

# Rays of light for cleantech returns

New analysis takes into account the timing of mass rollouts of clean technologies but also the timing of their decline.

By JOHN O'BRIEN



Utility-scale solar is forecast to have a long gestation but will form a major component of the industry by 2050.

Source: Darren Baker/istock

To build both long-term economic sustainability and investment returns, it is essential to have a view of the type and timing of technologies that will be adopted on a large scale.

Much contemporary literature provides advice on current and forecast cost curves for future energy technologies. There are other reports that provide forecasts of the future energy mix to 2020 or 2030. However, these provide little assistance to governments or investors wanting to fully understand long-term trends.

Australian CleanTech recently sought to consolidate many of the existing reports to provide longer-term technology forecasts. The report, *Prosperous Sustainability: Clean Technology Forecasts to 2050* (see *Powering up, powering down, over*, for key findings), presents a scenario of technology development.

The forecasts include the timing of mass rollouts of technologies and, possibly more interestingly, the timing of their

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decline. It is based on economic activity measures rather than installed capacity as this will indicate the areas of growth.

## Picking winners or securing options?

It could be argued that this is an exercise in picking winners - a risky proposition at the best of times. An alternate viewpoint is that by understanding technology development pathways and likely maturation profiles, policymakers and investors are able to ensure that they secure options for the future scenarios. It appears that, without this knowledge, the exercise of picking winners is to be undertaken blindfolded!

By understanding the likely timing of technology maturation, it is possible to develop policies that secure the maximum benefits for a specific region. These benefits may include opportunities for economic development, the creation of so-called 'green collar' jobs and the potential to establish global or regional centres of excellence.

Cities, states or nations will have the greatest chance of securing technology leadership by recognising this potential early and implementing proactive policies to build the foundations of industry growth. These foundations may include policies focussed on investment attraction and the development of industry, infrastructure and skills.

## Applying the data

These forecasts can be used to build a profile of the pipeline of technologies that will be deployed in any particular region. If this

exercise is done well, the benefits for investors, local communities and economies would be significant.

To build this pipeline, technologies could be divided into four maturity stages: mature, start-up, incubator and research. All four stages could be combined into a physical cleantech park initiative with technologies expected to emerge in a staged fashion over 20-plus years.

This would provide continuity with respect to economic development, with an emerging technology taking over from a declining one, and also would drive synergies between the technology companies.

Similarly, the pipeline could be used to build a balanced cleantech investment portfolio with some solid current returns combined with more speculative early-stage stocks.

## A 2010 investment portfolio

A cleantech park or investment portfolio built in 2010 might comprise of the following technologies: mature - wind turbine manufacture, PV panels, energy efficiency technologies, desalination technologies, recycling technologies; startup - building integrated photovoltaics, concentrating solar, geothermal, wave energy, water recycling.

While the incubator category comprises second-generation biofuels and second-generation wind turbines, electric vehicles and recharging infrastructure, smart grid; and biomaterials and nanotechnology form the research category.

## Powering up, powering down

Key findings on technology maturation:

### Wind energy

The current wind technology will grow quickly over the next few years and gradually be replaced by second-generation technologies (which may include vertical axis and darrieus turbines) towards the end of the decade. Eventually the requirements for large towers and motors will mean that wind is left behind as an expensive technology for new installations.

### Solar energy

Solar rooftop panels will continue to grow quickly over the next few years. After that, however, it is forecast that other solar technologies, such as building-integrated photovoltaics (BIPV) will become cheaper and retrofit panels will start to become obsolete. Utility-scale solar is forecast to have a long gestation but will form a major component of the industry by 2050.

### Other renewables

Geothermal is another long-term survivor although it is going to take more than five years for industry growth to occur with any significance. Wave and tidal power follow the same growth path as geothermal through to about 2030, after which they start to decline as technologies with fewer mechanical parts emerge as cheaper options.

### Transport energy

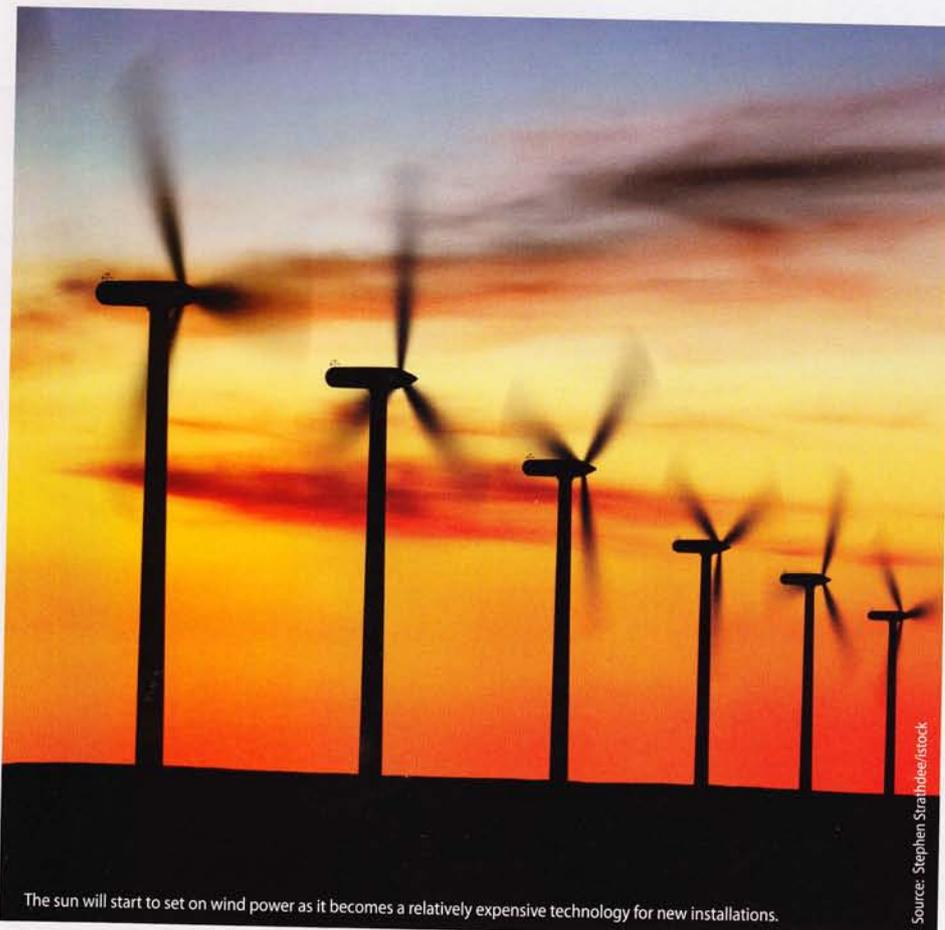
Cellulosic and algae biofuels start to replace first-generation biofuels within the next few years and, as oil prices rise, they will grow for some time. The growth of electric vehicles and recharging infrastructure has been brought forward by recent events in the global car industry. As we see the first EVs arrive in Australia, the major rollout will commence in 2012 and continue to grow throughout the forecast period.

### The built environment

Built environment technology, comprising energy efficiency, green building products and materials and smart grids, is forecast to continue to grow and innovate throughout the entire period. Energy efficiency and building products will grow quickly immediately as some of the easy wins are taken. Smart grids, however, will only significantly expand in the 2020s once structural issues connected with distribution networks are resolved.

### Water and waste

Water and waste technologies are forecast to grow throughout the forecast period. Preserving, reusing and creating new sources of potable and 'fit-for-purpose' water, along with materials recycling and resource recovery, will be driven by growing populations and improved living standards.



The sun will start to set on wind power as it becomes a relatively expensive technology for new installations.

The exact combination of technologies will of course depend on the specific regional strengths and weaknesses and the competitive forces in play in each sector. To adapt the global technology findings to local circumstances requires the analysis of current cleantech strengths and capabilities and the building of a specific regional technology forecast.

There are many limitations to this type of foresight work. It will certainly not provide any policy or investment certainty. It may help to provide caution against backing industries with limited long-term prospects. Its greatest use, however, is to provide a framework for governments and investors to build long-term economic benefits by focussing on the sectors of cleantech that are most likely to be 'winners' both globally and within their regions. **ci**

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