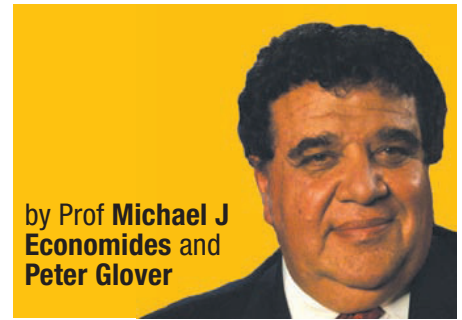


'Independent reports have consistently revealed an industry plagued by high construction and maintenance costs, highly volatile reliability and a voracious appetite for taxpayer subsidies.'



by Prof Michael J Economides and Peter Glover

## A heavy blow to wind power strategy

**W**ind power: expensive, unreliable and it won't save natural gas. This is not what President Barack Obama's energy and climate strategists would want to hear. It would be anathema to Al Gore and other assorted luminaries touting renewable energy sources which in one giant swoop will save the world from the 'tyranny' of fossil fuels and mitigate global warming. And as if these were not big enough issues oilman T Boone Pickens' grandiose plan for wind farms from Texas to Canada is supposed to bring about a replacement to natural gas use for power generation that will lead towards energy independence from foreign oil.

Too good to be true? Yes, and in fact it is a lot worse.

Wind has been the cornerstone of almost all environmentalist and social engineering proclamations for more than three decades and has accelerated to a crescendo the last few years in both the United States and, even greener, European Union.

But Europe, getting a head start, has had to cope with the reality borne of experience and it is a pretty ugly picture.

Independent reports have consistently revealed an industry plagued by high construction and maintenance costs, highly volatile reliability and a voracious appetite for taxpayer subsidies. Such is the economic strain on taxpayer funds being poured into wind power by Europe's early pioneers – Denmark, Germany and Spain – that all have recently been forced to scale back their investments.

As a result, last summer, the UK, under pressure to meet an ambitious EU climate target of 20% CO<sub>2</sub> cuts by 2020, assumed the mantle of world leader in wind power production. Thus the UK's wind operation provides the ideal case study – and one that provides the most complete conclusions.

The UK has all the natural advantages. It is the windiest country in Europe. It has one of the continent's longest coastlines for the more highly productive (and less obtrusive) offshore farms. It has a long-established national power grid. In short, if wind power is less than successful in the UK, its success is not guaranteed anywhere.

To begin with, wind infrastructure has come at a steep price. In fiscal year 2007/08 UK electricity customers were forced to pay a total of over \$1 billion to the owners of wind turbines. That figure is due to rise to over \$6 billion a year by 2020 given the government's unprecedented plan to build a nationwide infrastructure of over 25 gigawatt capacity, in a bid to shift away from fossil fuel use.

Ofgem, which regulates the UK's electricity and gas markets, has already expressed its concern at the burgeoning tab being picked up by the British taxpayer which, they claim, is 'grossly distorting the market' while hiding the real cost of wind power. In 2007 UK domestic energy prices for electricity and gas have risen twice as fast as the EU average according to figures released last November by the Organisation for Economic

Cooperation & Development (OECD). While 15% energy price rises were experienced across the EU, in the UK gas and electricity prices rose by a staggering 29.7%. Ofgem believes wind subsidy has been a prime factor and questions the logic when, for all the public investment, wind produces a mere 1.3% of the UK's energy needs.

Last July, the most in-depth independent assessment yet of Britain's expanding wind turbine industry appeared. *Will British weather provide reliable electricity?*, published in the journal *Energy Policy* and written by gas turbine expert Jim Oswald and his co-authors, came up with a series of damning conclusions. Oswald reported that not only is wind power far more expensive and unreliable than previously thought, it cannot avoid using high levels of natural gas, which not only will increase costs but in turn will mean far less of an impact on CO<sub>2</sub> emission than has been claimed.

Oswald's report highlights the key issue of load factor, the actual power generated compared to the theoretical maximum, and how critical it is to the viability of the wind power industry. In 2006, according to UK government statistics, the average load factor for wind turbines across the UK was just 27.4%. Thus a typical 2MW turbine actually produced into the system only 0.54MW on average. The worst performing UK turbine had a load factor of just 7%. These figures reflect a poor return on investment. But this poor return is often obscured by the subsidy system that allows turbine operators and supporters to claim they can make a profit even when turbines operate at a very low load factor. Bottom line? British consumers are paying twice over for their electricity, funding its means of production and paying for its consumption as end users.

The British report highlights what more and more wind farms would mean when it came to installing gas turbine back-ups. 'Electricity operators will respond by installing lower-cost plant (\$/kW) as high capital plant is not justified under low utilisation regimes.'

But cheap gas turbines are far less efficient than big, properly sized base-payload turbines and will not be as resilient in coping with the heavy load cycling they would experience. Cheaper, less resilient plants will mean high maintenance costs and spare back-up gas turbines to replace broken ones that would suffer regular thermal stress cracking. And of course, the increasing use of gas for the turbines would have a detrimental effect on reducing CO<sub>2</sub> emission – always one of the chief factors behind the wind revolution.

Critically, most of the issues raised in the independent report have not been factored into the cost of wind calculations. With typical British understatement, Oswald concludes that claims for wind power are 'unduly optimistic'. We think they're blown away. **OE**

● Michael J Economides is a professor at the Cullen College of Engineering, University of Houston, and editor-in-chief of the Energy Tribune. Peter Glover is a UK-based writer. The views expressed in this column do not necessarily reflect OE's position.