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## Lighting up the world

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**The greatest impact of LED-based lighting could be in developing countries, where it can be powered by batteries or solar panels**



**MightyLight shines bright**

WHILE trekking in Nepal in 1997, Dave Irvine-Halliday was struck by the plight of rural villagers having to rely on smelly, dim and dangerous kerosene lanterns to light their homes. Hoping to make a difference, Dr Irvine-Halliday, a professor of electrical engineering at the University of Calgary in Canada, founded the Light Up The World Foundation. The non-profit organisation has since helped to distribute low-power, white light-emitting diodes (LEDs), at low cost or free, to thousands of people around the globe.

About 1.6 billion people worldwide are without access to electricity and have to rely on fuel-based sources for lighting. But burning fuel is not only extremely expensive—\$40 billion is spent on off-the-grid lighting in developing countries a year—it is also highly inefficient and contributes to indoor air pollution and the emission of greenhouse gases. If people switched from using fuel-based lamps to solar-powered LEDs, carbon-dioxide emissions could be reduced by up to 190m tonnes per year, reckons Evan Mills, a staff scientist at America's Lawrence Berkeley National Laboratory. That is equivalent to one-third of Britain's annual carbon-dioxide emissions.

LEDs are an ideal off-the-grid light source because they need so little power. They can be run on AA batteries, or batteries recharged using small solar arrays. Compared with kerosene lanterns, LEDs can deliver up to 100 times more useful light to a task, besides being extremely long-lasting. All this adds up to a life-changing impact for the lamps' owners, ranging from increased work productivity, more time to study at night and reduced health problems and fire hazards.

Several firms are getting ready to tap into this underserved market. Cosmos Ignite Innovations, a spin-out from Stanford University that is now based in New Delhi, India, has developed the MightyLight, a solar-powered LED-based lamp that is waterproof, portable and runs for up to 12 hours. So far, Cosmos has sold nearly 5,000 of its \$50 lamps to various charities.

Another company, Better Energy Systems of Berkeley, California, is testing LED add-ons that might work well with its Solio, a portable solar array that can also be used to charge mobile phones and other devices.

The International Finance Corporation (IFC), the private-sector investment arm of the World Bank, recently secured \$5.4m in financing for "Lighting the Bottom of the Pyramid", a four-year initiative that will engage lighting manufacturers with pilot projects in Kenya and Ghana.

One task is to make LEDs affordable, says Dr Mills, who is a consultant on the IFC project. Households in rural Kenya, for example, spend an average of \$7 a month on kerosene for lighting. Although the cost of a solar-powered LED lamp over its lifetime is much less than the cumulative cost of fuel, many people cannot afford the initial \$25 to \$50 outlay for such a lamp. If that hitch could be ironed out—via microfinance, perhaps—the payoff could be bright.