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A BRIGHT FUTURE FOR SOLAR POWER

The proposal passed February by the US House of Representatives to redirect tax breaks from the fossil fuel industry to renewable energy companies could give solar power a much-needed boost.

Already threatened with a White House veto, the measure, which now heads to the Senate, would eliminate incentives for the world's five biggest oil companies, using the revenue to extend tax breaks for the wind and solar energy industries. Experts say the US\$18 billion package would prevent the loss of crucial jobs and investments from the fast-growing — and promising — alternative energy sector. In doing so, it would pave the way for the large-scale deployment of solar power — among the most promising of renewable energy technologies, if futurologist Raymond Kurzweil's predictions are anything to go by.

Kurzweil and other solar enthusiasts say that the sun, which provides the Earth with more energy per hour than the entire population uses in a year, could eventually meet 100 percent of our energy needs. Yet solar power currently accounts for less than 0.1 percent of energy produced worldwide. The large discrepancy between the sun's potential and realized use is the result of numerous obstacles, not least of which is the technology required to capture its golden rays, convert them to a usable form and store the energy effectively.

Currently, around 90 percent of solar panels on the market are made from silicon cells, reaching at best 15–20 percent efficiency. But several emerging technologies in chemistry, materials science and solid-state physics now look set to change the status quo. One example is the use of nano-sized semiconductor particles called quantum dots (*Science* **319**, 718–720; 2008), which, together with special lenses and mirrors to concentrate sunlight, could boost the theoretical efficiency of solar cells to 80 percent. And as buildings become more energy efficient, achieving the dream of a sun-fueled planet looks increasingly plausible.

Even more burdensome than the need for technological know-how, however, is the cost of generating energy from the sun. At higher efficiencies, solar cells become prohibitively expensive to produce. And none of the existing technologies bring the cost of producing electricity low enough to compete directly with coal, gas, wind or nuclear. This, too, looks set to change, however; experts predict that with economies of scale, prices will plunge fivefold by 2015, putting the cost of solar energy on a par with that of coal.

And unlike other renewable energy options such as wind, solar has the trump card of public support, with 27 percent of Americans choosing it above others as the energy source likely to be used most in 15 years' time (*New York Times* 16 July 2007; http://www.nytimes.com/2007/07/16/business/16solar.html?_r=1&oref=slogin). Yet until now, political support for this budding energy source has not matched the public's enthusiasm. If the bill to boost renewable energy gets the go-ahead from the US administration, it could remove one of the remaining impediments to using the sun as a significant source of energy, bringing Kurzweil's predictions that much closer to reality.

OLIVE HEFFERNAN, EDITOR

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