

# Solar photovoltaic power starts to achieve some big numbers

**H**ow big is solar power? The strength of solar energy, surely, is that the very small electrical outputs from small systems are multiplied by the very large number of installations – one on every rooftop, perhaps – to add up to something significant. This is all true but, in addition, the solar industry is also beginning to deal in some quite sizeable PV plants.



This issue of the magazine includes a report (page 5) of a huge, 750 MW solar energy project to be built in the Californian desert, close to another of 150 MW. A look around some websites suggests that another seven or eight PV plants above 200 MW in size are being built or commissioned around the world – most of these in the US. Looking below 200 MW, dozens of plants of 50 MW or greater are already in use. Quite a number of these are in Germany and Italy, but they can also be found in India, China, Ukraine, Canada, Portugal, Spain and France. Germany and Ukraine are both well-represented in the list despite their not particularly sunny climates – as a result of highly favourable support programmes for solar power.

Indeed the growth of large-scale PV plants has been quite a feature of the solar industry in recent years, with the installed capacity of over 400 individual plants each over 10 MW in size reaching 10 GW by the end of last year. The installation of large-scale PV plants was pioneered in Germany and Spain in the first decade of this century with the arrival of new feed-in tariffs, before spreading around the world. The pattern was for initially very generous feed-in tariffs being reduced rapidly as scale was reached and manufacturing and installa-

tion costs plummeted. Although this resulted in a boom-and-bust industry pattern in the short-term, a longer-term view shows an efficient application of funding to kick-start what is now a sizeable industry.

So, healthy growth for large-scale PV, but the huge numbers of much smaller PV systems still dominate the overall total. At least 96 GW of solar PV capacity has now been installed world-wide, according to the Photovoltaic Power System Programme of the International Energy Agency (IEA), which has just published a report on the subject. That's 96,000 MW of capacity, much more than the 10 GW of utility-scale plants in place. The small number of output watts multiplied by the large number of systems principle still applies.

After several years of rapid growth, the solar industry has settled down to steadier growth rates of around 30 GW per year in each of the last two years. Europe still dominates for the moment, says the IEA, but 2012 saw the emergence of the Asia Pacific region and Americas as significant markets, with the Middle East and Africa yet to show, as they surely will.

Observers believe, though, that growth of large-scale plants in the future is a safer bet than smaller, rooftop plants. Obligations on US and other utilities to source a proportion of their electricity from renewables will fuel growth of large-scale PV plants in the west, while the UNFCCC's Clean Development Mechanism (CDM) is supporting many of the plants being installed in Asia.

So, although in some ways last year was one of consolidation for the solar industry rather than one for breaking new records, the success story for PV is set to

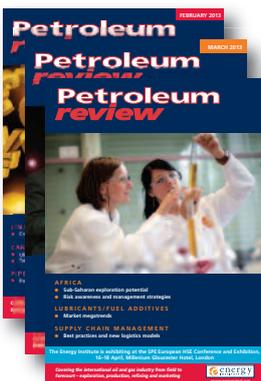
continue. Some big numbers in terms of both scheme size and total installed capacity are being reached. Not quite so big as first glance suggests, though. For proper comparison with old-fashioned thermal and nuclear power stations we need to apply a capacity factor for PV that reflects hours of darkness, low light levels etc of around 15–20%, compared to capacity factors of 60–90% for conventional plants.

Nevertheless, PV (and wind) are the new power supplies of the moment, when very little coal or nuclear plant is being built. According to the IEA report again, PV was the largest source of new electricity generating capacity installed in Europe in both 2011 and 2012, ahead of wind, and then gas. Overall, PV accounts for around 2.5% of Europe's electricity demand, a figure that is growing.

- Oil and gas production from the UK Continental Shelf appears to have reached the mid-life phase of its evolution; production is established on a downward trend, now some 10% below the 1999 peak. So wrote James May, then the Director General of the UK Offshore Operators' Association (now Oil & Gas UK) – but back in May 2003, a decade ago. And the 'established' trend is indeed established. Annual production now is well under half of the 250mn tonnes of oil equivalent pulled out of the North Sea in 1999. May's emphasis then was on efforts to ensure that remaining UK oil and gas reserves were 'recovered to the maximum,' and this remains the priority for Oil & Gas UK, and the government, today.

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