Insight into the Transformation of Energy Markets

Renewables: Moving from Niche to Mainstream

The renewables sector is entering an exciting new phase. Rapidly evolving technology, economies of scale and regulations and changing attitudes among policy makers means that, despite reductions in subsidies, renewables are winning market share from fossil fuels around the world.

The announcement in September that the US and China will formally ratify the Paris climate change agreement was greeted around the world as a major step in the battle against global warming and was seen by many as providing an additional boost for the already fast growing renewable energy sector.

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The historic agreement comes in the wake of a number of factors that are stepping up the pace of growth in renewables. Once considered a niche industry driven by environmental policies rather than economic realities and the need to meet energy needs, the renewable energy market is experiencing rapidly accelerating growth as costs fall while reliability and consistency of supply improves.

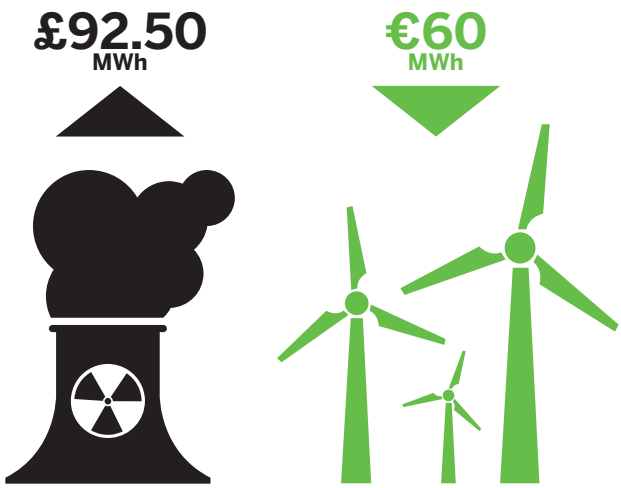
The Paris agreement is set against a backdrop of technological innovation and falling production costs brought about by economies of scale. The price of both wind and solar are being driven down by competitive tendering as markets move from feed-in tariffs to long term power auctions.

Falling costs

The cost of building offshore wind farms has fallen to an all time low. In September Vattenfall, a Swedish manufacturer won the Danish Near Shore Wind Tender to build two facilities to power around 375,000 households.

The price of just over €60/MWh is considerably lower than the previous record, set just two months earlier by Danish group Dong Energy, which won a contract in the Netherlands for €72.70/MWh . Vattenfall also announced an investment of €5billion in sustainable development over the next five years and an increase in its wind power production in all the countries in which it is present. The figures contrast sharply with the recently announced costs for production at Hinkley point which have provisionally been set at £92.50/MWh for 35 years.

Investments in technology have seen production prices fall. Every time world usage of solar panels doubles, for instance, the price of making them falls by around a quarter. With wind power the cost reduction on doubling of capacity is nearly a fifth.



Whereas coal and gas fired power stations have expensive running costs as raw materials have to be bought in, the fuel for wind turbines and solar panels is free. The only running costs are maintenance and repair and, thanks to the nature of the technology, these tend to be very low.

Technical innovations range from solar paint, which uses organic photovoltaic technology to generate electricity when it's applied to cars and houses through to electricity generation from kinetic energy generated by people playing football on AstroTurf.

It's about interconnection

Perhaps most importantly, technology is also improving interconnection allowing renewable energy sources to overcome the problem of a lack of output at night or when there is no wind. Electricity can now be stored and transferred more easily, cheaply and rapidly. Storage in particular is key to ensuring that power is consistently available, whatever the weather conditions for generation might be and it's becoming increasingly efficient and cost effective.

Around 55 of the 420 members of RenewableUK, the UK's main renewable energy trade association, are actively investing in solutions in this area. As part of efforts to meet the need to make renewable energy available more easily and quickly, in August the National Grid announced the results of its first Enhanced Frequency Response auction. Successful bidders for the £65million tender have 18 month in which to complete their projects for the four-year contracts.

Battery energy storage dominated the submissions and this technology is evolving rapidly, driving down costs. According to a report by Moody's last year, battery prices have fallen by a half since 2010 and, it notes, "commercial and industrial use of lithium-ion batteries for energy storage could become economically viable in the next three to five years if the decline in battery prices persists."

Improvements in battery technology are also enabling electronic vehicle (EV) technology to become viable and reliable and to add to the appeal of EVs to consumers. One of the most successful manufacturers, Tesla, recently unveiled Powerwall, a home storage device that holds energy typically generated through solar panels installed in a home during the day and allows the homeowners to use it – again most usually - in the evenings.

To boost its EVs Tesla is building a vast "Gigafactory," in the Nevada desert with a capacity of 35Gigawatt hours. According to the company when the new facility comes online in 2018 it will produce more lithium ion batteries annually than were produced through the world in 2013.

Regulations are changing

Such innovation is also providing opportunities and challenges for policymakers who are having to react more quickly than ever to new products and services in the renewables sector. Meanwhile, technology and economics aside, changes in regulation are also driving the growth of renewables.

Governments, too, are realising that lower running costs mean that they can reduce feed-in tariffs or withdraw them completely. Although this has presented challenges to many renewable energy firms, it is, in turn, forcing the industry to become more economically self reliant.

China's signing of the Paris agreement comes in the wake of a growing trend throughout the country to reduce its reliance on fossil fuels and coal in particular. According to figures released by the country's National Bureau of Statistics earlier this year, China's solar energy capacity increased by 74 per cent, while for wind the figure was 34 per cent. Meanwhile its imports of coal fell by 30 per cent.

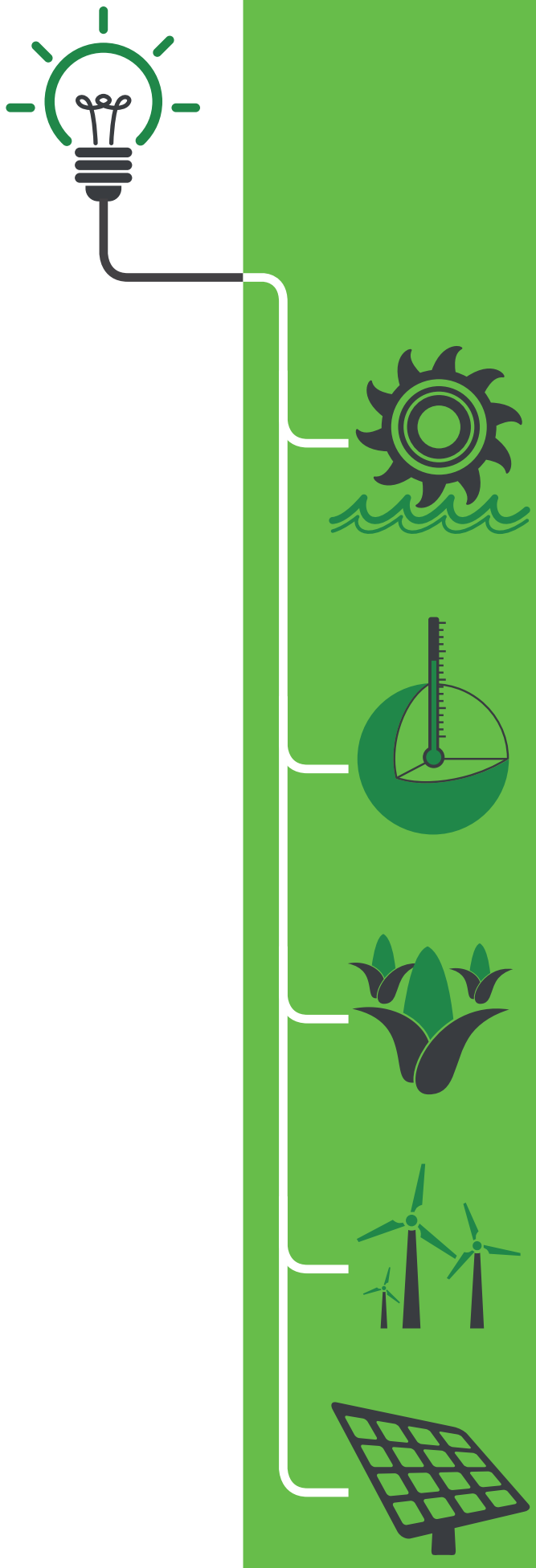
As the world's second biggest polluter reduces its carbon footprint the argument employed in the UK and other European countries that their own emissions are relatively minor in comparison to those of China and therefore any perceived sacrifice to reduce them is statically pointless, will become less and less cogent.

As well as buying in equipment and know-how from the West, China is experiencing growth in its indigenous renewables sector. For example, Goldwind, founded in Urumqi in 1998, is the largest player in the Chinese market. Its fully integrated business spans the whole product lifecycle through R&D and investment to manufacturing sales and service.

The developing world is embracing renewables

Africa is also witnessing an expansion of its renewable energy sector. Rapid increases in population are driving the need for energy sources that can come on-line quickly. While a traditional coal fired power station might take five to ten years to start production with even longer timescales for nuclear, output from a solar production plant can begin within just two or three years from when permission to build it is given.

In the developed world countries are also witnessing the growth of renewables in a variety of different ways, depending on their political situations, economic circumstances and their legacy energy production.



> As technological innovation explodes and production increases in the renewables industry, public antipathy towards the fossil fuel sector is growing as fast as these companies' raw materials are declining and their business models challenged.

The Fukushima disaster in Japan prompted the country to refocus on renewables, admittedly alongside fossil fuels. The US Energy Information Administration (EIA) expects total renewables used in the electric power sector to increase by a respectable 5.8 per cent in 2017.

In Germany Chancellor Angela Merkel's "Energiewende" policy to boost renewables while phasing out nuclear and fossil fuels has been helped by the country's ability to export power at peak production times while last year Denmark's wind farms supplied 140 per cent of the country's demands.

In South America wind, biomass, photovoltaic solar energy and hydroelectric energy are enjoying sustained growth. Chile's ambitious target of 70 per cent of its energy supplied by renewables by 2050 has seen huge renewable projects being developed in the country. Here, wind power now costs around $45/MWh with the cheapest solar project coming in at just $29/MWh.

Even though it has scaled back its commitment to renewable energy recently, Saudi Arabia earlier this year pledged to develop 9.5GW of renewable energy in a paper entitled "Saudi Arabia Vision 2030."

Fossil fuel companies facing challenges

As technological innovation and investment continues to increase in the renewables industry, fossil fuel companies face increased scrutiny from investors and the public, encapsulated by the concept of "the carbon bubble" – the idea that big capital investments in carbon emitting energy sources may not produce a return due to the imperatives of complying with global climate agreements. Compounding this political challenge has been the commercial impact of stagnating demand for coal, and other fossil fuels.

This summer Peabody Energy, the US's largest mining company declared bankruptcy in the wake of similar experiences by Arch Coal, Alpha Natural Resources and Patriot Coal Corp among others.

Withdrawal of subsidies and supports along with the ending of nationally binding targets after 2020 in the EU has presented the renewables sector with economic challenges. Looking at the bigger picture, though, thanks to problems with fossil fuel supply along with demands by consumers and moves by policymakers but principally because of economic changes brought about by new technology renewable energy is breaking out of the niche interest and specialist investment sector into the mainstream.

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