

# Renewable energy sector runs the risk of overpowering market

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Another day, another billion-dollar renewable energy deal. That has been the story of the past few weeks as a raft of companies have made eye-catching solar and wind-power investments.

US private equity group, [KKR](#), swooped on Spanish solar developer Gestamp. Germany's [Siemens](#) won a huge wind-turbine order from Denmark's Dong

utility. [SunEdison](#), the US renewables juggernaut, agreed to buy the Vivint solar-installation group. A lot more transactions of this nature can be expected as what was once called "alternative energy" keeps growing.

But what if the extra-clean electricity eventually generated is doomed to make no money? Or to be more precise, not enough money to keep the companies producing it profitable without a lot more renewable subsidies?

This unsettling idea has emerged from research by a German energy economist, Lion Hirth, a former renewables analyst at Swedish utility Vattenfall who now runs a Berlin energy consultancy.

His work goes beyond the familiar thinking about renewable energy, namely that costs have plummeted faster and further than expected. This view is broadly correct. China, for example, now sells solar panels for only 61 cents per watt of electricity-generating capacity, according to the Bloomberg New Energy Finance research group. That is down from \$4.50 seven years ago, in 2014 prices, and it means that rooftop solar panel systems that once cost as much as a new car are now the price of a decent television.

Wind-farm costs are also falling. The world is adding more generating capacity for renewable power each year than for natural gas, coal and oil combined.

That includes other types of clean energy, such as hydropower. But wind and solar power

alone now account for more than 20 per cent of the electricity mix in countries including Denmark, Portugal, Spain, Ireland and Germany. This share is set to rise in line with efforts to combat climate change. Germany has a goal to get 80 per cent of its electricity from renewables by 2050 and much of it will have to come from wind and solar because there are constraints on other sources.

This is all good news for the planet. But Dr Hirth's research suggests that it will also make wind and solar generators victims of their own success, because the more their power penetrates an electricity grid, the more they cannibalise their own prices.

This is because of the unusual nature of wholesale electricity markets, where benchmark prices are set by traders buying and selling power by the hour, half hour or less. The hours in which solar and wind farms produce the most — such as midday for solar when the sun is strongest — are precisely the same hours that those farms depress the wholesale electricity price, because higher supplies flatten prices.

That means that on average, over the course of a year, the price these renewable generators get for selling their electricity is going to be lower than, say, a gas plant, which does not depend on intermittent sun or wind and therefore produces power in high-price hours as well as low ones.

The idea is not hypothetical. When hurricane-strength winds swept across Germany in March this year, wind and solar generators produced about as much as 30 nuclear power plants at one point in the afternoon, briefly making wholesale electricity worthless. This is happening when wind and solar have a 21 per cent share of electricity in Germany. So what happens if that proportion rises? Bad news, according to Dr Hirth. His modelling suggests that the value of wind power falls 40 per cent when wind farms' share of the market rises from zero to 30 per cent.

In other words, if wind has a 30 per cent share of the market, each megawatt hour of electricity it generates is worth 40 per cent less than a megawatt hour generated when there is no wind power on the grid.

The decline in value would be even steeper for solar generators, Dr Hirth says, because their highest producing hours are concentrated in a shorter time span when prices are low.

The upshot is that if we want more renewable electricity, we may have to spend more on smarter ways of storing and using power, or subsidise green generators for far longer, and more generously, than widely envisaged.

The cost of subsidies is already a concern in some countries, prompting clean-energy advocates to argue that they will not need such support for much longer. If Dr Hirth is correct, such hopes may be seriously misplaced