

JEREMY LEGGETT

The future and renewable energy

*There are two reasons why society has to get out of oil, and at first look they seem contradictory. One: it is running out. Two: we cannot afford to burn it all, writes Jeremy Leggett**

This piece is the fourth and final curtain raiser to a pioneering multidisciplinary meeting being convened at the Geological and Royal Societies in October and November this year. Entitled Challenges and Solutions: UK energy to 2050, a two-day meeting at Burlington House will first attempt to look at all elements in the energy equation, and to produce answers - in a report to be published during a half-day event at the Royal Society one month later. For further details and a First Circular, please go to the Events Section of www.geolsoc.org.uk. All those attending the two-day session in Burlington House will be entitled to attend the public meeting in the Royal Society.

As almost every geologist knows, oil is running out because it is a finite resource¹. Much rests on when the 'topping-out point' - peak of production - will occur. Those who tell us it is far off include the US Department of Energy and most in the oil companies. Let's call them the 'late toppers'. They profess that some 2-2.7 trillion barrels of conventional oil are left in known deposits and predictable future discoveries. At the other end of the spectrum are the 'early toppers', such as the industry insiders in the Association for the Study of Peak Oil and Gas, who reckon on more like one trillion barrels. In a society that has allowed its economies to become almost inextricably geared to growing supplies of cheap oil, the difference is seismic.

If there are 2-2.7 trillion barrels left, the topping-out point lies relatively far away in the 2030s. The 'growing' and 'cheap' aspects of the oil supply equation are feasible until then, at least in principle, and we have time enough to prepare the alternatives that will follow the hydrocarbon age. If there are one trillion barrels left, the topping-out point is as close as 2008 plus or minus two years. The 'growing' and 'cheap' aspects of the equation then become impossible, and there is not enough time to make the transition from oil to alternatives. Economies cannot run without energy, and economic trauma lurks around the corner.

This way of looking at oil, of course, assumes that we can afford to go on burning it for as long as we find and pump it, and many geologists, most economists, and almost all financial analysts live in a culture that assumes this. Advocates of mass-exploitation of unconventional oil, in particular, need to be blind to all other possibilities. But they are wrong. We can't. The reason is global warming. If left unmitigated at source, global warming is also quite

capable of kicking us into the next depression, never mind its effect on ecosystems.

I do not have space to review the evidence for the early oil topping point here, or for the seriousness of global warming. I want to consider the core consequent question: can we progressively replace oil and the other fossil fuels at just the right urgent pace to avoid economic calamity as a result of oil shock, climate shock, or both?

Microcosms of energy innovation today show what could have been done to displace fossil-fuel use and cut emissions on a large scale since the 1990s. A notable example in the UK is Woking Borough Council, which has cut carbon dioxide emissions by 75% since 1990, via a hybrid energy system involving private wires, combined heat and power, solar PV and energy efficiency, plus or minus fuel cells and absorption chillers.² The UK Government's view today is that with this kind of approach 'we could achieve a virtually zero-carbon energy system in the long term ... this is technologically and economically feasible ...'.³ Just one member of the renewables family could contribute hugely to this goal: '... solar energy alone could meet world energy demand using less than 1% of land now under crops and pasture.'⁴

Based on encouraging early experiences like this, the more optimistic practitioners in the embryonic renewable energy industries believe our technologies - in strategic harness with energy-efficiency - could probably power and fuel the world in its entirety 10-20 years hence, given political will of the type directed at the war against terrorism. (And why not? As the British Government's chief scientist has said, the threat from global warming - an inspector-proven weapon of mass destruction - is far greater). But we couldn't plug the gap in four years. The grim reality seems to be that if the early toppers are correct, and the oil topping-out point indeed falls before 2010, the shortfall between expectation of oil supply and actual availability will be such that gas, renewables, liquids from gas and coal, or nuclear - in themselves or in any combination - will not be able to plug the gap in time to head off economic trauma.

We will be in big trouble - global warming or no global warming. Realisation that growing supplies of cheap oil are no longer available will descend at some point this decade, the alternatives will not be ready in sufficient volume, and the economic dominoes would begin to fall.

Some important corollaries fall out of the analysis. Amid the ruins of the old energy infrastructure, the oil depletion and global warming issues will conflate, as many try to turn *in extremis* to the world's vast coal reserves. Renewable energy use, alongside energy efficiency, will increasingly substitute for oil and gas, growing explosively whatever happens. Whether this growth will occur instead of coal expansion, rather than alongside it, will

determine if economies and ecosystems can survive the global warming threat.

However the future pans out, renewable energy plays a central role in it. But if the early toppers are right, we will be called upon rather soon to lead the charge for damage limitation amid economic dislocation.

At the Geological Society-led conference this October last year, representatives of the family of renewable energy industries will be putting over their views of how fast our technologies can lead the damage limitation and the hopeful renaissance beyond. Others will be putting the case for continuing with energy technologies and industries that are less kind to environment and society. Given events in and around Iraq, and the efforts in the UK to reheat nuclear power in a world wherein lawless statehood and terrorism alike are growing, it is difficult to imagine a more timely debate.

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Notes

1. Leggett, J. K. (ed.) *Global Warming: The Greenpeace Report*. Oxford University Press. 1990. See also *The Carbon War*. Penguin. 2000. www.carbonwar.co.uk
2. Jones, Allan. 'Woking: Local Sustainable Energy Community'. Presentation to Low Carbon Thames Gateway Conference. Barking, UK. 16 June 2004.
3. DEFRA press release, 4 February 2002, foreshadowing the UK Government's Energy White Paper.
4. Tony Blair, in his 2003 speech launching the Energy White Paper.