PORTLAND MARKET REPORT

APRIL IN VIEW

IS THE ANSWER BLOWING IN THE WIND?

As we discovered last month, the economics, the 'green payback' and the public perception of solar energy are all fundamentally sound. But what of its renewable 'big brother', wind, which is currently being developed on a far greater scale? How efficient is this form of power generation and how commercially viable? How politically charged is it and, more fundamentally, can the mass building of giant steel windmills ever be considered as truly green?

Harnessing wind energy relies on more basic technology than solar panels and, broadly speaking, wind turbines are relatively simple pieces of kit. They are made up of 3 main parts; the tower, the blades (designed in the style of an aeroplane wing) and the 'nacelle' (engine housing for the generator and driveshaft). The kinetic energy of the wind is channelled in a circular motion to create rotational energy via an electrical generator. The generator transfers that energy into a gearbox, which factors up the wind's 25-50 revolutions per minute (rpm) to 1,500 rpm for the generation of electric current.

"EXTRACTION OF IRON ORE AND LIMESTONE ARE CLEARLY NOT ENVIRONMENTALLY FRIENDLY PROCESSES"

Whilst the engineering principles of a turbine are straightforward, the physical stresses placed on 100m steel blades travelling 500m every second, make for a far from ordinary structure. Reinforced steel (for the tower), concrete (for the base) and fibreglass composites (for the blades) are required to the tune of around 1,500 tonnes (total) per windmill. This means that for every turbine produced, a hefty carbon price has to be paid. Combined, steel and concrete manufacturing contribute over 15% of the world's CO2 emissions, whilst the extraction of iron ore (steel) and limestone (concrete) are clearly not environmentally friendly processes. Finally, the assembly and transportation of the turbines themselves rely on giant fuel guzzling machines (trucks, ships, cranes etc).

To entirely replace fossil fuel electrical generation over the next 25 years, it is estimated that a minimum 10-fold increase in the number of wind turbines will be required, across the world. This, by definition, means that our carbon footprint will get dramatically bigger, as we manufacture the units to ultimately take us to the promised land of zero-emission electricity. Inevitably there will be much debate around whether "getting worse to get better" is the right approach, but equally, there should be no doubting the efficacy of wind turbines once they are up and running. The latest 15-megawatt (MW) bladed behemoths can power over 2,000 smartphones in one single rotation and, over a standard 20-year lifetime, these turbines will generate more than 25 times the energy that it takes to produce them in the first place.

Wind power also has a key geo-political benefit over solar, which is that the industry is not controlled by China. With turbines, it is actually the Europeans that lead the way, and the Americans are catching up fast on the back of Joe Biden's 'New Green Deal', which promises 60,000 new wind turbines over the next 10 years. China's position is still predictably strong, with around 45% of global turbine manufacturing, but almost all of these are serving China's huge domestic market. Plus, there is a large difference between a 45% market share and the 70%+ Chinese domination that exists in the global solar industry.

There is always a 'however' though, and the Achilles heel of wind power is what happens when the wind doesn't blow. Unlike solar panels which can, more or less, generate electricity every day (even on cloudy / rainy days), wind turbines frequently generate zero electricity. This means that, for electrical grids to maintain baseload at all times, there has to be a gas-fired power station lurking somewhere in the background, ready to fire up on a windless day. This obligatory 'reserve' of fossil fuel power dramatically changes both the environmental credentials and the cost basis of running a wind-farm.

Despite this, there can be no doubt that wind power over the last 15 years has been extremely successful in displacing fossil fuel generation and this trend is absolutely set to continue. On most days, at least 10% of Britain's electricity comes from wind power (sometimes that figure is much higher – up to 40%) and this compares to 2010, when renewable generation was basically zero (less than 1% on any given day). Looking ahead, 80% of (planned) incremental power generation in Europe will be from renewable sources, which means that emission-free electricity is genuinely attainable in our lifetime.

"THE ACHILLES HEEL IS WHAT HAPPENS WHEN THE WIND DOESN'T BLOW."

This will be an incredible achievement, but the time really has now come to inject a little more honesty and reality into the green debate. Let's drop the ludicrous idea of immediate 'carbon neutrality' as it is simply not possible – other than in the greenwash imaginations of marketing departments and PR advisers. To decarbonise the grid at speed means the world's carbon footprint is going to get worse before it gets better, and this absolutely highlights why effective CO2 storage is now imperative. Heavy industrial processes come at a high carbon cost and carbon sequestration is the best way to deal with this problem here and now. Moreover, the general public needs to understand this compromise, along with what a decarbonised energy future looks like. If this doesn't happen, then cynicism, scepticism and general opposition will prevail.

For more pricing information, see page 38

Portland
www.stabilityfromvolatility.co.uk