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The renewables reality: clean energy hasn't risen for 25 years

Big countries are already cutting back on support for solar and wind. They should be doing the opposite, or else the renewable revolution will falter



Things are looking gloomy
Mark Pinder/reportdigital.co.uk

By Michael Le Page

THIS year has seen renewable records smashed in the UK. On 21 April, the country went a whole day without using coal to generate electricity – the first such day for 135 years. Then on 7 June, particularly sunny and windy conditions meant that renewable sources supplied more than half the UK's electricity.

Achievements like these make it sound like the green revolution is well under way. Many think the growth of renewables is now unstoppable, and that clean energy will entirely replace fossil fuels in the not-too-distant future.

They may need to think again. Spending on renewables in the UK is set to plummet 95 per cent over the next three years, according to a study by the London-based Green

Alliance think tank, as the ending of subsidies strangles investment. Other big countries are also cutting back on subsidies, including Germany and Japan.

Globally, renewables are still growing extremely fast, led by China, but some detect signs this is tailing off. “What you read in the media does not fit with the facts and figures,” says Jan Petter Hansen at the University of Bergen in Norway. His research suggests renewables could peak by 2030, before they supply even a tenth of the world’s energy.

Beyond the headlines

So is the green revolution already faltering? Do we need to do more to ensure a clean energy future?

Let’s start with the current situation. Despite the headlines, wind, solar, geothermal and bioenergy supply just 8 per cent of the world’s electricity, according to BP. That’s not great, considering that converting electricity generation to clean energy is the easy part of cutting carbon emissions.

“Just 14 per cent of our energy isn’t from fossil fuels, and this has barely changed in 25 years”

Looking beyond electricity, renewables supply only 3 per cent of the world’s total energy use, which is dominated by industries like aviation and shipping. Even counting hydro and nuclear, just 14 per cent of our energy isn’t from fossil fuels – and this figure has barely changed over the past 25 years (see graph).

Coal is far from dead, although the world has at least burned less of it in recent years. Hundreds of new coal plants are planned in countries such as India, though some people argue that most will never be completed.

Meanwhile, oil and gas are growing fast enough to negate the fall in emissions thanks to declining coal and rising renewables. At the rate we are going, a clean energy system is still centuries away – yet we are nearly out of time to limit global warming to 2°C.

But there’s no need to despair, say the optimists. The cost of electricity from wind and solar is becoming competitive with that from fossil fuels, even without subsidies. Once renewables are cheaper, their growth will accelerate and continue until they displace fossil fuels.

These optimists also point out that the growth in wind and solar has consistently beaten forecasts of fossil fuels companies and even the International Energy Agency.

Is the future really this rosy? On the face of it, the announcement last month of a subsidy-free solar farm, to be built by UK company Hive Energy, appears to back such a view. But subsidy-free projects remain unprofitable, says Giles Redpath, the firm’s CEO – despite building costs for solar farms falling considerably, and low interest rates making investment more affordable. “Realistically, the numbers don’t quite work. People are taking a bit of a risk,” Redpath says.

So it is a bad time for many developed countries – including the UK, Germany, Japan, Spain and Italy – to be cutting subsidies, which will inevitably put the brakes on renewables.

Of course, it could just be a blip. Growth could pick up again in a few years as costs fall

further, making wind and solar truly competitive with fossil fuels.

Here, history isn't encouraging. In the 1950s, during the golden age of nuclear, many predicted that it would grow inexorably and displace fossil fuels, at least for electricity generation. In reality, the adoption of new ways of producing electricity has taken decades and tailed off far short of sweeping the old methods aside.

In general, successful technologies grow slowly at first, relying on early adopters, then exponentially once they hit the mainstream, before finally levelling out. Researchers call it the S-curve, after the shape you get when you plot this on a graph.

Wind and solar are now in the exponential growth phase. But according to Hansen and colleagues, their growth curve shows early signs of levelling off (*Renewable and Sustainable Energy Reviews*, doi.org/f92686).

Of course, this is just one study. But there is no doubt that we need renewables to take off even more steeply if we are to get anywhere near the goals set out in the Paris climate agreement (see graph).

The optimists respond that renewable energy has unique advantages that will allow it to do just that. For instance, it is more flexible and scalable. "In Africa you see a single panel tied to a tree and someone is charging a phone," says Redpath.

However, renewables also have a huge disadvantage compared with other energy sources: intermittency and variability.

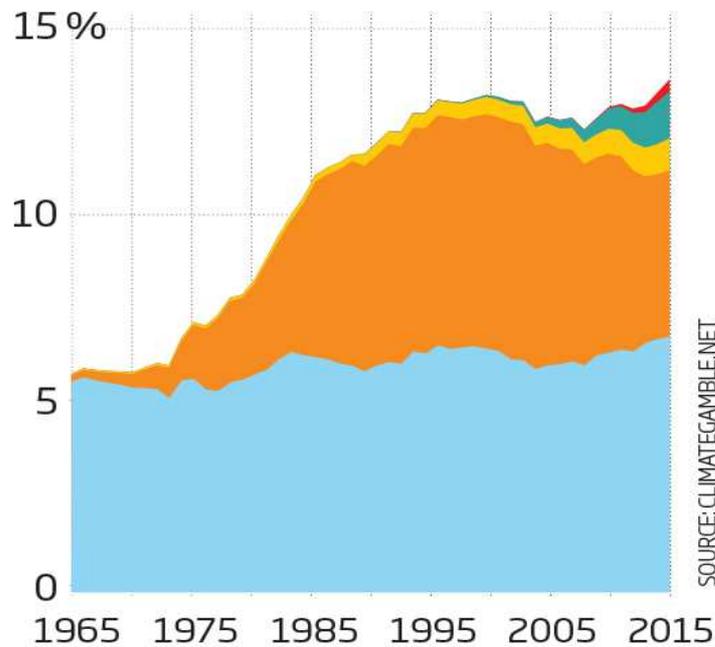
What's more, this isn't just a practical headache: it also makes renewables less profitable as they scale up. In generating systems with a high proportion of renewables, there's a surplus of electricity when it is sunny or windy, so its price plummets.

Part of the answer is to change the way the system works so that devices such as electric cars can take advantage of the surpluses, says Juliet Davenport of UK green energy provider Good Energy. And part of it is to store energy by using it to make hydrogen, or by charging batteries.

Flatlining

The global share of non-fossil fuel energy has barely grown in the past 25 years, with growth in wind and solar offset by falling nuclear

- Solar
- Wind
- Biomass and other
- Nuclear
- Hydro



The cost of battery storage is falling so fast that in just two or three years it could be feasible to store solar energy for just a few hours and sell when demand, and thus prices, are higher, says Redpath. But batteries are not going to solve the lack of sunlight in the winter.

This is why there is still debate about whether it's even feasible to get all our electricity from renewables, which would require vast amounts of storage or supergrids to connect generators to distant areas where there is demand. Both are hugely expensive.

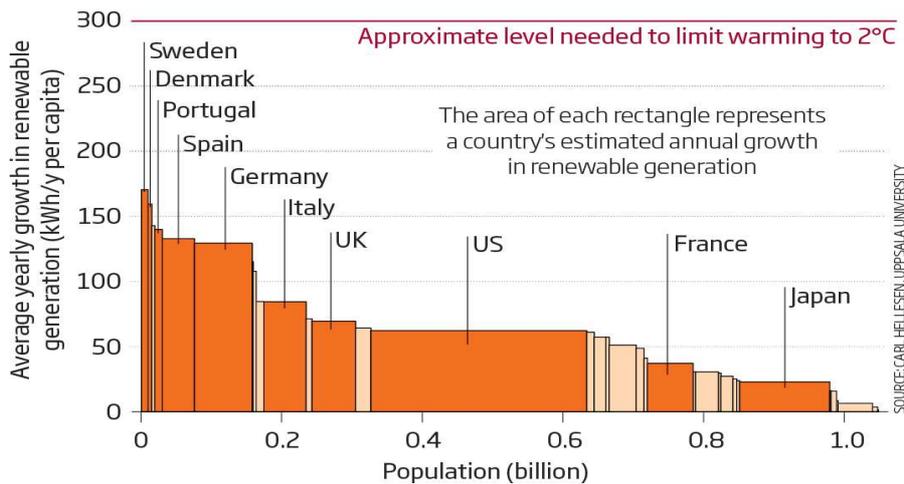
Davenport is one of the optimists. "There is a pathway to 100 per cent renewables," she says. "I think it can be economically viable [in the UK]."

But we should not focus only on wind and solar, argue many energy researchers. We have to hedge our bets, pursuing every option including carbon capture and storage as well as more nuclear power.

And clearly, the market alone cannot be relied upon to deliver a clean energy future. The message politicians need to hear loud and clear is that they must do even more to promote renewables. The good news is that expensive subsidies are far from being the only option.

Falling short

To avoid major global warming, each year the world's richest nations must all add renewable power generation equivalent to 300kWh/y per capita. But they are far from this goal, and the largest nations have some of the biggest shortfalls



The first priority should be ditching subsidies that funnel state money into dirty fossil fuels like coal, and imposing a high and rising price on emissions.

Then there are all the policy and infrastructure changes needed to ease renewables' access to the grid. Planning approval is the biggest obstacle to onshore wind in the UK, says Davenport, who is seeking the go-ahead for a subsidy-free project.

“There was nothing inevitable about France’s nuclear power revolution: the state made it happen”

France’s past shows what can be done: the country gets three-quarters of its electricity from nuclear. But there was nothing inevitable about France’s nuclear power revolution. It happened because the state decided to make it happen, after oil prices skyrocketed in the 1970s.

All countries need to follow this example and redouble their efforts to boost renewables. “The pace has to be increased,” says Hansen. “It’s an important message.”

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