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## Energy conservation

# Not such a bright idea

## Making lighting more efficient could increase energy u

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SOLID-STATE lighting, the latest idea to brighten up the world while saving the planet, promises illumination for a fraction of the energy used by incandescent or fluorescent bulbs. A win all round then: lower electricity bills and (since lighting consumes 6.5% of the world's energy supply) less climate-changing carbon dioxide belching from power stations.

Well, no. Not if history is any guide. Solid-state lamps, which use souped-up versions of the light-emitting diodes that shine from the faces of digital clocks and flash irritatingly on the front panel of audio and video equipment, will indeed make lighting better. But precedent suggests that this will serve merely to increase the demand for light. The consequence may not be just more light for the same amount of energy, but an actual increase in energy consumption, rather than the decrease hoped for by those promoting new forms of lighting.

The light perceived by the human eye is measured in units called lumen-hours. This is about the amount produced by burning a candle for an hour. In 1700 a typical Briton consumed 580 lumen-hours from candles, wood and oil. Today, burning electric lights, he uses almost 100,000 times as much. Better technology has stimulated energy being purchased for conversion into light.

That, at least, is the conclusion of a study published in the *Journal* by Jeff Tsao of Sandia National Laboratories in New Mexico and f

the introduction of solid-state lighting could increase the consumption within two decades.

To work out what solid-state lighting would do to the use of light, colleagues made some assumptions about global economic output, the efficiency of the new technology and its cost. Assuming that, by 2020, LEDs are about three times more efficient than fluorescent ones and that electricity is the same in real terms, the number of megalumen-hours consumed worldwide according to their model, rise tenfold, from 20 to 202. The amount of electricity to generate that light would more than double. Only if the price of electricity and the amount of electricity used to generate light start to fall by 2020

Dr Tsao and his colleagues see no immediate end to this process. The supply of light stimulates the desire for more—rather as the constant environmental *bête noire*, roads, stimulates the growth of traffic. Homes and workplaces are typically lit at only a tenth of the brightness of an overcast day, so there is plenty of room for improvement. And many people would prefer to be bright at night remain dark because of the expense. Some parts of the outdoors might be illuminated at night to be a

It is worth remembering that when gas lights replaced candles a century ago, some newspapers reported that they were “glaring” and “dazzling.” At the time, gas gave off about as much light as a 25 watt incandescent bulb that is well on the dim side. So, for those who truly wish to reduce energy expended on lighting the answer may not be to ban old-fashioned incandescent current trend, but to make them compulsory.

Science and Technology

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