John Preedy Memorial Lecture, 16 November 1990

The Energy Alternative

By Walter C. Patterson

Once upon a time, Sellafield was called Windscale. Friends of the Earth had its London office in two modest rooms on the third floor of 9 Poland St, in the heart of Soho. I was FOE's first full·time energy campaigner: and like everyone else in the office I was paid £l700 a year. In January 1975 British Nuclear Fuels held a press conference at Windscale - the first since 1962. I came back from the press conference convinced that FOE had to challenge BNFL's plan to build an enormous new reprocessing plant to separate plutonium and ship it around the world by the tonne. My FOE colleagues agreed.

For more than three years, from January 1975 until May 1978, the Windscale campaign escalated, until it was dominating FOE's activities, in Poland Street and across the country. Those of us in Poland St were fortunate to have a small but courageous band of dedicated FOE colleagues actually on the spot, living and working in Cumbria, in the vicinity of Windscale. The FOE Cumbria local group people were in the front line, and had to withstand the obloquy and the sometimes vindictive attacks of their immediate neighbours, many of whom of course worked for BNFL. I can't now recall when I first met John Preedy; but I'm pretty sure it will have been over a pint or two of Hartley's in one of the hostelries we frequented during our sorties into the front line. Although our paths crossed only briefly and tangentially, I regarded John very much as an engaging friend and a dedicated colleague; the news of his death in 1983 stunned and saddened me.

As it happens, John and I had a mutual interest quite distinct from Windscale. For the first year after I joined the FOE staff in Poland St in 1972, I was FOE's garbage expert. My first published work for FOE grew out of the Schweppes campaign against non-returnable bottles. It was a report called called *Packaging In Britain: A Policy for Containment*. When John set up Britain's first bottle-recovery scheme in Whitehaven, I was among the many rooting for him. But he also took up the cudgels against BNFL, and had more success than we did over the THORP reprocessing plant. After the Windscale inquiry of 1977 and the Parker report in March 1978, THORP got the government go-ahead in May 1978 - from, as it happens, Tony Benn. But when BNFL applied to extract process water from Ennerdale in the adjoining Lake District, John added his voice to those opposed, and BNFL was refused permission. I think John would be pleased to know that we still have THORP in our sights. Twelve years after the go-ahead the plant is still at least three years from start-up: and an article in the current issue of the *Financial Times* newsletter *Power In Europe* makes clear that THORP's future looks more doubtful by the week, as customers back away from its rocketing costs and alarming consequences.

THORP, indeed, is almost the last of FOE's old nuclear targets left to hit. When the FOE energy campaign began in October 1973, it focused on challenging the Central Electricity Generating Board, who revealed in December 1973 that they planned to order not one, not two but 32 - count them, 32 - 1300MW Westinghouse pressurized-water reactors by 1982. In 1975 the Atomic Energy Authority told the Royal Commission on Environmental Pollution not only that they could foresee having 104 000 MW of nuclear plant in operation in Britain by the year 2000 - but that 33 000 MW would be plutonium-fueled fast breeder reactors. The fast breeder reactor programme was for nearly 20 years the centrepiece of what passed for British energy policy. It was a bottomless pit for energy research and development funds and the putative reason for separating plutonium at Windscale/

Sellafield. In the summer of 1988, despite Mrs Thatcher's enthusiasm for plutonium, the government had to terminate the programme. A year ago last Friday the government was also forced to terminate the PWR programme. This evening, only one half-finished PWR survives, at Sizewell B - and the CBGB itself is no more. THORP at Sellafield may well be completed, eventually. But the day BNFL starts up the plant, and contaminates it once and for all with high-level radioactivity, it will become a staggering liability for ultimate decommissioning. I have been convinced since the 1970s that THORP will never operate; today my conviction is stronger than ever.

However, a corollary of FOE faith dates back to our early days in Poland St. We had to spend a disproportionate amount of time firefighting, trying to keep the authorities from doing something dangerous or just stupid. But we always tried simultaneously to advocate what we considered more sensible activities. We were never satisfied just to say 'Don't do that': we always tried to say 'Do this instead'. In 1975-76 the old House of Commons Select Committee on Science and Technology held hearings on what they called 'alternative sources of energy'. Czech Conroy and I drafted FOE's evidence to the Committee, and appeared before them on 26 May 1976. Earlier this week, while preparing for this evening, I dug out the old Committee report, including our memorandum and the transcript of our appearance; and I was startled and delighted to find that we had entitled our memorandum 'Energy Alternatives and Energy Policy'. I had no idea that I had been using the phrase 'energy alternative' - as distinct from 'alternative energy' - so long ago. As I hope to explain this evening, the distinction is fundamental.

Rereading what we wrote then from the new postnuclear perspective of 1990, it is hard to believe how overwhelmingly dominant the nuclear cheerleaders were in 1976 and indeed for many years thereafter. What we said in our evidence in 1976 stands up pretty well in 1990; but it was still mainly firefighting against the more ludicrous official nuclear proposals. The first really practical positive steps in FOE's energy campaign actually started with the local groups. While we in Poland St were arm wrestling with the nuclear bruisers, FOE Durham, and thereafter a rolling tide of other local FOE groups, launched a programme in which FOE people offered to insulate the lofts of pensioners and others less well off. FOE groups took on semi-volunteers, sometimes paid a pittance from government support funds, got insulating material sometimes at advantageous prices from local concerns, and made such a success of the enterprise that the Department of the Environment in 1978 sent out a circular endorsing the FOE effort, and commending it in the House of Commons.

Since that time, however, official interest in improved insulation - and official funding, of every kind - has steadily waned: and the thermal performance of Britain's building stock remains far below that of many other industrial countries, and far below its real economic potential. In April 1990 new Building Regulations came into force: the standards they set for new buildings are about equivalent to those which were in effect in Sweden 50 years ago. As to existing buildings, let me tell you a little story. I grew up in a city in Canada called Winnipeg. In Winnipeg we always took for granted that in any twelve-month period the outdoor temperature would vary over at least 130 Fahrenheit degrees: we'd have some days of 95 degrees above zero, and some of 35 below. When I came to London in 1960, I could not believe the buildings. If you picked up a typical British home and dropped it into Winnipeg in mid-winter, the occupants would freeze to death in a matter of days, even with heaters running flat-out - because the heat in a typical British building barely slows down before it has leaked out through roof, walls, windows and floors.

When I first came to London I lived in a bed-sitter in Bayswater, and had the use of a bathroom that had been built in a sort of greenhouse over the front door, between the second and third floors. The boiler was in the basement. The hot water pipe ran up the outside wall; and not only was it not insulated, it was painted black - the best possible colour to radiate heat away. Even in high summer

the bathwater was never more than tepid; and in winter it usually froze solid. As a physicist, I could not understand why they even bothered with an arrangement so futile. But the example is all too typical of the energy thinking that has shaped Britain‘s building stock. Even in the 1990s it remains an energy and environmental liability, and indeed a disgrace.

The real potential for improvement was spelt out as long ago as 1979, in a landmark study by Gerald Leach and his colleagues, called *A Low-Energy Strategy for the United Kingdom*. Gerry was an old friend and sparring partner of the FOE energy campaign, and his report was stunning. Unlike previous 'alternative' studies, it took as a premise the official projections for economic growth, and assumed a steady increase in the material well-being of all Britons. Leach emphasized that the study entailed no 'hair-shirt' assumptions - on the contrary, homes would be warmer, baths more frequent and appliances more generally available. The Leach study even accepted that car and air transport would increase as official studies assumed, while noting parenthetically that this might not be an especially attractive idea. Even with these assumptions, taking the issue right into the government‘s own backyard, Leach and his colleagues showed that by 2025 Britain could enjoy material well-being as traditionally defined, while using not more but substantially LESS fuel and electricity · at least 8 per cent less, and potentially down to 22 per cent less. Leach's findings were soon echoed by similar studies right across the industrial world: and they sent a tremor through traditional energy thinking.

Traditionally, so-called 'energy planning' was nothing of the kind. It was directed exclusively to planning future investments in new fuel and electricity supplies like coal mines, oilfields, gas pipelines and power stations. Immediately after the OPEC oil shock of 1973, fuel and electricity suppliers subverted the perfectly good word 'energy' and began using it to mean 'fuels and electricity'. But fuels and electricity are not 'energy'; they are just carriers of energy. Fuel and electricity suppliers began talking about 'energy supply' instead of fuel or electricity supply. They paid little attention to how the fuel or electricity was used, or for what actual purpose.

Instead they talked about 'energy demand', in terms of averages and aggregates across entire societies. They assumed that this so-called 'energy demand' arose as a necessary corollary of economic growth. They assumed that 'energy demand' was beyond the influence of 'energy policy' except through fuel and electricity prices; and they extrapolated these aggregates and averages to deduce that 'energy demand' - by which they meant the use of fuels and electricity - would continue to increase more or less in step with economic growth. They even talked about 'energy production', 'energy consumption' and 'energy conservation'; indeed they still do. Every time I hear them, I, as a physicist, cringe and grit my teeth. Probably the best known of all the laws of physics is the law of conservation of energy: in any natural process whatever, energy is neither created nor destroyed. Energy is NEVER produced. Energy is NEVER consumed. It is changed from one form to another, but it is ALWAYS conserved. This point is not mere pedantry; because what the policy people really mean is FUEL conservation - that is, using less coal, or oil, or gas, for instance. That is quite a different matter, for one key reason.

That reason is crucial, and startlingly simple. NO ONE WANTS ENERGY. For that matter, no one - neither you, nor I, nor anyone else · wants coal, or oil, or gas, or electricity. Think about it. What we want is COMFORT, no matter what the weather: and ILLUMINATION if the sun isn‘t bright enough: and COOKED FOOD. We want to exert forces and move heavy weights, and to get from place to place quickly and conveniently. What we want is ENERGY SERVICES. We get these services from HARDWARE like buildings, lamps, appliances, industrial plant and vehicles. If we make the HARDWARE better, it will provide the same or better services while using much less fuel or electricity - indeed, in the case of comfortable buildings, possibly no fuel or electricity at all.

This is the key to the energy alternative. It is not just a technological shopping list, not just a new catalogue of so-called 'alternative energy sources'. The energy alternative is a new way to THINK about energy — not in terms of fuels and electricity, but in terms of ENERGY SERVICES and the hardware that provides them. In the past fifteen years, many analysts in many places have compiled a vast array of data on how we use energy to provide services, on the hardware we use and how we can improve it. Many examples in many countries demonstrate the abundance of options available and already in use. Two I would recommend in particular are *Energy for a Sustainable World*, edited by Jose Goldemberg et al., and *Electricity: Efficient End-use and New Generating Technologies, and their Planning Implications*, edited by Thomas Johansson et al.

Gerald Leach is now working for the Stockholm Environment Institute in preparation for the United Nations Conference, sometimes called Stockholm Plus 20, to take place in Brazil in 1992. Earlier this year he and a Polish colleague published a study analyzing the potential for reducing CO2 emissions from energy use in Britain and Poland. According to their report, 'The broad conclusion for the UK is that the technical potential exists to exceed a 20% reduction target for 2005 by a substantial margin, even with considerable growth in the economy and energy-related material living standards. 'The assumptions we have made for the Policy Scenario, which achieves a 22% CO2 reduction compared to 1987, are by no means extreme in the technical sense or in the rate and extent to which cleaner and more efficient technologies are deployed. Virtually all the assumed technical improvements are economic, or highly so. They reduce consumer costs or increase the profitability of firms, often by large amounts...'

Unfortunately, however, official UK energy policy is to have NO policy: except of course to persist in pursuing the nuclear fantasy, which bends everything else out of shape - as witness the misshapen mess of electricity privatization. Earlier this month, while rummaging through my archives, I turned up the very first article I had published about an environmental issue - nuclear waste. The article was published in the summer of 1970 - 20 years ago; and in it I noted in passing that carbon dioxide from fossil fuels might prove to be a problem. The greenhouse issue is NOT a new issue; it has merely taken the politicians a long time to notice it. Even the UK government's own Building Research Establishment earlier this year published a report showing that straightforward improvements to building insulation could cut the carbon dioxide emissions associated with keeping Britain comfortable by more than 25 per cent in l0 years. But the government says it can only 'stabilize' emissions - get back to current levels after an increase - by the year 2005: after which presumably emissions will increase again, as our 'great car economy' - Mrs Thatcher's mind-boggling phrase - gets ever farther out of control.

This is nonsense on stilts. The government simply can't be bothered to clean up its act, and ours. More than a year ago FOE published a brisk document entitled 'Getting out of the Greenhouse': it's worth revisiting, eminently sensible and practical policy proposals that any government could readily adopt, if it took energy seriously. Our current government simply does not. Take a really simple and obvious measure: our European partners have proposed that all appliances be labelled with their efficiency, according to the sort of standard tests now routinely used in the US and on the Continent. Our government has just rejected the proposal, presumably to protect those manufacturers who can't be bothered to improve their designs, against competition from better products, a curious interpretation of the 'free market' ideology allegedly espoused. The US and other European countries even ban the sale of appliances below a certain minimum efficiency; ours of course does not.

Why does our government not at least set an example for improving end-use efficiency? What about upgrading the thermal performance of the government's own buildings - tens of thousands of them, not just offices all over the country, but schools, hospitals, research establishments, military establishments and prisons? And why not stipulate that all incandescent bulbs in government buildings be replaced by compact fluorescent bulbs? If you have tried to find one of these, you know that it is usually stacked on a top shelf at the back of the shop, covered in cobwebs, with a price sticker calculated to deter anyone who actually spots it. The problem is that the compact fluorescents are made by the same companies whose business is based on traditional incandescent bulbs that burn out every few weeks. Compact fluorescents, by contrast, last for five years or more, and use only about one-fifth as much electricity to deliver even better light, soft and warm and pleasing. My wife and I finally found a supplier - another old FOE person, as it happens - who will sell compact fluorescents at a reasonable rather than exorbitant markup. We converted all our household lighting to compact fluorescents, at a cost that was not insignificant; but when we got our next electricity bill, about a month ago, it was only about half of what it had been the same time the previous year. The investment will pay off even at current prices; but it could be much easier. Why doesn't the government invite lamp manufacturers to tender for compact fluorescents for all government premises? Government orders would stimulate the market, prompt the manufacturers to tool up and bring down unit costs for all purchasers. They would also save taxpayers a great deal of money.

At present you pay no VAT on fuel or electricity, but pay full rate on efficient hardware - and the more fuel or electricity you use, the lower rate you pay. Again and again, the system is distorted in favour of increasing supply and against improving end-use efficiency.

What about transport? Forget the 'great car economy', with its congestion, noise and pollution. Let’s abolish all tax relief on company cars, that curious and unique British anomaly. Let the 'great car' pay its real costs — and I'll bet we see a switch to company bicycles.

All this would be entirely feasible, would improve our energy services, would stimulate employment, manufacturing and exports, would strengthen Britain's economy, would benefit the British environment and those of us who live in it, and would set a leading example for the rest of the world.

Why are we not doing it? Whenever the question of reducing environmental impact arises, we hear urgent warnings about the 'costs' that will arise. To be sure, improving the efficiency and environmental acceptability of end-use hardware will cost impressive sums of money. But the money spent will not vanish; it will be paid to those who design, manufacture, install and maintain the improved hardware. Far from representing a burden to an economy, the move toward higher efficiency may well stimulate industrial activity and increase economic well-being. The real significance of the 'cost' argument is different. It means that some of the economic and political power and influence of traditional fuel and electricity suppliers will be transferred away from them to other sectors of society: and these suppliers do not like the idea one bit.

When my book *The Energy Alternative* was published in July, I wrote an article for the *Guardian* newspaper: and I began it with a little catechism:

Q: What do the US, the Soviet Union, China and Saudi Arabia have in common?

A: In June in Geneva they joined forces to oppose plans to reduce carbon dioxide emissions.

Q: what else do these countries have in common?

A: They are the world's four largest oil producers. The first three are also the world's largest coal producers.

No further questions, Your Honour.

We have just seen the same process at work in Geneva again, with the US and the Soviet Union rejecting calls to adopt targets for reducing carbon dioxide emissions. I do not for one moment want to minimize the problem this represents; but I do want to see the problem accurately described. Improving end-use efficiency and reducing environmental impact does not create some vague 'black hole' of unrewarded cost imposed on society as a whole. It entails rather a power struggle between different sectors of global society, and it should be acknowledged as such.

Reducing carbon dioxide emissions means using less fossil fuel; and the fuel suppliers do not like this idea at all. The same applies to traditional electricity suppliers when they contemplate increasing the efficiency of electricity use. The government threw out a House of Lords amendment to the Electricity Act, proposed by FOE and colleagues, that would have included an explicit duty on the companies to foster efficiency. Only weeks ago FOE issued a warning that the profits of the privatized companies in Britain could nevertheless fall as a consequence of improved efficiency. In the US, however, electrical utilities are taking advantage of the opportunities. Many leading utilities have already begun a metamorphosis, turning themselves from electricity suppliers into energy service companies. Under a discipline called 'least-cost planning' - of which the prime mover was my old friend and Poland St colleague Amory Lovins - a utility offers to go into a customer's premises and install high efficiency lighting, heating, and air conditioning and even thermal insulation. The regulator allows the utility to recover its investment in the customer's premises by charging a higher rate for electricity; but the improved hardware uses so much less electricity that the customer's actual bill is lower. The customer gets the same or better energy services at lower cost; the utility gets a more rapid and reliable return on end-use investment than it would on new generating plant; and the environment benefits because less fuel is used, producing less emissions and toxic waste.

Governments like to blame you and me for not doing more to improve efficiency. This will not do. Moving over to the energy alternative is not simply up to you and me as individuals, because the traditional energy system is loaded against us. Governments are blaming us to distract attention from their own lack of political courage in confronting the traditional power and influence of the fuel and electricity suppliers. We must be clear what our energy problem really is. It is not technical nor economic but political. The alternative is there if we want it. What we need is a democratically elected government that genuinely wants to change the ground-rules - taxation, regulation, laws and standards - that determine the way we use energy to provide services. Changing such ground-rules appropriately is the normal responsibility of a democratically elected government. If we want to move to the energy alternative, insulating our own lofts and switching our houses to compact fluorescents will not suffice. We need to elect a government that accepts its true responsibilities for energy and the environment. The greenest thing you can do in the near future is to cast the right vote.

The overriding priority for at least the next decade is improving our end-use efficiency. If we do so, we shall find that supplying the fuels and electricity we still need will be at once much easier and much more environmentally acceptable. As I have described in *The Energy Alternative*, the range of options is vast and growing, including advanced combustion technologies and all the variety of

so-called 'renewables‘. If we get the next decade right, the prospects thereafter - not just in Britain but worldwide - will look much brighter.

Since its inception FOE has been working to change the world for the better; and its track record is already impressive. FOE’s energy campaign has been promoting the energy alternative for two decades. Can we actually change the way the world works? I believe that we can and that we must. LET'S DO IT.