

**Opinion Inside Business**

## Nuclear is less costly than you think

Lower strike prices for renewable energy do not guarantee it is more competitive

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Wind turbines on the hills behind Hunterston B nuclear plant in West Kilbride © Reuters

Jonathan Ford YESTERDAY

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Does it make any sense to build nuclear plants in Britain? Not obviously, unless you are an atomic evangelist. In recent months, half the participants in the country's once-vaunted "nuclear renaissance" have packed their bags and departed. First Toshiba and then Hitachi dropped reactor projects, each citing their inability to get finance on terms that would deliver power to consumers at acceptable cost.

Critics point to the widening gap between the strike prices demanded by nuclear and renewable investors, highlighting the new low of £57.50 per megawatt hour for two UK offshore wind schemes due for delivery in 2022-23.

These are well below Britain's one live nuclear project, which gets £92.50 (in 2012 money) indexed for 35 years. In a letter to the Financial Times last week, business secretary Greg Clark said the government wanted nuclear's zero-carbon capacity, just not "at any price".

But is building nuclear really as uncompetitive as it is painted? Let's compare two hypothetical projects; one a nuclear plant producing 1 gigawatt of electricity, and the other an offshore wind project generating the same amount.

Now to get a similar amount of energy from offshore wind as from nuclear, you need more than just 1GW of nameplate capacity. The reactor will produce at a 90 per cent capacity factor and the wind farm about half that. So you need roughly 2GW.

Then there's another problem: those moments when the wind doesn't blow for a protracted period. Bridging that with battery storage remains prohibitively expensive. So to protect against it, you need almost 1GW of back-up generation.

Now with nuclear and renewables, the main driver of the cost of the electricity is the capital devoured by the project. So how does our hypothetical offshore scheme fare? The average price per kilowatt to build it is about £3,000, based on data in the [2018 Annual Technology Baseline](#) compiled by the US National Renewable Energy Laboratory. Multiply that by 2 and that gives you £6,000 per effective kW. Then there's the back-up gas plant on top: a further £1,200/kW. So the total cost is about £7,200/kW.

Now compare that to the estimated cost of Hinkley Point, seen as an absurdly expensive project. That comes in at £6,400/kW, plus a further £3,000-£4,000/kW for financing costs. Remember that nukes last at least twice as long as offshore renewables, meaning the latter will require a further round of capex in the reactor's lifetime. The apparent gap in prices shrinks.

So why are renewable projects able to post such low strike prices? One reason is that they don't bear all the costs on the network they generate, such as the need for back-up capacity that fires up only a few days a year, or being paid to switch off when there's too much wind. These costs are mutualised; something that's easier when renewables are a small part of the energy mix. They don't disappear though. And the more renewables on the system, the more they intrude.

Of course, this is not a static picture. Renewable strike prices have fallen from £140-£150/MWh in 2014 to £82.50 for projects delivered this year. As efficiency improves, they should fall further. Technology may find solutions to intermittency, reducing the need for back-up power.

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But here's the other surprising news: nuclear can get cheaper, too. Analysis for the [Energy Technologies Institute](#) (an organisation backed by the government and a number of energy companies) looked at 34 delivered nuclear projects round the world. While some first-of-a-kind schemes in Europe and North America came in at \$9,000-\$12,000/kW (£6,900-£9,200), 85 per cent came in at less than \$5,500/kW, and nearly 40 per cent at below \$3,500/kW (£2,700).

Much of that is down to time-saving efficiencies such as repeating the same design and having a more efficient supply chain. Low-cost projects don't just come from low-cost countries. Some of the cheapest were built in Japan and Korea.

Now, none of that is an argument for buying nuclear over renewables. Reactors last a long time, 60 years or more. There's a big opportunity cost to building lots if other cheaper solutions emerge.

But in a world where Britain has a commitment to make stringent emission reductions, there are no simple, easy answers. On its present course, the country may end up with just 4.4GW of

nuclear out of a 90GW system. That requires great faith in other technologies — whether renewables, interconnectors or others — somehow stepping up and delivering the goods.

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