promoting the UK renewable energy industry

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RPA response to the Energy Review

The Renewable Power Association is a newly established trade association, set up at the end of June. A list of founding members is appended to the rear of this document. The RPA's remit is to promote the UK renewable energy industry;

- by representing the interests and viewpoint of producers of renewable energy,
- to UK, European and international governments and authorities, the public, NGOs and the media,
- by working with all who are interested in the industry's growth, and
- by providing appropriate services to its members.

This response contains a general section on the scale of renewable energy resources and deployment issues, followed by answers to some of the questions posed in the paper prepared for the Stakeholder Workshop meeting held on the 20th July. (Author, Gordon McKerron, Ref. Stakeholder Workshop I vl.0 Dated 17 July 2001).

Large scale deployment of renewables is, of course, dependent on a planning climate which facilitates the development of renewable energy projects. The industry has had great difficulty in this area. It is essential that the planning issue is addressed and the initiatives such as regional planning targets feed through and make a material difference to the process.

I hope you find this response helpful. If the RPA can be of any further assistance, please don't hesitate to contact me.

Yours sincerely etc.

David Byers,
Chief Executive, RPA.

Enclosed / referenced papers

- Milborrow, DJ, 1996, *Capacity credits - clarifying the issues.* British Wind Energy Association, Eighteenth Annual Conference, Exeter, MEP Ltd, London, available from the BWEA., tel. 0207 402 7102.

- *Arguments on the Construction of PBMR Reactors in South* Africa. Steve Thomas, SPRU (University of Sussex) February 1999. Is available from the web:- httD:Ilwww.sussex.ac.uk/spru/environmentlresearchlpbmr.html
- *Integrating wind power.* Gaynor Hartnell, Renewable Energy World. March-April 2000 issue. (being sent separately by post)
- *Geological carbon sequestration - silver bullet or pipe dream?* ENDs Report. 318 page 17— 20.

Introduction

It has been suggested that, as well as improving energy efficiency, there are three main approaches to
reducing GHG emissions:-

- Renewable Energy
- Nuclear Power
- Carbon capture and sequestration

Of these, renewable energy is the only truly sustainable approach. Ignoring for a moment the economics and technical feasibility of the other options, there will always be radioactive waste to manage if the nuclear route is followed and the reservoirs where carbon could be stored are themselves a finite resource.

Renewable energy can therefore be seen as a "no-regrets" option. In addition to its inherent sustainability, many renewables are at this point in time cheaper, safer and more technically proven than nuclear power or carbon sequestration. Other renewable technologies may currently be more expensive, but are still safer, and costs are expected to come down.

RE is one of the most rapidly growing markets in the world and the UK should take the opportunity of establishing a firm market position. The UK's expertise in off-shore wind development foundations being a particular example.

Objectives of energy policy

1) Is the above description of energy policy objectives accurate and useful?

The description in the paper is certainly an accurate and useful description of energy policy objectives. In particular we would agree that the "dash for gas" although beneficial to the environment and improving diversity was achieved by way of chance and economic regulation, rather than environmental concern or regulation. We also agree that this fortunate conjunction is unlikely to persist

2) In relation to energy security, what are the main risks faced both in the shorter and the longer term?

The fuel crisis provided a dramatic example of an unforeseen crisis, not caused by difficulties with resource availability or infrastructure problems. Any fuels that are imported or transported will be subject to such potential supply crises, even in the context of sufficient resource being available. The majority of renewable energy sources deliver themselves to the power plant, and no amount of human intervention could stop them! This, coupled with their diverse nature, reduces two elements of energy security risk.

Wind energy is often suggested to put a risk to the lights staying on, by opponents of the technology. There is plenty of information on the subject, and it is generally acknowledged that up to 20% of energy supplies can be accommodated from intermittent sources without operational changes to the system, and more still can be accommodated at a small incremental cost.

Unfortunately there is also much misunderstanding of this issue, and confusion about the terminology. Intermittent renewable energy technologies can only generate electricity when the energy source (e.g. wind, waves, tides etc) is available. Some intermittent sources are predictable, others can be forecasted. Intermittency should not be confused with unreliability.

All electricity generation technologies are intermittent, but for different reasons. Wind, run-of-river hydra and PV are intermittent due to uncontrollable changes in the energy content of the source. Coal and gas plant, however can be intermittent due to problems on the electricity network and nuclear due to safety constraints and refuelling requirements. However, economic considerations mostly dictate the running regime of fossil fuel fired plant.

It should be noted that the renewable energy technologies achieve typically higher availability than conventional power plants. For example wind plant availability is typically over 98 per cent

Just because wind, for example, İS intermittent, this does not mean that it is not *firm,* i.e. it does have a capacity credit The capacity credit of power is a measure of the ability of the plant to contribute to peak demands of a power system. In the UK, about 100MW of wind plant can statistically be relied upon to the same extent as 40MW of coal fired plant. Papers on the issue of integrating wind energy and capacity credit values of wind (by Gaynor Hartnell and David Milborrow respectively) describe these issues in greater detail.

In the longer term the issue of integrating renewable sources is likely to be far more important, as larger volumes of intermittent renewable electricity enter the system. Offshore wind energy and possibly wave and tidal stream would be expected to make significant contributions. The latter is intermittent but predictable with a very high degree of accuracy, far into the future. These sources are likely to enter the grid at discrete locations; they may well require adaptations to the planning of the network to cater for very large inputs of power. None of these should cause any inherent difficulties initially, but there would be a cost implication and perhaps storage requirement Set against this, it is likely that the current electricity trading arrangements ("NETA") will have been superseded and that the new arrangements wilt be less discriminatory against smaller or intermittent generators.

In this context some storage and extra spinning reserve may be required, but it is difficult to predict what
form this would take due to:

- Uncertainty in the generation technology mix
- Storage technology developments (which may develop more rapidly than otherwise due to NETA)
- Improved demand side management
- Improvements in predicting wind (and wave) output

2) Are environmental objectives likely to become more important in relation to other objectives?

Environmental objectives are likely to be increasingly important in relation to other elements of the energy policy triangle". There are many synergies between renewable energy technologies and other policy objectives, and these fortunately operate in a positive direction. For example wind energy, biomass and energy crops help diversify farms and rural communities. Recovering the energy content from municipal solid waste improves integrated waste management by diverting biodegradable waste away from landfill, thereby reducing potential methane emissions and helping to meet the targets in the landfill directive. Utilising landfill gas also helps the requirements of the land for directive, as well as reducing methane

emissions to atmosphere from waste already landfilled. In addition, all forms o renewable energy are more labour intensive than conventional energy technologies, particularly energy crops. This is not to imply they are any more costly

3) What (serious) trade-offs can be foreseen between energy policy objectives in the future?

It might be expected that a strong environmental drive would have to be traded off against higher energy costs. However the costs of renewable energy technologies are falling, and, with the exception of energy crops, there is no risk that the cost of fuel could increase in the future. Fossil fuels, in contrast, are likely to increase in price over the longer term. Nuclear power, with its high capital costs is expensive at the outset and is unlikely to achieve major cost reductions in the short to medium term. The enclosed paper by Steve Thomas illustrates this point well. The universal trend towards liberalisation of energy markets enforces the trend towards modular, low risk energy technologies, such as gas and many kinds of renewables.

'Uncertainty' questions (Technological)

- Will at least one technology, currently either unfashionable or unknown, achieve economic breakthrough in the energy field?

Even if one (non-renewable) low carbon technology *did* achieve economic breakthroughs, this would not damage the market for renewables, partly because diversity of supply will remain important, but more importantly because the market for low carbon energy sources will be so large. The Royal Commissions recommendation of the 60 per cent reduction in carbon emission leaves plenty of scope for significant improvements in energy efficiency, demand side management, a new economic breakthrough *and* large-scale renewable energy deployment

- Will at least one renewable energy technology achieve radical cost reductions?

There is evidence of rapidly falling costs for wind energy and PV. For example photovoltaic solar cells have achieved cost reductions of two orders of magnitude over the last 20 years. Future reductions of another order of magnitude (from the present $3-5 to about $0.33 per watt) are predicted for thin film solar cells, are predicted by the National Renewable Energy Laboratory. These reductions can be achieved largely through increases in the volume of production (to a scale of the order of 100 to 1,000 MWp per annum from the present — *10*MWp). Short-term Government-supported programmes (such as the 70,000 roofs project proposed) can make a great contribution to building this volume. The UK still has the opportunity to gain a leading position as the industry emerges.

For many other renewable energy technologies, the cost is falling. However, the cost of fuel is an important component of the overall cost of energy from energy crops projects, and in this context it is unlikely that comparable rates of cost reduction can be achieved. Such projects will need dedicated support mechanisms in order to reach their full potential.

- Can carbon sequestration overcome environmental problems and become a reasonably cheap and reliable technology[7]

Carbon capture reduces the thermal efficiency of fossil fuel fired electricity generation by up to 14% and is expensive and unproven long term route to emissions reduction. The majority

of options for disposing of C02 centre around technologies for enhancing the recovery rate of gas and oil. There are many stages to this approach; the CO2has to be captured, purified, compressed, transported and finally disposed of. There is a lack of data on the costs involved. In the case of ocean disposal, the C02 could escape through geological processes or out-gassing. The whole approach smacks of an expensive and illogical technological fix rather than addressing the root of the issue the need to generate energy without producing CO2in the first place.

Problems with this approach are described in the enclosed article from the ENDs journal. "Geological carbon sequestration silver bullet or pipe dream?"

- Will decentralised and locally based energy systems become more important that now, and become dominant?

Decentralised energy systems will continue to increase in importance, although the Renewable Power Association is sceptical of the some commentators' assertion that in the medium to long-term the high voltage National Grid will become a thing of the past Renewable energy sources such as offshore wind, and wave and tidal stream, if successful, would benefit significantly from the existence of a national grid network.

- Are fossil fuel-based technologies (e.g. the internal combustion engine) likely to react effectively to competitive challenges from other technologies?

Even if fossil fuel based technologies do react effectively to competitive challenges from other technologies fuel costs, resource and security (geopolitical) issues are ultimately unavoidable. These problems do not occur with the majority of renewable energy technologies.

- Is it likely that nuclear power can revive in the UK on the basis of new technology?

It is noted that Pebble Bed Modular Reactor technology has been mooted to present an opportunity for a revival of nuclear power in the UK. A paper produced by a Steve Thomas, then of the Science Policy Research Unit, puts this suggestion in context and is enclosed for your information.

Steve Thomas's paper does not deal with safety or public acceptability arguments. As well as concerns over operational safety and waste disposal, the unfavourable economics, now more explicit as a result of liberalisation, would provoke a significant public reaction.

Renewables, energy efficiency and demand side management could and should fill the gap left by nuclear power. This approach would be far preferable from an economic, energy security and public acceptability perspective.

- Will demand side measures (new technology, better diffusion) contribute more to carbon savings than supply technology?

There is significant scope for load management to reduce the capacity requirement by evening out electricity demand and this may be particularly useful in localised situations where renewables provide significant inputs to the gird. However these measures are unlikely to reduce the overall requirement for energy, and therefore will not contribute substantially to carbon savings, other than by facilitating renewable energy integration.

Regarding energy efficiency, trends today to show that domestic energy consumption is increasing despite the fact that the stock of energy consuming equipment is becoming

increasingly energy efficient Put simply, increased consumerism has more than compensated for improvements in energy efficiency. One hopes that the situation cannot continue indefinitely, but it may require government intervention to kerb it Increasing the amount of personal transportation is an area that already has lead to dramatic increases in energy use, and this could continue much further.

Uncertainty' questions (Energy/economy/environment trends)

- 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?

Possibly, but a muted underlying trend will not be sufficient to meet environmental objectives. There is also the risk that other effects, e.g. increasing numbers of households, greater consumerism, increased transport requirements etc will increase overall energy use even though energy efficiency and technology improvements may improve overall energy productivity.

- Is it agreed that electricity will become of much greater importance than today? This trend seems likely.

- 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)?

Given the huge number of scientists who have reached the conclusion that global climate change is occurring, compared to the small number that question it, it is impossible not to reach that conclusion.

- Will demand from consumers for private/individual means of transport continue to grow?

This seems likely without radical improvements in public transport and intervention to promote home working etc. Renewable energy can play a valuable role in transport, through biofuels and electric powered vehicles. Biofuels have clean emissions and by providing an alternative land use can help diversification of the rural economy.

- is security of access to energy services likely to be more highly valued?

- Alongside continuing use of other instruments, will policy mechanisms of a market-based type (e.g. taxes, emissions trading) become more important?

The RPA

The RPA is open to all companies involved in the UK renewable energy industry. As well as biomass, biogas, wind, hydro and energy from waste generators, there are members who specialise in the production of fuels and heat from renewable sources. Members also include equipment and service providers to the renewable energy industry, such as law firms, consultants, financiers, equipment manufacturers and supply agents.

More information can be found at www.renewablepowerassociation.org

Founding members of the RPA, as of September 10th 2001

Addleshaw Booth & Co
BIFFA Waste Services Ltd
Border Biofuels
Brightstar Environmental Ltd
Campbell Carr
Cinergy Renewable Trading
CJDay Associates
Clarke Energy Ltd
CLP Envirogas
Cory Environmental
David Byers
ENER-G PLC.
Energy Developments (UK) Limited
Energy Power Resources Ltd
EnviroFinance
Ernst & Young
Fibrowatt
First Renewables Ltd
Hammond Suddards Edge
Ilex
Impax Capital Corporation
Intersolar Group
Mobil Oils
Norton Rose
Organic Power Ltd
Primergy
Salans Hertz.feld & Heilbronn
Summerleaze RE-Generation
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