

How tide has turned on UK tidal stream energy as costs ebb and reliability flows

Investors are seeing rising potential in tidal power as turbines become more powerful and easier to deploy



Orbital Marine operates powerful turbines below a plane-like floating platform near Orkney and has secured government funding to deploy three more. Photograph: Orbital Marine Power

Tom Wall

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or decades the immense practical difficulties of harnessing the powerful tides flowing around Britain's shorelines have put off investors and government officials searching for big renewable energy sources.

But as the costs of deploying turbines in tidal streams fall, more and more people are seeing the potential in an energy source that creates energy as the tides ebb and flow at predictable hours every day – energy that is renewable but not intermittent.

The cost of generating power from tidal streams has fallen by **40% since 2018** – and a **report** published last month by a government-backed research centre, Offshore Marine Catapult, forecasts prices could fall below nuclear energy in little over a decade, with one-megawatt hour of power due to cost as little as £78 by 2035 compared with **£92.50** for the new Hinkley Point C power plant.

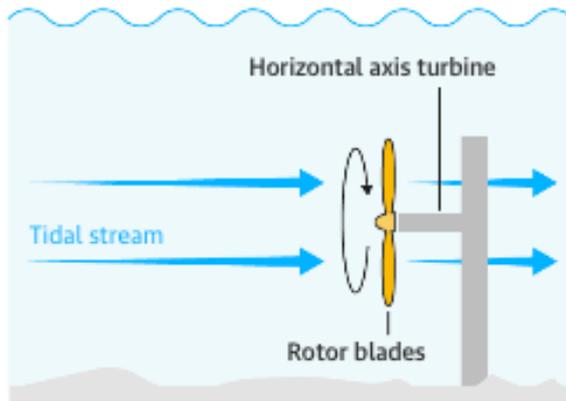
Simon Cheeseman, the report's author, argues tidal stream energy is at the "point of commercialisation" as companies are keen to scale up production and deployment. But he says the sector still needs careful nurturing to ensure it follows the successful trajectory of offshore wind, which in 11 years has gone from **generating** only enough energy for 4% of British homes to generating enough for 33% of British homes. "In the early days of offshore wind, you had strong government support. This is the perfect blueprint for tidal stream energy," he says. "There is no reason tidal can't follow that same route."

Orbital Marine, which operates what it says are the world's most powerful turbines below a plane-like floating platform near Orkney, has secured government funding to deploy three more floating turbines next year. Each platform can generate enough power for 2,000 homes and creates an estimated 100 jobs, according to the firm. "We want this to kickstart a real phase of change for us. We want to start manufacturing consistently and pull in more commercial investment," says Andrew Scott, the company's chief executive. "This is the first time in my 20 years in marine renewables that we've got a genuine chance of making tidal stream energy work commercially."

How tidal power generators capture energy from the natural ebb and flow of the oceans

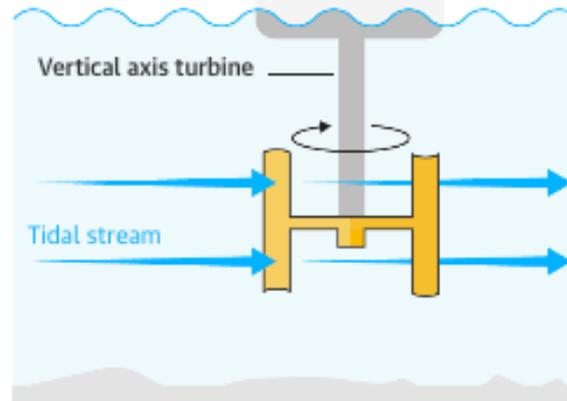
Tidal stream: horizontal axis device

Similar to a wind turbine. The tidal stream turns rotor blades to generate power



Tidal stream: vertical axis turbine

Uses two scoop-shaped blades rotating on a vertical axis to harness energy

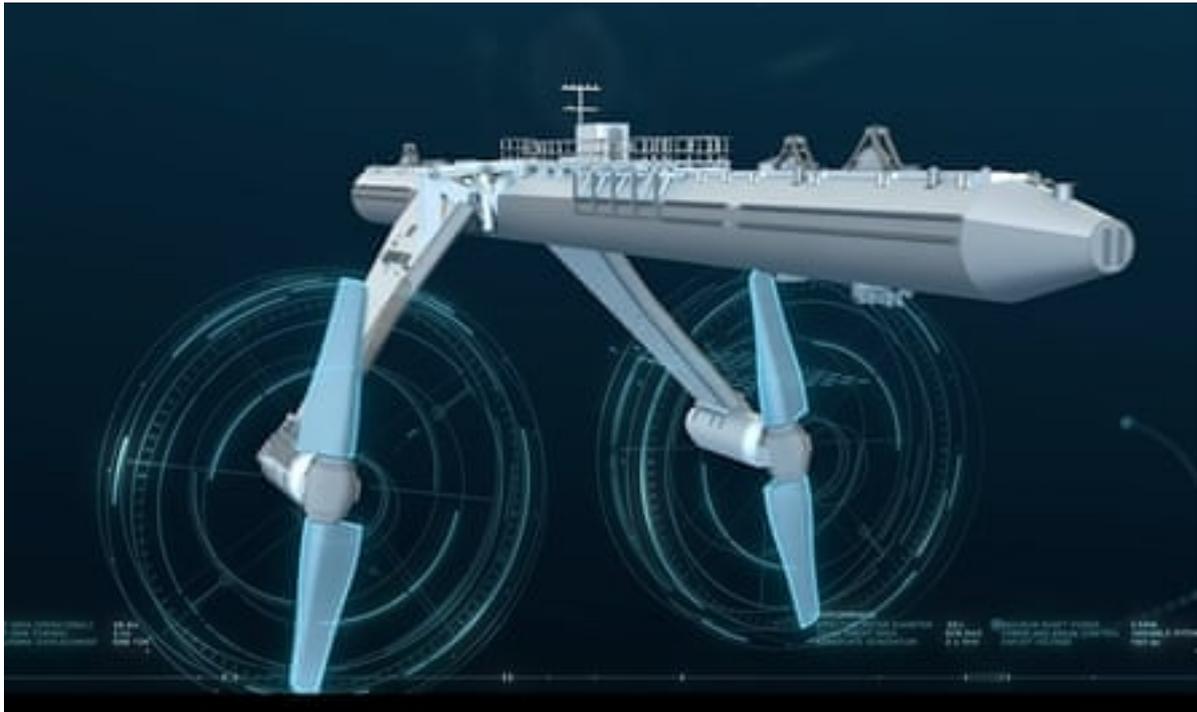


Guardian graphic. Source: The European Marine Energy Centre

Another pioneering developer, Simec Atlantis Energy, is planning to install up to 56 turbines on the seabed at the northernmost tip of **Scotland** by 2027.

“We’ve got the world’s largest tidal stream project off the coast of Caithness – 70% of the global tidal output has come from that site,” says Sean Parsons, the company’s external affairs director. “We’ve just won a government contract to expand that site from what is now 6 megawatts to take it all the way up to 34 megawatts – enough power for 68,000 homes. It’s tidal at scale.”

Orders are even coming in from the rest of the world. “I’m feeling very excited about the industry and about what we are doing,” says John Meagher, director of business development at Nova Innovation, which operates seabed-mounted turbines off the remote Shetland Islands. “We are doubling the size of our Shetland tidal array from three to six turbines and we’ve exported our first turbine to Canada. We’ve won a feasibility study to look at the potential for an array [of turbines] in Indonesia. It just feels like things have really started to change.”



An illustration of Orbital Marine's underwater turbines. Photograph: Orbital Marine

Unlike tidal barrages and tidal lagoons, which involve mounting turbines in sea walls, tidal stream turbines are lowered directly into strong tides out at sea. The challenges of installing and testing turbines in sometimes turbulent waters have made it far more costly than building wind and solar farms. But developers have been steadily refining their designs and driving down costs, with turbines becoming more powerful and easier to deploy at sea. “We are learning by doing: it used to take two days to connect up devices in the water but now it takes just two hours,” says Cheeseman.



'We've got no choice': locals fear life as lab rats in UK hydrogen heating pilot

While tidal power is always likely to supply a smaller proportion of Britain's renewable energy, the report says it could play a crucial part in decarbonising the nation's energy system. "Offshore wind and solar are intermittent. But we know for certain when the tides come in and go out," says Cheeseman. "It provides the energy buffer that you need in a system that will increasingly depend on irregular power."

Government support, however, has been patchy. Ringfenced funding was introduced in 2008 but scrapped in 2016, leading to the liquidation of some developers and restricting the industry to small-scale prototype turbines for five years. But at the end of last year the ministers **allocated** £20m worth of funding to the sector, under the government's "contract for difference" scheme, which provides a guaranteed price for renewable energy. Four commercial-scale tidal energy bids, including two from Orbital Marine and one from Simec Atlantis, were successful. These projects are expected to deliver a near fivefold increase in the energy from British tidal power by 2027, upping the amount generated rising from 10.4 megawatts to 51.2 megawatts.

The government's renewed faith in the sector is already attracting a surprising range of private-sector investors. "It was almost an impossible job to raise investment but since [the funding announcement] we've managed to get

investment from major oil and gas providers and we've got an active inbound interest in equity investment right now," says Scott.

Nevertheless, problems remain. Unlike offshore wind, there is no official target for marine energy including tidal stream power, which is needed to drive investment. And the process of getting approval for underwater turbines can be extremely long-winded. It has taken Nova Innovation two-and-a-half years from gaining the seabed lease to being ready to install a turbine in Nova Scotia, Canada. But in the UK it can take more than twice as long to complete a tidal stream energy project, with everything from environmental impact assessments to grid connection causing delays. "From the word go ... to actually putting turbines in the water, you are looking at six years – that's a huge difference," says Meagher.

The tidal stream industry is growing once more. But there is no guarantee that ringfenced subsidies for tidal stream energy will remain in the next funding round, expected at the end of the year. "This is arguably the most important period," warns Scott. "We've got proven technologies that are ready to be commercialised and growing export markets. If the government falls short in its commitment now, it could squander this incredible opportunity for the UK to become a world leader in tidal stream energy."