

Objectives and Uncertainties in Energy Policy

Note for STAKEHOLDER WORKSHOP - 20 July 2001

1. Introduction

1.1. The Energy Project is still at an early point of development. It is building on the ongoing project at PIU on Resource Productivity and Renewable Energy, and the two teams are now integrated. The Energy Project will share important elements of methodology with the Resource Productivity project. However, the Energy Project has a wider scope than the earlier project and needs to decide on important issues of focus and scope. This paper:

- briefly outlines the Project scope;
- sets down some of the main issues in relation to energy policy objectives, and asks the Workshop participants for its reactions to them; and
- outlines some early thinking about the nature of uncertainties over the longer term and also asks for reactions.

2. Background: Project Scope

2.1. The Energy Project has been asked to consider the range of energy policy objectives that Government currently now pursues, and might pursue in the future.

2.2. Among the objectives that deserves particular and fresh consideration is that of security and diversity of supply. The Project has also been asked to consider the energy policy implications of the Royal Commission on Environmental Pollution's recommendation that the UK may need to achieve a 60% cut in carbon emissions by 2050.

2.3. In order to focus on the long term, with its inherent uncertainties, the Project will use a scenario framework of a well-established kind, and will try to develop visions of possible future energy systems and their components. However it will be eclectic in methods and will also focus on shorter future time periods including 2010 and 2020. We will also use a risk and uncertainty framework: what are the risks which policy should address?

2.4. We see the 'bottom line' of the Project as asking the following question:

- How might the framework and practice of energy policy-making change, compared to current approaches and policies, once renewed consideration is given to security of energy supply, and to long-term issues like climate change, and to possible conflicts between objectives ?

3. Objectives of Energy Policy

3.1. There have always been multiple objectives in energy policy-making. The three most commonly quoted objectives are:

- Economic (encompassing low costs, innovation and a better demand/supply relationship) ;
- Environment (increasingly concentrating on long-run issues of climate change and possibly addressed partly by higher prices);
- Security (a wide-ranging objective often in practice concentrating on worries about insecure fossil fuel supplies).

3.2. This set of objectives is often referred to as the policy 'triangle'. The first, 'economic' objective, is often framed in terms of low energy prices, as in DTI's PSA with the Treasury, though its meaning is often ambiguous as between low *prices* and low *costs*. The notion of 'security' also needs close analysis as it can carry multiple meanings. Our Advisory Group has suggested that we should formulate 'security' objectives in terms of risks and specify clearly the kinds of risk that policy may be addressing.

3.3. In principle there can be both synergies and trade-offs between these policy objectives. A major concern of the Project is to identify both synergies and trade-offs, and to examine ways of enhancing synergies and minimising trade-offs. It is often argued that there can be synergies between environmental and security objectives (eg renewable energy helps climate change by emitting no carbon, while simultaneously reducing dependence on fossil fuels) while there are trade-offs between economic and other objectives (renewables may not be a least cost choice in the short run).

3.4. However there are also a number of other objectives that energy policy might need to pursue:

- Social inclusion, including reduction in fuel poverty;
- Industrial objectives, including the development and exploitation of UK technology (eg in clean coal).

3.5. UK policy has in principle been interested in all these objectives. Over the last decade, however, the main objective of energy policy *actively* pursued has been to reduce costs and hence prices, mainly by means of opening the energy sector to competition where possible, and by price-regulating monopoly networks (gas and electricity transmission) where necessary.

3.6. Environmental, security and social objectives have also been important, but a mixture of chance (eg low world fossil fuel prices, privately profitable replacement of coal by gas) and design (eg downward regulatory and competitive pressure on costs) have meant that pursuit of economic objectives has also been accompanied by:

- better environmental performance because of the rise of gas; and
- better security because gas has (so far) added to diversity.

3.7. However, this fortunate conjunction is unlikely to persist. Both environment and security of supply now seem to be more pressing issues

than a decade ago, and the gains from 'sweating' the assets of the formerly nationalised energy industries are essentially one-off. Further reductions in greenhouse gas emissions will take place to a much more limited extent via unaided market decisions, and the UK will probably become increasingly dependent on imported fossil fuels from the second half of this decade onwards. This in turn brings risks to security, including higher prices. It may also bring other 'crisis' risks (eg that some major energy exporter may find itself unable or unwilling to export for a period, or that terrorism seriously disrupts international energy trade).

3.8. This means that simultaneous pursuit of all (or even the classic triangle) of energy policy objectives may become more difficult - trade-offs are likely to become important. On the other hand technology developments might help resolve some conflict - eg cheap carbon sequestration would ease the competitiveness/environment trade-off.

Questions on objectives on which we would welcome your views

1. Is the above description of energy policy objectives accurate and useful?
2. In relation to energy security, what are the main risks faced both in the shorter and the longer term?
3. Are environmental objectives likely to become more important in relation to other objectives?
4. What (serious) trade-offs can be foreseen between energy policy objectives in the future?

4. The Longer Term and Uncertainty

4.1. Getting a handle on likely future events and trends even 10 years ahead is extremely difficult. When we move to a 50 year time-horizon, we face massive uncertainties. To deal with a wide range of possible future states of the world, and test the robustness of present and possible future policy against those states, scenario analysis is one obvious starting point.

4.2. However there are certain propositions about the future about which individuals have higher and lower degrees of confidence. These may also provide useful starting points for longer term analysis. We have therefore started a process of considering the extent of consensus and disagreement about a number of propositions about the future that are relevant to UK energy policy (though many relate to a much wider world). In order to develop the propositions we pose a series of questions.

4.3. A preliminary version of some of these questions is set out below. When Or in some cases, if) answered, they represent potentially important hypotheses about future states of the world. It will be important to test them out against a wide range of expert and stakeholder opinion (which is why they are at the moment framed as questions). Some may be held with high degrees of confidence even 50 years into the future; others may be much more controversial; while yet others will simply be beyond our current capacity to make serious judgements.

4.4. The questions are arranged in three main groups all relating to the period up to 2050. In practice we are developing an analytical framework in which scenarios are used to derive possible energy systems. We will then analyse: (i) how robust are these systems across different scenarios; (ii) how well they stack up against our energy policy objectives; (iii) how far they deliver synergies between objectives; and (iv) how far they minimise key risks and trade-offs. In the period up to 2020 our analytical framework will be informed by modelling and timelines of key events. The purpose in putting forward this list now is to to check the current state of stakeholder and wider opinion on some key uncertainties with a view to helping us decide where we need to focus our efforts in developing our risk framework.

'Uncertainty' questions on which we would welcome your views

A. Technological

1. Will at least one technology, currently either unfashionable or unknown, achieve economic breakthrough in the energy field?
2. Will at least one renewable energy technology achieve radical cost reductions?
3. Can carbon sequestration overcome environmental problems and become a reasonably cheap and reliable technology?
4. Will decentralised and locally-based energy systems become more important than now, and become dominant?
5. Are fossil fuel-based technologies (eg the internal combustion engine) likely to react effectively to competitive challenges from other technologies?
6. Is it likely that nuclear power can revive in the UK on the basis of new technology?
7. Will demand side measures (new technology, better diffusion) contribute more to carbon savings than supply technology?

B. Fossil Fuels

1. Is it agreed that natural gas will become the dominant fossil fuel in the UK, in Europe or worldwide?
2. Given forecasts that world fossil fuel supplies will peak and decline within 30 years or so, how likely is it that fossil fuel supply shortages (or radically higher fossil fuel prices) will prove a major constraint on energy policy choices?
3. Economically recoverable UK fossil fuel reserves are expected to peak and then decline relatively soon, but

since past supplies have generally exceeded expectations, can we be confident of such forecasts?

C. Energy/economy/environment trends

1. Is it agreed that, in the absence of further policy measures, there will be a persistent but muted underlying trend towards further decarbonisation of the economy?
2. Is it agreed that electricity will become of much greater importance than today?
3. Is it agreed that climate change science is unlikely to reverse itself (so that the case for internationally co-ordinated action on emission reductions would be likely to become stronger)?
4. Will demand from consumers for private/individual means of transport continue to grow?
5. Is security of access to energy services likely to be more highly valued?
6. Alongside continuing use of other instruments, will policy mechanisms of a market-based type (eg taxes, emissions trading) become more important?