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Renewable Energy: 10% by 2010

By Professor Ian Fells CBE FREng FRSE

There were 5,624 water mills listed in the Domesday Inventory for England in 1086. They were mostly used for grinding grain. Each village had one, it was a communal facility. Today, in India and China, many villagers also have a communal energy plant but now running on human and animal waste and producing methane or biogas for cooking; fuel wood, used for thousands of years, has run-out. It is ironic that the first fuel to run out is a normally renewable resource. Pressure from the rapidly increasing population has made replanting of trees for future fuel wood unsustainable. In the UK wood, or charcoal, was the main fuel source until the beginning of the Industrial revolution. By then the great forests that spread across the Midlands and into the Lake District had been cut down for fuel, or to build ships, causing profound environmental change. Coal became the energy source for the industrial revolution, oil was a competitor by the end of the 19th century and now, at the turn of the 20th century, gas has joined the other two big players in the energy league. But all these three fuels contain carbon and produce carbon dioxide when burnt, accelerating global warming and destabilising the weather machine. World temperatures and sea levels rise inexorably. With energy use set to double by 2050 over 1990 figures and multiply fivefold by 2100, continuing rise in carbon dioxide levels seems inevitable. But in an attempt to stem the tide the industrialised nations met in Kyoto in 1997 and agreed to reduce greenhouse gas emissions, the major culprit being carbon dioxide, by 5.2 per cent over 1990 figures by 2010. The UK has committed to reduce carbon dioxide emissions by 20 per cent by the same date. How can this be achieved?

The use of renewable energy is not new as I have pointed out. In addition to wood, vegetable oil was used for lamps, and small-scale hydro systems were powering distilleries and mills through the 19th century until "piped" electricity became available. Renewable energy such as electricity from hydro, wind or solar does not cause emissions of carbon dioxide and fuel crops such as rape, coppiced willow, grass and so on are carbon dioxide neutral provided they are managed and replaced with more carbon dioxide consuming crops. So renewable energy is a potent weapon in the battle for the climate. What is its realistic potential?

Some 20 per cent of world energy is renewable but this is almost entirely fuel wood, (and suppliers of fuel wood are running out), or hydro-electric power from large dams which are categorised as unsustainable by environmental pressure groups. Indeed, many renewable sources, wind power for example, are opposed by environmentalists which makes growth in renewables more difficult. The new renewable sources, photo voltaics, wave, tidal power and wind hardly appear in the statistics but are . . .

set to grow if they are given financial and technical support by government. In Europe 6 per cent of the **energy** supply is renewable and targeted to double to 12 per cent by 2010. Renewable energy supplies are only 1 per cent of UK **energy**, 80 per cent of which is biomass, so there is a long way to go to reach the EU target of 12 per cent renewable energy by 2010. The UK is committed to 10 per cent of **electricity** supply from renewables by 2010; it is currently 2.5 per cent with hydropower supplying the larger share of 1.5 per cent and wind 0.25 per cent.

A four-fold increase in renewable electricity in 10 years, although laudable, will require considerable government intervention if it is to be achieved. The abandonment of the NFFO subsidy and adoption of the market-led scheme laid out in the Green Paper "New and Renewable Energy" (DTI February 2000) requiring suppliers to provide 10 per cent renewable electricity by 2010 or be fined is a novel approach, but with prices capped at 5 pence per unit of renewable electricity, suppliers may choose to be fined. 5 pence will not give sufficient incentive to offshore wind, tidal, tidal stream and wave power developers to invest in new schemes and seek contracts from electricity suppliers without additional capital grants. The money available for research and development in these newer technologies, some 200 million pounds, will not go far. The growth of renewables may stall if new incentives are not provided. Just one new coal fired power station costs around £1000 million and a gas fired station about half that and we hope to stimulate development of around 5000MW of new renewables with just £200m!

Fortunately substantial subsidies for renewable electricity are available in other European countries such as Denmark, Germany and Spain. Energia Hydroelectrica de Navarra has just ordered 1800 new wind generators with a capacity of 1.4 GW. Europe has already passed its wind energy target of 8,000 MW for 2000, with an annual growth rate of 30 per cent. But despite this success with wind, the most mature of the renewable electricity technologies, apart from landfill gas and energy from waste, it only provides 0.2 per cent of world electricity. Part of the problem is the dilute nature of wind and solar energy. Water-based systems have an energy intensity an order of magnitude higher but apart from hydro-electric power, the potential of tidal, tidal stream and wave power has hardly been tapped.

If the projection of the World Energy Council of 20 per cent of world energy as renewable energy by 2050 and the even more ambitious figure of 40 per cent given in a Shell scenario and the extremely challenging reduction of 60% in green house gas emissions called for by the Royal Commission on Environmental Pollution are to be achieved, more much political will and more resource will be needed to make it happen. Back sliding of the new American administration who are renegeing on their Kyoto commitments is not encouraging.

As for 10 per cent of UK electricity being renewable by 2010, a ten fold increase in wind will only provide a quarter of what is needed. To put this into perspective, if all the current world wind energy capacity were

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installed in the UK, perhaps on the South Downs, it would only provide 10% of **UK electricity!** Something on a far grander scale such as the Severn Barrage which would provide 7 per cent of UK electricity or imports of renewable electricity from abroad will be required.

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