

SOLAR POWER TURNS UP THE HEAT ON OIL

DURING THE NEXT DECADE SOLAR POWER COULD COMPETE ON PRICE AND PERFORMANCE AGAINST THE TRADITIONAL ENERGY SOURCES. THE KEY TO ITS SUSTAINED SUCCESS WILL BE DEVELOPING WAYS OF STORING THE SUN'S ENERGY - SOME ANSWERS ARE ALREADY IN DEVELOPMENT

Solar power already seems old hat. The dominant narrative is that we are in the cheap mass production phase of an established technology, that panel production will be dominated by China, while trade disputes will continue to make the headlines.

Think again: radical technology may be about to increase sunlight conversion efficiency from theoretical limits of around 33 per cent to upwards of 87 per cent. Such an increase suggests that over the next decade or so, solar power will be able to compete with traditional forms of energy on price and performance at peak periods.

Yet solar alone will not be sufficient to meet growing power demand. The future will require diverse integrated systems combining multiple technologies, such as prototype systems in Abu Dhabi's Masdar City, or closer at home with "EcoIsland" on the Isle of Wight illustrate.

This heterogeneous energy future will rely on the convergence of recent technology advances in wind, wave, hydrogen, super capacitors and other diverse forms of energy capture and storage.

Yet this is not simply a technology story: systems designers and integrators in both the public and private sectors must rise to the challenge of delivering not just efficiency, but also resilience.

Beyond oil

Within ten years, we may well begin to see cheap, abundant, universal, low carbon power

emerge in everything from micro-devices to major power stations.

Think of the possible implications. The power structures of 'big oil' replaced not by 'peak oil', but perhaps post oil, or rather a world in which oil is no longer so dominant? It is hard to imagine a future where civilisation remains dependent on fossil fuels – continually wrestling with their environmental impact and ultimately finite supply.

Progress with solar power has been slower than many may have expected, but we may have reached a tipping point.

Based on recent predictions, installations of solar photovoltaic (PV) systems are on course to increase 50-fold by 2020 compared with 2005. Global installed capacity now exceeds 65 gigawatts (GW). By 2020 this is predicted to reach 600 GW.

They will also be cheaper. The price of PV modules is falling and they are already 75 per cent lower in price than they were three years ago. China's low-cost production has given the world a taste of the potential of cheap solar systems.

The second major driver of the step change is revolutionary new technologies.

Solar cell technology patent activities have grown substantially, providing us with insight into disruption ahead. Advances in next generation Solar PV technologies such as black silicon, organic PV solar cells and multi-junction cells bring the promise of increased efficiency and/or further decreases in costs of production. Then there is also quantum dot technology, which promises to boost energy conversion efficiency and cut manufacturing costs.

The increasing number of multi-junction solar cells patents

