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SUSTAINABLE DEVELOPMENT; SHINE ON.

BP made a profit on its solar business last year and the world solar market is growing by 40% a year. But while momentum behind the business is building, the economics of solar power generation continue to depend on state support, reports James Gavin.

Solar power has been around far longer than people have been aware of climate change. Yet only recently have people begun talking about tipping points for a technology whose resource is the most abundant form of energy there is - the sun. Advocates see solar as standing on the verge of mass commercialisation.

BP Solar, they say, offers proof - last year, the BP subsidiary, a leading solar-power company, made a profit for the first time. Furthermore, last year, the share prices of the world's 24 publicly traded solar companies rose by an average of almost 185%.

Solar photovoltaic (PV) power has started to compete on national electricity grids in the most developed solar markets - Japan, Germany and the US, which account for 85% of total installed OECD capacity. Installed capacity in Japan and Germany has risen by an average of more than 40% a year for the past decade.

Going on-grid

BP Solar, which reported 30% growth in sales in 2004, is interested in grid-connected, or on-grid projects - selling electricity into established, mainstream markets. Around 90% of the PV capacity it installed in 2003 was on-grid. "For most of the 30 years that BP Solar has been in the business, the market has essentially been an off-grid business," says Nicole Anderson, a spokeswoman for BP Solar. "Over the last five to 10 years, the global solar market has become more of an on-grid business in developed countries such as Germany, Japan, Spain and the US, underpinned by government support structures, stimulating investment and access to customer demand."

Some experts predict that the solar PV market will more than quadruple in value by 2010, from \$7bn to \$30bn. Buttressed by improving margins, solar PV's backers see its profitability improving rapidly. BP, for example, expects sales of solar equipment and systems to add 200 megawatts of generating capacity this year - twice as much as in 2004. The most optimistic forecasts see PV-generated electricity becoming cost-competitive with other commonly used forms of power generation in five to 15 years.

BP, which has invested \$0.5bn in the solar business over the past five years, says research

is under way on a number of next-generation PV technologies.

Scientists see great potential in organic, nano and even quantum-dot technologies.

Nanotechnology provides a way of growing PV cells on plastic substrates, potentially enabling cells to be printed cheaply rather than assembled from silicon parts. These technologies offer the prospect of either significant cost reductions or improvements in cell efficiency of over 30%, the company says.

BP Solar says the cost of installed systems has dropped six-fold in 20 years, taking solar closer towards parity with conventional power - the core objective. It says that in the last 10 years alone, solar-power cells have risen in efficiency by over 40%. Cutting the cost of installation will bring other improvements.

But despite these advances, solar's share of the energy mix is still minute. Although BP's solar business is profitable, it still accounts for only 1% of group turnover.

Critics allege that like other renewable energies, solar's chances of becoming a source of base-load energy for the electricity industry are more fantasy than reality. Doubters such as the International Policy Network think-tank point out that most PV cells produce less energy in their lifetime than is needed to make them in the first place.

And while producers argue that prices will fall as market penetration grows and demand inflates, this still depends largely on supportive legislation being in place.

Take away the handouts

One reason cited by ExxonMobil for its failure to invest in solar, despite its own projections of a 10% annual growth rate in the business over the next 25 years, is that this is only possible because of government subsidies and tax breaks. Take away the handouts and the energy is a non-starter, according to the firm's manager of energy demand and supply forecasting, Scott Nauman.

BP and Royal Dutch Shell contest the hard-nosed ExxonMobil approach. They counter that the need for subsidies and incentives need only be temporary.

"Government support structures will be needed until solar has achieved grid-parity. At grid-parity, solar will be able to compete with other sources of energy on a level playing field," says BP's Anderson. Shell, which is complementing its investments in wind-power by building a solar business, is optimistic that most European governments will support the solar industry as long as necessary.

BP Solar, however, admits that growth markets are those where the government is supportive of solar investments through incentives. Germany, the biggest growth market,

has a subsidy system - held up as a model for the rest of Europe - based on a system of guaranteed feed remuneration. This involves a guaranteed minimum price being paid for the electricity fed into the public grid from renewable energy sources.

At the consumer end of the market, the US is considering tax breaks for adopters of solar energy. Under the energy bill passed by the US Senate in June, homeowners will receive a federal tax credit to install solar energy systems, worth 30% of the cost of the system.

But others appear to be headed in the opposite direction. In the UK, the government has been accused of reneging on pledges to hand out grants for solar projects. The Renewable Power Association, an umbrella group of renewable energy companies, accused the government of planning to end its 2002-2012 programme for solar PV prematurely, in March 2006. The industry has relied on grants to beef up demand and to ensure there is a market for panels.

The tide is turning

In the context of the G8 summit's failure to agree on emissions-reductions targets, the absence of legislative support is likely to continue to stymie the uptake of solar in many markets. But with BP Solar racking up global sales of \$410m in 2004, the energy's powerful band of advocates may feel that the tide is turning in their favour. And those that have invested the most may have most to gain.