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You may laugh at this big battery, but it could cut your energy bills by 70%

BEN STEVENS

Green power and a new wave of energy storage may sound the death knell for traditional suppliers, writes **Danny Fortson** in the first of a series

Every few minutes, the clackety-clack of passing trains reverberates through the offices of Powervault, one of a handful of start-ups nestled under the arches near London Bridge station.

Joe Warren seems undistracted by his old-world surroundings. The tall, fresh-faced entrepreneur is talking about the future, as fresh-faced entrepreneurs do.

He is standing next to Powervault's first product, a household battery the size of a small fridge, with lit-up horizontal bars that, like a mobile phone, show its charge. "Our vision is that these will be as common as a dishwasher or a washing machine," enthuses Warren.

If his vision comes to fruition, energy — how we consume it, who produces it, and who profits from it — will be transformed. Warren reckons that his £2,500 battery, combined with rooftop solar panels, can slash household power bills by up to 70%.

Electricity and gas demand have been falling, incrementally, for the past five years owing to more efficient household appliances and better insulation.

Batteries that can soak up cheap or even free power during the middle of the day, then discharge it at peak

evening times — when power is most expensive — would dramatically speed up that drop in demand.

They could also unleash renewable technologies that today remain tethered to the blowing wind and shining sun, and sweep away the business model of the big six utilities, who for the last half-century have flogged electricity to passive, disengaged customers from fossil-fuel power stations.

"Storage is the game-changer for the way the British power market works over the next decade," said Simon Virley, a former Cabinet Office official who is now chairman of KPMG's energy practice. "With widespread deployment of storage, you no longer need power stations to be available for the tea-time peak in demand."

The technology had long been deemed niche and too expensive. Now, thanks primarily to the motor industry's push into electric cars, costs have plummeted.

The price of lithium-ion batteries has halved in three years, though they remain twice the price of the lead-acid batteries in the Powervault device. They are set to drop by another two-thirds, however, from \$550 per kilowatt hour of capacity to \$200 per kilowatt hour, by 2020, according to a recent study by the Australian Renewable Energy Agency.

Dozens of companies have



emerged in Europe, China and America to cash in on the revolution. The most eye-catching, of course, is Tesla, the electric car maker started by PayPal and SpaceX tycoon Elon Musk. The \$5bn battery Gigafactory he is building in the Nevada desert — on Electric Avenue, naturally — will at a stroke double global production capacity. The age of the cheap, household battery is barreling toward reality.

Amid such dramatic change, the Competition and Markets Authority last week made headlines after publishing the findings of its two-year inquiry into the energy market.

Its recommendations included price controls for the most vulnerable customers and forcing companies to open



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parts of their customer databases so rivals can spam them with offers. While campaigners wrung their hands over how the watchdog was cowed by the big six into watering down its remedies, a larger point risked being missed.

Technology is moving so fast that in a few years the industry the competition authority has so assiduously analysed could be unrecognisable.

Barry O'Flynn, power and utilities director at EY, said: "We are likely to see bundled solar-and-storage offers on the high street in the next 12 to 18 months across Europe, as is happening in other parts of the world. Once that happens, everything changes."

Battery technology, he said, is following a similar trajectory to solar panels, whose prices have plunged 70% in five years, thanks to mass production in China and to technological improvements.

From a standing start in 2010, homeowners and businesses in Britain have thrown up 10GW of solar panels, according to Bloomberg New Energy Finance. That is equal to 2.5 times the capacity of Drax in North Yorkshire, the largest power station in western Europe.

The rush was helped along by generous subsidies, since curtailed. However, the falling price means that in a couple of years state support won't be needed for solar to be competitive with other sources.

Combined with other forms of "distributed generation" like onshore wind farms and community energy schemes, a quarter of Britain's power is now produced by sources other than the large power stations for which the industry is known. Dominic Nash, an ana-

lyst at Macquarie, likened the trend to going "back to the 19th century" when energy was, necessarily, generated locally.

If distributed generation is the nail in the coffin of the old energy market, batteries could be the hammer that drives it home.

Having a place to store excess power obviates the need for a constant stream of electrons flowing in from the national grid. This means that, in theory, the home can for the first time become the main hub of generation, relegating large, centralised plants to the role of back-up producers. Linking it all together are smart meters — which are being slowly rolled out across Britain — and mobile phone apps to ensure that rooftop panels, white goods and batteries work in concert to use energy most efficiently.

It won't be a smooth transition. The pain of the first leg of that change is already being felt. Since their peak in 2007, European utilities have lost more than €400bn (£310bn) of combined market value as pollution laws have forced mass closures of old plants.

Subsidies, meanwhile, have led to a blossoming of cleaner alternatives while web-savvy retailers have started taking big bites out of the incumbents' traditional stronghold, household supply. As recently as 2012, the big six utilities controlled 99% of the market. That is now 87% — and falling.

Some of the incumbents have begun experimenting, tying up with battery developers and testing financing structures to appeal to customers. But whether they will fully grasp the new reality that could end their long-held dominance of the market is far from clear.

O'Flynn said: "Some of the

incumbents will be unable to react. New competitors are rushing in to offer energy solutions using innovative technology and different forms of finance to go after the very customer base on which the whole current utility business model is based."

The revolution will probably come faster than the utilities realise, but slower than the upstarts would like. "Either way," said one senior industry source, "change is coming."



Leading the charge: Joe Warren, boss of Powervault, one of several firms shaking up the energy market by using batteries to store solar power