained from energy use. Measures targeted specifically at the fuel poor may be one option for balancing the competing objectives of energy efficiency and fuel poverty.

Transport

The review does not explicitly consider transport, but it is important in the context of the Government's emissions reduction targets that the role of transportation in energy use is considered. Current projections suggest that road transport growth is likely to account for a significant increase in greenhouse gas emissions[2], though fuels continue to be cleaner (emissions of regulated pollutants in petrol and diesel will fall to less than 20% of 1995 levels in coming years). In 'wells to wheels' terms, we should recognize that high fuel specifications (for example, even lower sulphur content) mean greater CO2 emissions during the refining process, even though local air quality is improved. Any net reductions in emissions will not be realized for a considerable time until new engine technology has achieved wide market penetration.

In the long term, hydrogen and fuel cell technology could play a significant role in mobility. Hydrogen fuel for transportation requires fuel cell vehicles and refueling infrastructure, which are likely to take a considerable time to establish. In the medium term, while a refueling infrastructure is established, bio-fuels and natural gas as "carrier

[2] EU's Auto Oil 2 programme, Royal Commission on Environmental Pollution

fuels" [3] could provide a bridge to a wholly renewable and emissions-free energy source from hydrogen, produced by renewable energy.

Many markets operate with products traded many times between distant locations, but with the products themselves only ultimately physically travelling the shortest route between producers and end consumers (eg gas). While there are inevitably limits to the nature of products which lend themselves to this process, consideration should be given to further opportunities, consistent with a free market, for such efficiencies to be captured.

The Government can give clear signals by using public vehicles to pilot hydrogen technology and by investigating financial and other incentives to encourage the use of hydrogen in its early stages. Codes and standards for hydrogen safety and other regulatory issues should be addressed at an EU level to ensure common standards.

Security and Diversity of Supply

We believe that fossil fuels, which will continue to be a significant part of the energy mix through to 2050, will make a major contribution to secure and diverse energy supplies for the UK. The main challenge in ensuring security and diversity of supply is to create a regulatory framework that allows maximum freedom to the markets, while still ensuring timely investments in major infrastructure and supply projects, taking into account the long lead periods required for such projects and the inherent uncertainty in the longer term supply/demand balance.

Oil and Gas

We endorse the submission to the Energy Review made by the Oil and Gas industry (UK Offshore Operators' Association) in relation to upstream oil and gas matters and support their view that the industry can continue to meet demand for the foreseeable future providing market and regulatory conditions are conducive.

[3] which can be used to produce hydrogen either on-board a fuel cell vehicle, in the case of bio-fuels, or in the case of gas to produce hydrogen for direct hydrogen fuelling of vehicles

Maximising indigenous supply from the UKCS' ever more marginal fields is inextricably related to fiscal policy. It is also likely to be a key factor in the extent to which future use of the UKCS' infrastructure can support the UK objective of an open, transparent, non-discriminatory and competitive single European gas market and facilitate multiple import routes for Norwegian gas, including NGLs, into the UK.

Taken together, these two issues will play an important part in ensuring security of supply while maximising benefit to the UK economy and workforce as a whole.

Renewables

It is our view that wind energy provides the most opportunity for development of renewables in the UK at this moment in time. Shell is a partner in the first offshore wind farm at Blyth and is focusing on further development and operation of wind farms both onshore and offshore in the UK. We believe that there will be economies of scale as the technology matures and that wind energy projects will start to compete with conventional power in the short to medium term. Until this happens, the Government will need to take action to ensure that its own targets for renewable energy are met.

The Renewables Obligation and a more positive approach to planning will encourage installation of wind energy technology. However Government will need to ensure that NETA does not disadvantage intermittent renewables like wind. Allocation of further offshore licences is essential with removal of restrictions on the numbers of licences held and a limit on cap on development size. Government should also review the low level at which the penalty has been set (3p/kWh) which makes it difficult for offshore projects to be developed without further financial support after the proposed initial grant programme.

An obligation on the grid operator to fund or part-fund extending the grid to offshore wind farms should be considered, as this is often a large part of the project development cost and a significant barrier to offshore wind energy deployment.

Energy companies who offer to install offshore wind energy as part of their exploration and development plans should be given credit. This will be a significant consideration in awarding exploration licences, and will incentivise energy efficiency and emissions reductions offshore.

On Solar Photovoltaics (PV) we would like to see the Government set a target for installed capacity and encourage R & D in solar electric technologies. The introduction of a scheme that makes it attractive for people to invest in a solar electric system and which demonstrates its advantages, will need to overcome the 'capital cost hurdle' by reducing the 'out of pocket' expenses for the end consumer and by introducing net metering.

Downstream Security of Supply for Oil Products

We endorse the United Kingdom Petroleum Industries Association (UKPIA) submission to the Energy Review and the view that industry will continue to provide secure supplies of oil products, built on a strong UK refining sector and growing demand.

Conclusion

Fossil fuels will remain a major part of the energy mix in the UK over the period considered by the review. Security of supply should not be a major issue provided appropriate policies including fiscal policy are pursued to maximise indigenous production and to enable access for imports through existing or enhanced infrastructure. Technology and markets will be instrumental in ensuring that the other objectives are met, provided they are given scope to develop a range of solutions to meet societal demands. This should not preclude some time-limited intervention by Government to achieve certain specific goals, but it is the market which will drive most solutions.

September 2001