PORTLAND MARKET REPORT

MARCH IN VIEW

EVERY CLOUD... COULD THE CRISIS IN UKRAINE HASTEN A SUNNIER FUTURE?

Despite the untold riches currently being enjoyed by traditional oil and gas companies (see last month's report), it is also true that the crisis in Ukraine has stimulated significant activity across all energy sectors. In the short-term, demand for non-Russian oil and gas has of course boomed, but policy makers and investors are continuing to turn their attentions to renewable energy. Solar and wind power currently supply around 5% of the world's energy needs, with this figure being expected to increase to 25% by 2035 and, possibly, to 50% by 2050. More importantly, from a geo-political perspective, this is energy that can be sourced and developed outside the control of unfriendly and / or tyrannical governments. Next month our report will focus on wind but, before that, we will turn our attentions to solar power. How does it work, how efficient is it, how sustainable and, most importantly for consumers, how cheap?

"THE MOST EXPENSIVE FORM OF GENERATION OVER THE LAST 10 YEARS"

Harnessing solar energy relies on photovoltaic (PV) cell panels that are mounted on rectangular frames and linked together to form a photovoltaic system (often colloquially referred to as a 'solar array'). In simple terms, sunlight is absorbed by the panels before generating electron excitation which, when diffused through the panel's silicon film, generates an electrical current. As the output of a solar panel is direct current (DC), inverters are required for conversion to the alternating current (AC) used in grid transmission. Over 90% of PV solar panels use high-purity silicon, and converting sand into solar cells is a high-cost, high chemical and highly energy-intensive process. Silica-rich rock formations first have to be pulverized into smaller fragments, which are then treated with an array of chemicals – many of which (gallium, arsenide, hydrochloric acid, hydrogen fluoride, acetone) are toxic. The resultant 'sponge' is then melted at extreme high temperatures (arc furnace process) to form cylindrical ingots. The (now) silicon ingots are then sliced into thin disks called wafers, which are intricately soldered together with plastic piping and copper conductivity rods to make up the main components of the panel.

Reading all of that, it would be reasonable to ask how green is this product? After all, significant amounts of fossil fuel energy are required in the manufacturing process, which also relies on copious amounts of crude oil derived naphthenic liquids, in the form of the chemicals used. Getting a precise answer to the 'environmental payback' question is predictably difficult because so much depends on how the raw materials are extracted and what type of energy (coal or gas) is used in the arc furnace. Our best estimate is that one solar panel consumes the equivalent of 250 – 300 kilowatt hours (kWh) of electrical energy in the production process. That panel should generate around 100kWh of electrical energy per annum, giving a green payback of around 2-3 years. On a lifespan of 25-30 years, this is actually quite an impressive figure.

So what about solar energy at a commercial level? Here too the calculations are notoriously difficult, as they again depend on the same factors of raw material and processing. Plus, the byzantine complexity of electricity pricing (see previous reports) makes clear-cut conclusions difficult. In 2022, the returns for solar power (along with all renewable generation) were enormous, because consumer prices were based on the stratospheric cost of gas. But this has not always been the case, such that the fixed renewable tariff applied by UK power generators (to cover the capital costs of renewable projects) have made solar (and wind) power the most expensive form of generation over the last 10 years. It remains the case though, that as the original capital investment depreciates over time, related power generation from those assets will become cheaper every year until there is no cost at all. Because…well, sunlight is free!

Emission free, zero cost generation and still much cheaper than wind turbines to manufacture, it would seem foolish to bet against the inextricable rise of solar power. Certainly, Joe Biden seems to think so in his 'new green deal', where there is a commitment to build 500m solar panels in the USA over the next 10 years. The general public also seems to feel fairly positive about solar power. In a 2022 survey, 70% of the UK population was broadly favourable towards solar, whereas the corresponding figure for wind was only 50% (unsurprisingly, power from fossil fuels only received a 20% approval!).

"IT IS DIFFICULT TO SEE A WORLD WHERE SOLAR POWER DOES NOT PLAY A HUGE PART"

Despite this, global investment in solar power lags behind both wind energy and the enormous amounts of money currently going into roadside electrical charging. Plus there remains the thorny issue of China's predictable domination of the sector, with 70% of the world's solar modules being manufactured in that country. And, whilst China's dominance of the solar industry has benefitted consumers, this is largely a result of anti-competitive practices that have manipulated the price of solar panels down by 85% since 2010. This, in a fairly obvious attempt to control the global market.

Expect that particular problem to run for a while, because energy generation typically comes under the umbrella of 'strategic importance'. Western governments might even seek to hamper solar capacity, if it was to result in over-reliance on Chinese production. But, putting politics aside and viewing things at a macro-level, it is difficult to see a world where solar power does not play a huge part in our energy solutions going forward. With a modest initial carbon and capital footprint, followed by years of minimal cost operations, solar surely has a future that is very…bright!!

For more pricing information, see page 50

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