



The changing approach to renewable energy

Why businesses should start to think of renewable energy differently



The transition from fossil fuels to renewable energy is well underway and many businesses are responding well. Despite this, the market still faces challenges in the form of feed-in tariffs, power quality problems, planning permission and the threat from cheap imports of renewable technology. Businesses that are looking to make the transition unscathed in the next few years need to start thinking of renewable energy differently.

2016 was a record year for the installation of renewable power, with 161GW added to the world's capacity, according to the 2017 Global Status Report by REN21. Solar power led the way, accounting for 47 per cent of the additions. This was followed closely by wind power at 34 per cent and hydropower at 15.5 per cent.

Recent data from the UK shows even more positive growth. At lunchtime on Wednesday, June 7, 2017, the UK produced 19.3GW of power from renewable sources, including 7.6GW from solar and 9.5GW from wind. The output set a new record for renewable energy in the UK and was enough to meet 50 per cent of midday power demand.

The National Grid control room, responsible for monitoring activity, said that it was the first time that renewable energy and nuclear power have together produced more power than gas and coal plants combined.

A positive response

Businesses around the world have responded positively to this transition. The Climate Group, a not-for-profit charity, now has over 100 members signed up to its RE100 initiative to commit to using only electricity generated from 100 per cent renewable sources.

Many companies, including M&S, Lego and Heathrow Airport, have already achieved this target and others, including BT, Tesco and Aviva have made a commitment to do so at different points from 2022–2030.



The industrial sector is no different. Rolls-Royce has a target to reduce its energy use by 30 per cent by 2020, while Jaguar Land Rover already sources 100 per cent of its electricity for UK facilities from renewable sources. As a result, Siemens — whose wind turbines represent a generation capacity — aims to achieve a Levelized Cost of Energy (LCoE) for offshore wind of below eight Euro cents per kilowatt-hour by 2025.

The cost of renewable energy, for wind and solar in particular, is falling rapidly. According to the REN21 report, "record-breaking tenders for solar PV occurred [in 2016] in Argentina, Chile, India, Jordan, Saudi Arabia and the United Arab Emirates, with bids in some markets below USD 0.03 per kilowatt-hour.

"Record lows in offshore wind power tenders in Denmark and the industry closer to its goal to produce offshore wind power more cheaply than coal by 2025."

Feed-in tariffs

Following the 2009 EU Renewable Energy Directive, the UK is legally bound to source at least 15 per cent of its energy needs for electricity, heat and transport from renewable sources by 2020. To meet this target, in feed-in tariffs (FITs) — a tax-free subsidy scheme to incentivise small scale generation of electricity under 5MW using renewable technologies.

The scheme proved popular, with a total of 797,314 FIT installations between April 2010 and March 2017, according to figures by the UK energy regulator Ofgem. Generators of electricity were paid per unit of electricity they generated, with a further payment per unit of electricity they exported back to the grid.

For example, in the first year of the scheme, a solar photovoltaic (PV) system with a total installed capacity of under 10kW would be eligible to receive 44.19 pence per kWh of electricity generated.

Although the intention of the scheme was to reduce the rate gradually over the contract period of 25 years, the Government was widely criticised for heavy cuts to the tariff rates. The first cuts were made in 2011, reducing the rate for solar PV to 21p/kWh. The second round, in November 2012, saw the rate drop to 15.44p/kWh. The rate continued to fall year-on-year and reached 4.07p/kWh in July 2017.

Speaking in December 2015, then energy and climate change secretary Amber Rudd said, "We have to get the balance right and I am clear that subsidies should be temporary, not part of a permanent business model. When the costs of technologies come down, so should the consumer-funded support."



A new approach

Although feed-in tariffs may no longer provide a financial incentive for many individuals and businesses, other methods of securing a stable supply of renewable energy have grown alongside feed-in tariffs in recent years.

The Renewables Obligation (RO) scheme in the UK is a model used by the Government to encourage large-scale generation of electricity from renewable sources. It works by placing an obligation on licensed electricity suppliers in the UK to

source a set proportion of their electricity from renewable energy. Although the scheme closed for new applications in March 2017, it will be replaced by an alternative scheme called Contracts for Difference (CfD).

For businesses, financial models such as Power Purchase Agreements (PPAs) are proving popular. A PPA is a long-term contract — typically 10 to 15 years long — between a business and a renewable utility provider.

Because it's a commercial contract, a PPA mitigates the risk traditionally associated with renewable technologies by defining the schedule for delivery, penalties for under delivery, the payment terms and termination clause. As a result,

businesses can use PPAs to plan their finance and credit well in advance and compensate for fluctuations in supply.

There are also other schemes including the Renewable Heat Incentive (RHI) in the UK, an equivalent subsidy to feed-in tariffs, designed to increase the uptake of renewable heat by businesses.

In the US, there is also net metering, a billing mechanism that allows owners of solar PV systems to offset their export credits beyond the month

in which they generate electricity. This gives them the flexibility to consume their renewable electricity in months where they may not generate as much.

The combined effort of these developments is proving successful. Although the UK is still short of its target of generating 20 per cent of all energy from renewable sources by 2020 — with a figure of 8.2 per cent as of February 2017 — for electricity alone the news is positive. According to the 2017 Digest of United Kingdom Energy Statistics (DUKES), renewable electricity accounted for 25 per cent of generation in 2016, with 83 TWh of electricity being generated.

Challenges

However, there are still a variety of challenges that businesses face when considering the move to renewable energy. While larger businesses have the resources, smaller businesses may struggle to cope. Factors including size, cost, availability, standardisation, urban planning, installation, power quality and the perceived sensory impact of renewable technologies can be overwhelming.

Although the size, cost and availability of renewable technology is improving, factors such as urban planning and power quality can still cause problems if businesses are not careful. In a 2016 House of Commons briefing paper, entitled Planning for onshore wind, some typical reasons for refusing planning permission included: the negative impact on landscapes, harm to the residential amenity and the adverse effect on animals, wildlife and air traffic control.

In a separate case, reported in the Lancashire Telegraph in April 2017, plans for three new wind turbines were halted by planners after almost 1,400 objections were made. The installer, Viridis Wind Turbines, wanted to erect three 77-metre high turbines in Hoddlesden Moss in

Blackburn, Lancashire. Residents cited obstructions to the character of the area and charity group the RSPB said that "the development could pose a serious threat to wildlife and moorland habitat".

Power quality

While challenges such as urban planning are widely understood, what is less understood is the power quality challenges that users of renewable energies still face. Unlike planning, which is a considerably more transparent process, power quality problems can be invisible to most users, often going unnoticed and being misunderstood.

The move away from centralised, fossil fuel power plants to distributed renewable generation brings with it the need for localised power conversion. Although inductor and semiconductor technology has improved in recent years, the conversion process — combined with the fact that it is carried out over a higher volume of smaller networks, which incorporate the use of variable speed drives (VSDs) — results in high-frequency electrical noise on the network.

The propagation of electrical noise from renewable sources can cause a variety of electromagnetic interference (EMI) and radiofrequency interference (RFI) problems, something that can affect telecommunications networks and wireless systems.

Radiated electrical emissions are regulated under a variety of rules around the world. In the USA, the Federal Communications Commission's (FCC) Title 47 Code of Federal Regulations (CFR), part 15, regulates emissions from RF and

digital devices for residential and industrial environments.

The rules specify maximum boundaries of 10m and 30m for disturbances caused by electronics, such as solid state inverters found in solar PV panels, and high-power switching equipment found in devices connected to medium-voltage (MV) networks.

In Europe, the electromagnetic compatibility (EMC) directive 2014/30/EU (formerly 2004/108/EC) states that, "Manufacturers of equipment intended to be connected to networks should construct such equipment in a way that prevents networks from suffering unacceptable degradation of service when used under normal operating conditions.

"Network operators should construct their networks in such a way that manufacturers of equipment liable to be connected to networks do not suffer a disproportionate burden in order to prevent networks from suffering an unacceptable degradation of service."

With over 25 years of experience in the power quality sector, REO UK understands the challenges faced in renewable applications. REO specialises in wound components and its power line filters tackle EMI and RFI by removing high-frequency electrical noise from the supply network, with a filtering range from 50 kHz to 20 MHz. Most electronic noise falls within this range and will be safely removed before it reaches the powered devices. Being able to effectively filter out those disruptive frequencies brings us a step closer to safely adopting renewable power.

Buy better

Along with a change of approach to renewable energy models, business leaders must also consider the quality of the renewable equipment they buy. As the cost of equipment comes down, purchasing decisions must change from a short term, capital expenditure (CAPEX) approach to a long term total expenditure (TOTEX) one.

This approach also means buying renewable equipment from markets and regions where there is a sustainable and consistently high-quality supply of products. Take the solar PV panel market, for example. Nine of the top ten solar cell producers in 2016 had capacity based in China, according to PV-Tech.

The Chinese Government has been widely criticised for its use of unsustainable subsidies in the solar sector. The impact was so great that Chinese manufacturers began exporting ultra-cheap solar panels to Europe, eventually leading to the EU Commission imposing anti-dumping tariffs on imports of Chinese solar panels in 2013, a move that was only relaxed three years later in 2017.

Green future

As the world transitions from fossil fuels to renewable energy, it's a good time for businesses to revisit their approach to the technology and business models that power the renewable sector.

By making a few fundamental changes, businesses can cement their transition to a low-carbon economy, improve their competitive advantage in the marketplace and help the renewable sector continue to set records for sustainable energy generation.



REO manufactures resistive and inductive wound components for use with static frequency converter drives in lift and HVAC applications. The company is becoming increasingly involved in renewable energy technology, where power quality is of overriding importance.

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