1. Energy Alternatives for Japan

Like most industrial nations, Japan depends on imported oil, gas and coal for a large proportion of its energy needs. This is bad for the nation's security, as the oil crisis of 1973 demonstrated very clearly. It is also bad for the environment: the burning of fossil fuels causes air pollution, acid rain and global warming.

In the 1960s, Japan's leaders turned to a new, powerful source of energy which promised to end their dependence on fossil fuels and contribute to rapid industrial growth. Atomic power stations were built in rapid succession, and

eventually gained a 30% share of national electricity generation, with a total yearly output now exceeded only by the US and France. The long-term goal was to raise the share of atomic energy to 60%, but that now appears very unlikely. Events such as the near-meltdown of a reactor at Three Mile Island in the US in 1979 and the disastrous explosion of another at Chernobyl, Ukraine, seven years later, have made people aware of the inherent dangers of nuclear power generation. Assurances that nothing similar could happen in Japan lost all credibility after a series of accidents, emergency shut-downs, cover-ups and revelations of falsified data, culminating in the fatal Tokaimura disaster of September 1999. In the face of bitter public opposition to the construction of new atomic power plants, electric power companies are starting to look for viable alternatives.

For a nation whose technological achievements are the envy of the rest of the world, it should not be hard to replace dirty old thermal power stations and dangerous nuclear reactors with safe, clean, renewable sources of energy. However, so far there has been almost no progress in this direction. Energy from wind is now cheaper than that provided by burning oil or uranium; yet Japan gets less than 0.05% of its energy from this source, compared to Denmark's 10%. Japan has an abundance of underground heat, the source of her many hot springs, but so far only two geothermal power stations have been built, one at Yanaizu, Fukushima Prefecture, and the other at Hatchobaru, in Kyushu. If every public and private building in Japan installed rooftop solar energy panels linked to the local power network, nuclear power could be phased out; yet last

year there were fewer than 15,000 homes and businesses with such links. A great deal of energy could be obtained from the sea, by harnessing the energy produced by waves, underwater currents and tidal flows; but at present, the vast marine energy resources around this island nation are completely ignored. In 1998, a factory in Texas owned by Toshiba began using fuel cells to provide power for its computers, telephones, air-conditioners and security system; but the technology has yet to catch on in Japan.

Why are Japan's energy policymakers so slow to embrace renewable energy resources? One possible explanation is their inability to think small-scale, to recognize the merits of a system in which power is produced locally to meet local needs, with individual factories, hospitals, schools and even homes generating their own energy. While they grudgingly admit that local generation is cost-effective for isolated communities, they refuse to accept that even large cities can be self-sufficient in energy, through the use of solar energy, fuel cells and state-of-the-art architecture. A more cynical explanation is that there are powerful vested interests involved: those of the oil, gas, coal and nuclear power industries, which regard alternative energy resources as a threat to their cozy profits. Instead of resisting new technology, they should be developing it themselves. Renewable energy systems are part of a new, fast-growing industry in which there are huge profits to be made, as two of the world's largest oil companies—BP and Royal Dutch Shell—have realized.

In 1997, Kyoto played host to an international conference on climate change, at which the government of Japan made a commitment to reduce emissions of greenhouse