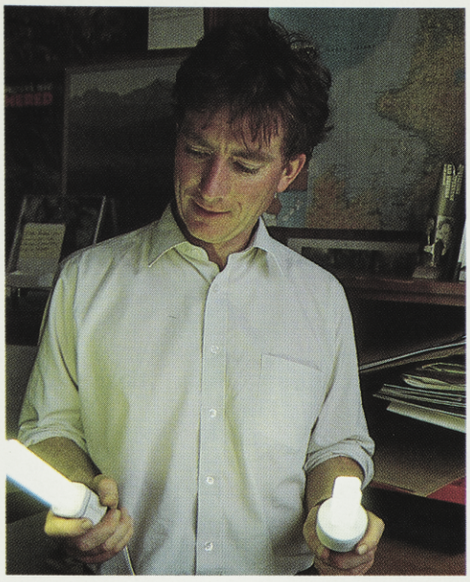

Author Bill Brander with energy efficient light bulbs. The price of the bulbs at approximately $50 each is prohibitive, but would fall if there was sufficient demand.

Energy suppliers, however, are generally too impatient to pick out lobster from the menu; they go for the biggest fish (dams and coal-fired power stations) only, and eat them whole. One answer favoured by American electricity regulators is for central government to require authorities to implement all cost-effective conservation options before starting to build new power stations. In response, one company, [Southern California Edison], simply gave away efficient light bulbs and other power savings equipment, to save the administration cost of loans schemes. This was cheaper than burning fuel in existing power stations, and so saved money for both the company and the consumer.

In deregulated and supposedly competitive New Zealand, a different approach is more politically acceptable. Independent businesses can buy the cheapest conservation options and re-sell them in competition with electricity suppliers. Indeed electrical supply authorities can and should invade their rivals' territories and buy negawatts from the most wasteful users, and resell them at a profit. Gas companies could play the same game to undercut the profitability of their electricity-selling rivals.

Best of all, New Zealand's energy efficient/greenhouse abatement campaign, "Climate for Change", could fund itself by direct selling of energy-efficient equipment, thus abating fossil fuel use directly, and eating into electricity sales (and expansionist power planning) at the same time.

At the moment, such opportunities are suppressed by pricing behaviour which amounts to predatory pricing: wherever electricity sales are at risk, suppliers tend to charge high "supply charges" for connecting a consumer to the grid, and set per-kilowatt-hour charges just below those of the nearest competing fuel. Furthermore the retail shops owned by power boards do not sell the best efficiency options: recent inquiries to two such shops disclosed that one salesperson never heard of miniature fluorescent bulbs, and the other said they were not carried because "there was no demand for them".

All that may be needed is vigorous enforcement of the Commerce Act, brought about by a strong campaign backed by conservationists and small business interests alike. Heavy regulation, whether to limit carbon emissions or charge taxes to penalise such emissions, may be needed only as a last resort if competition is successfully evaded by energy suppliers.

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GLOBAL TRENDS IN ENERGY USE

OIL, COAL AND NATURAL GAS supply 88 percent of world fuel consumption. The use of these fuels became the burning environmental issue of the 1980s. Even without acid rain and climate change, world economic order is threatened by the imminent depletion of our oil and natural gas reserves. Coal is more abundant, but less versatile, and because of its higher carbon content makes a greater contribution to the greenhouse effect per unit of energy produced.

Most of the world's fuel consumption occurs in the developed nations. The USA alone uses 24 percent of the world's fuel. Its average per capita consumption is 50 times that of the poorest nations.

If the projected world population in 35 year's time were to have an average per capita energy use equal to the industrialised nations today, world consumption would grow to over 5 times present levels. Such a world would require the oil output of at least three new Saudi Arabias, massive increases in coal production, and hundreds of nuclear power stations the size of Huntly. Even if this growth is logistically feasible using the current mix of supply technologies, it would shatter the world economy and ecological support systems.

One may well ask whether, without massive reductions in the material wealth of the rich, there is any possibility of a better living standard for the world's poor. Fortunately there is. Instead of focusing on supply we can look at what causes our appetite for energy.

The impact on the biosphere of world energy use depends on the product of 5 equally important factors:

- World population
- The stock of material possessions per person
- The throughput of resources to maintain these possessions
- The amount of energy to produce this throughput
- The environmental impact per unit of energy used

The factors at the top of this list involve very important social decisions while those toward the bottom are very strong functions of technology.

While the world must face these decisions, use of the right technology can buy time. A number of studies have shown that per capita energy use in the industrialised countries could be more than halved without cutting living standards and using technologies which are cost-effective. At the same time the living standards in developing countries could be raised to those in Western Europe. Even with the projected world population growth, energy use in the year 2020 would be not more than 10 percent above present levels.

This is not just theoretical. Japan used 6 percent less energy in 1988 than it did in 1973 even though its GDP grew by 46 percent over the 15 years. The savings have further sharpened Japan's commercial edge. As a result of its lower energy intensity (the amount of energy to produce a dollar of GDP) Japanese exports are estimated to be 2 percent cheaper than American ones.

Clearly both the responsibility and capability for limiting climate change and slowing resource depletion lies with the developed nations. Indeed the concept of sustainable energy use is meaningless for those in the world on the edge of starvation.

Change involves action at every level. It is now in the interests of developed nations to transfer efficient technology to the developing world. These countries have a low per capita fuel consumption, but because of their low efficiency, their economies are more energy-intensive than the wealthy nations. Unless they leapfrog the energy intensive phase of development, climate change and rapid resource depletion seem inevitable. At the national level governments need to remove barriers like information and market distortions which prevent efficiency competing on equal terms with supply. Local authorities need to examine ways to make cities more accessible without reliance on massive quantities of liquid fuel. Energy institutions need to sell their customers efficiency rather than more supply. Consumers need to link their desire for a sustainable future to the goods they purchase and their own use of energy.

Delaying action could be catastrophic. The US Environmental Protection Agency estimates that, if responses to global climate change are delayed until the year 2010, then the long term global temperature rise could increase by 30-40 percent.