

Energy efficiency is about doing th

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THE evidence for global warming is now so strong that few people challenge it.

It is clear that a swift and decisive global response is required to reduce the risk of large and unpredictable environmental, economic and social consequences.

Such a response must include measures for greenhouse gas emission reductions in the near term (the next decade), as well as clear strategies for achieving deep cuts of 50-80 per cent in the long term. Near-term reductions can most easily and cheaply be achieved using energy efficiency measures. Long-term reductions can be realised chiefly using various alternative methods of generating energy, and electricity in particular. There are cogent reasons why solar energy should form a large part of our future energy mix.

Measures to reduce greenhouse gas emissions in the near term are essential in order to stabilise greenhouse gas concentrations at acceptable levels. Particularly important is the need to minimise the building of new coal-fired power stations across the globe, since such power stations typically have a lifetime in excess of three decades, and will therefore continue to pollute for a long time to come. Energy efficiency measures offer the best possibility of achieving greenhouse gas reductions in the near term. Such measures can include improving the design of new and existing commercial and residential buildings to minimise heating and cooling requirements; solar water and solar air heaters; energy efficient

appliances and lighting; fuel efficient cars; a shift to public transport; and substitution of energy-intensive products with less energy intensive ones. Many of these measures have a negative net cost (the initial outlay is repaid by the savings within a few years), require no technological breakthroughs, can be rapidly adopted and result in improved comfort levels and quality of life. Energy efficiency is about doing things better, not doing without.

In the longer term, new methods of generating energy, and particularly electricity, will need to replace current coal-fired power stations. A long-term strategy should focus on those technologies which best meet the following criteria: potential to supply a large fraction of the world's energy requirements over a long period of time; potential for low cost; high probability of success (low technical risk); low social, environmental and health impacts; and low risk of diversion to military or terrorist ends. When the issue of global energy supply is considered in this way, solar energy technologies stand out as the best option. The global solar resource is vastly more than sufficient to meet our energy needs now and in the future. With the appropriate support, solar energy can supply most of the world's electricity needs by 2050, and can do so cleanly, cheaply and safely.

Photovoltaics, solar heat and wind energy are the only renewable energy technologies in sight that can provide very large quantities of sustainable energy with high (20 per cent) overall efficiency in order to limit land use requirements. These conversion technologies have small environ-



NEW-AGE: This paper-thin solar cell can be attached to everything from mobile phones to ca

mental impacts and insignificant military applications. In some countries biomass may also make a substantial contribution to energy supply, despite low conversion efficiency (0.5 per cent). The key to successful mass-utilisation of solar energy is diversity.

The solar energy mix will vary from region to region.

Photovoltaics — the direct conversion of sunlight to electricity using solar cells — is a particularly promising technology.

An important attribute of photovoltaics is its scalability — solar

cells and modules can be used to generate tiny amounts of power in calculators, or gigawatts in solar power farms. This scalability allows them to be installed on house roofs where they are visually unobtrusive. Solar cells have no moving parts, generate no noise and are highly reliable — a 20-year warranty on a photovoltaic module is standard.

The photovoltaic industry has grown rapidly, at an average rate of 23 per cent a year over the past 15 years. This growth rate is accelerating and reached 65 per cent in 2004. Current worldwide photovoltaic

