A Response to
Energy Policy: Key Issues for Consultation

Scientists for Global Responsibility

September 2002

Scientists for Global Responsibility (SGR) is an independent UK-based organisation of scientists and engineers promoting ethical science and technology.

We welcome this opportunity to respond to the Government's Energy Review.

Climate change

SGR agrees with the Government's Performance and Innovation Unit (PIU) that environmental objectives should be the main focus of energy policy, given that energy generation and use are major contributors to climate change, local air pollution and other environmental problems.

We believe there is significant room for improvement in the policy measures currently employed to move to a low carbon economy. The current combination of an energy tax (the climate change levy) for some industrial users of electricity, negotiated agreements for other larger users, and a voluntary emissions trading scheme for those not involved in the other two is over complex and flawed. Electricity generators are not covered and hence have no direct incentive to, eg, switch from coal to gas, major industrial users have a cap only on unit emissions not absolute emissions, while domestic energy use is not covered at all.

We believe that an upstream carbon tax, which would clearly provide an incentive a move to lower carbon fuels and zero carbon sources across the whole economy, would be the best way to go. It may be justified to couple this with an emissions trading scheme for larger industrial users. It would be very important to put in safeguards to ensure that those in fuel poverty are not made worse off by such policies, eg by recycling the tax to increase benefit levels (eg the winter fuel allowance). (See also energy efficiency)

We also feel that, to assist in the smooth introduction of measures such as a carbon tax, much greater effort is needed to counter public ignorance of the link between energy use and environmental problems. For example, a public survey in the late 1990's found that only 12% of respondents realised that energy use in the home was a significant contributor to global warming (DETR, 2000: 60).

Finally, it is SGR's position is that the UK Government should embrace the Royal Commission on Environmental Pollution (RCEP) recommendation of a 60% cut in GHG emissions by 2050. Such a target would set out a clear, long-term goal of moving the UK to a low carbon economy, and send an important signal to other countries concerning the level of commitment to tackling this issue.

Energy efficiency and CHP

RCEP highlighted the very inefficient way in which we use energy in the UK, chiefly due to: poor quality housing stock; using electricity as a major source of space heating; and wasting low-grade heat produced during the production of electricity by large plant.

Hence, SGR agrees with both RCEP and the PIU that improvement of energy efficiency should be a central plank in energy policy. Further we endorse the PIU' s recommendation for setting energy efficiency targets for each sector of the economy, including a 20% improvement in domestic energy efficiency by 2010, and a further 20% by 2020.

We also believe it very important that CHP (both large-scale and domestic) is given proper support to play a leading role in improving the efficiency of energy use, and that obstacles such as those posed by New Electricity Trading Arrangements (NETA) are dealt with. (New installations of CHP have effectively been completely curtailed by the impacts of NETA, together with rising gas prices.)

Further, we very much agree with giving strong incentives to utilities to sell energy services rather than units of electricity. This would enable the sometimes high investment costs associated with building insulation, or installation of small-scale renewable energy technologies (eg active solar water heating or building integrated solar photovoltaics) to be spread over a longer period of time, and create an additional incentive to increase energy efficiency. The current 28-day rule for switching suppliers appears to be acting as a disincentive to the sale of energy service packages.

Renewables

The large expansion of renewable energy is essential to any strategy for reducing greenhouse gas (GHG) emissions. Therefore SGR supports the PIU recommendation to expand the renewables target for electricity generation (excluding large hydro) to 20% by 2020. In order to assist in reaching this target, the Government needs to ensure adequate research, development and demonstration (R,D&D) in emerging technologies (see innovation).

The intermittency of supply of some renewables, eg wind, has been highlighted as a possible problem. As the PIU has pointed out, the costs of providing sufficient back-up generation will be small for the 20% target it suggests. However, as a greater and greater proportion of intermittent supply is provided, the costs may escalate. It is important for the long-term that adequate technologies and strategies are developed to cope with this. RCEP discussed several options, two of which SGR favours most:

- Moving to a decentralised national grid, with biomass- and some natural gas- fired CHP ensuring that supply matches demand.
- Making wider use of hydrogen as an energy storage medium within the electricity system.

Nuclear power and fossil fuels with carbon capture and storage (C&S) were also suggested as ways of ensuring a reliable electricity supply. The nuclear option we discuss below, and believe it is the least desirable. We feel that the geological storage

of carbon could be viable if (a) it were proven to be secure (ie leak-free), and (b) shown to have no significant local environmental or social impacts. We do not favour ocean storage of carbon due to the high potential for environmental impacts, and the difficulty in assessing the level of such impacts due to the complexity of the ecosystems involved. (We note that the Norwegian Government has recently cancelled plans to undertake an ocean storage experiment due to concerns over possible environmental impacts, and possible infringements of international laws on the marine environment.) There are two further concerns if C&S is likely to encourage continued dependency on imported fossil fuels. The first is obviously the security of supply issue. The second is discussed far less: the associated local environmental and social impacts during extraction, which can often be in sensitive ecosystems in poorer countries.

Nuclear

SGR is deeply concerned about the possibility that new nuclear power stations might be constructed. We believe that there are five main arguments against this course of action:

- Possible nuclear weapons proliferation
- Risk of a terrorist attack or serious accident
- Health and environmental problems associated with nuclear waste
- High long-term economic costs
- Environmental impacts of uranium mining

The link between nuclear power and nuclear weapons is a subject often avoided by governments and the nuclear power industry. Nevertheless, the separation between weapons and power generation is at best doubtful (eg Hesketh, 1999). Of particular concern in the UK context is the reprocessing of nuclear fuel at Sellafield, which encourages international transport in material which could be hijacked for use in nuclear weapons. The weapons connection is even more worrying when the construction of new UK nuclear power plant is considered in an international context - see below.

The risk of terrorist attack of nuclear facilities is now being taken seriously in the wake of September 11th, and SGR has contributed to an Office of Science and Technology briefing on this issue (OST, 2002). While we welcome the recent increases in security at nuclear facilities, the catastrophic consequences of an attack or sabotage are risks we feel society should not have to bear.

Nuclear waste, especially solid and liquid, is highly dangerous and there is still no agreement on safe disposal. While we welcome attempts by the Government to resolve this problem, it is very questionable whether this problem will be solved in the near term.

A related issue concerning nuclear power is that a large proportion of its costs are incurred at the end of its operating life during decommissioning. The economic convention of ' discounting' hides these costs, and hence they are rarely given adequate attention when a decision on the construction of a new power station is considered. As we have found recently, cost projections of this phase are normally too optimistic

leading to an unanticipated bill which taxpayers have to pay for. For example, the estimate for total decommissioning costs for old stations was announced this year to be a massive £48 billion, up £6 billion from the previous estimate (BBC online 2002). It is no coincidence that BNFL has recently announced record losses of £2.3 billion (BBC online, 2002a). Further the current major financial problems of British Energy, which has just announced a loss of £518 million (BBC online, 2002b), leads us to question whether nuclear power can operate adequately within the liberalised UK energy market.

Uranium mining has high environmental impacts, due to low concentration of ore, which leads to a large amount of mine tailings, coupled with the radioactive nature of those tailings. Generally the impacts of such mining are felt by poorer groups in society, eg in South Africa and the Aboriginal areas of Australia.

All these issues are especially daunting when considered in an international context. If the UK goes ahead with new build of nuclear power stations, this sends a message worldwide that this is an acceptable path to follow. We believe that many less secure countries (ie former Eastern bloc and developing countries) will follow this lead, and many will experience some if not all of the problems discussed above over the coming decades. Nuclear weapons proliferation will be very hard to control, while the potential of nuclear accidents or waste disposal problems will be multiplied. It will be very hard for the UK to argue that other countries should not follow a nuclear path if we have.

Gas and oil

SGR is concerned that large-scale exploration for oil and gas attracts very high levels of financial support, both public and private. While we realise that these fuels will continue to make up a significant proportion of primary energy sources in the UK during the coming decades, we still feel that much more of this finance could be directed towards renewable energy, energy efficiency and demand management. We do not believe that the large energy companies involved are taking adequate action considering the potential scale of the impacts of climate change.

Coal

Conventional coal-fired power stations emit at least twice the carbon dioxide per unit energy input as gas-fired stations. Hence, SGR believes it is important that we move away from this technology quickly, if necessary through Government intervention to close the least efficient power stations early. However, from a security of supply perspective, coal has distinct advantages over natural gas. Therefore there is a role for methane produced from coal. The most promising technology in this area, we feel, is Integrated Gasification Combined Cycle (IGCC).

Innovation

SGR welcomes the recent increase in Government financial support for R,D&D for renewable technologies and the steps taken towards the setting up a national energy research centre. We note that Energy Research Review concluded that the emphasis of publicly-funded UK energy research should be carbon sequestration, energy

efficiency, hydrogen production and storage, nuclear power (especially dealing with nuclear waste), solar photovoltaics, and wave and tidal power. Funding for many of these areas we welcome. We also welcome the incentives for the development of some of these technologies given by the current package of measures (Renewables Obligation, capital grants for biomass and offshore wind, enhanced capital allowances for energy saving technologies, Carbon Trust's low carbon innovation programme), though we feel that significantly higher levels of funding would be justified.
We do have a number of further points to make:

- Given the large amounts of finance currently being invested by the fossil fuel industry into carbon capture and storage, we believe that any publicly funded work in this area should be limited. Further the focus of this limited funding should be geological storage, in particular, on independent assessment of the integrity of this storage and any environmental impacts associated with this technology.
- We believe that no further public funding should be spent on nuclear fission, except in dealing with the nuclear waste legacy.
- We believe that the current multi-million pound funding for nuclear fusion should be cut in favour of the more promising renewable energy technologies, given that even optimists do not predict a significant role for fusion until late this century.

We have a number of comments to make on the level and source of the funding for energy research. First, we believe that the level of funding should be raised so that it is comparable at least with Japan. Further, we feel strongly that much of the extra funding for this research should come from:

- Redirection of a large proportion of the current £2 billion R&D budget of the Ministry of Defence. (It can legitimately be argued that expansion of the use of sustainable energy technologies can aid international security, eg Middle East security, preventing social problems such as major refugee crises arising from climatic disasters.)
- An additional tax on fossil fuel exploration on the UK Continental Shelf.
- Taxation or other charges on aviation fuel.

Transport

GHG emissions from ground-based transport are growing and remain one of the most difficult to reduce due to the heavy reliance that society has on car-based transport. While a switch to hydrogen powered vehicles is an important long-term goal, SGR believes that the main ways in which these emissions can be tackled in the near term is by social and political, rather than technological, change.

Under the Government' s Transport 2010 plan, too much funding is still devoted to car-based transport, while buses, cycling and walking are still marginalised. Better urban planning will help reduce the need to travel. Meanwhile measures to discourage the trend in buying larger and larger cars must be put in place, eg further increases in taxes for inefficient Sports Utility Vehicles. All these measures will have added benefits, eg reduced traffic accidents. Any policies put in place to aid the shift to a hydrogen-based transport system should not undermine policies which reduce the need to travel or encourage modal shift to other forms of transport.

Aviation is another area where emissions are growing fast and new technology will provide few benefits. In this case even hydrogen fuel would be unlikely to provide any benefit since the main emission would be water vapour which, at the altitudes it would be released at, would still cause a similar degree of warming as current aviation emissions.

Again, it is only social and political change that will achieve the required emission reductions. For a start, it is essential that aviation emissions must be brought within the international GHG targets negotiated under the UN FCCC. Further, aviation fuel should be not be exempted from taxes. While an international aviation fuel tax will be very hard to agree, an emissions trading framework could be set up more easily to control the emissions through a price mechanism. Finally, the Government must encourage alternatives to flying - high-speed trains and teleconferencing can make significant contributions here. The recent Government' s announcements on proposed airport expansion need to be reconsidered. We support the Environment Minister' s (Michael Meacher) contention that the current expansion plans are incompatible with the UK' s climate change programme and local environmental concerns.

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