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PEAK POWER

A secluded Lake District holiday home is the surprising setting for a Tesla experiment in green technology, says *Daniel Pembrey*

Deep in the mountains of the Lake District lies the future of British housing. Aquila, as the lakeside home is called, blends into its rural surroundings well enough, thanks to solid stone walls. Water leaks down the surrounding hillsides and snow-dusted peaks catch the light, as do the solar panels on the house's flat roof, which are hidden from view on the approach road. These were added by the electric car giant Tesla, along with a host of ingenious gadgets that make this one of the most ecofriendly homes in the world. "We're all visitors to these parts during winter," a cheerful local bartender tells me. "This is Mother Nature's home."

Mercifully, Aquila is built into the hillside safely above the swollen lake. Except it's not a lake. Haweswater is actually a reservoir, created nearly a century ago by Manchester Corporation to supply water to the industrial northwest. This contemporary three-bedroom house began life as a Water Board building that was used to store industrial equipment. The entrepreneur Stephen O'Sullivan bought it as an abandoned shell in 2014.

"The opportunity to acquire such an intriguing structure in beautiful wilderness comes along once in a lifetime," O'Sullivan says. "Given the strong bones of the building, I was keen to maintain its essential character." The renovation lent it a New York loft-style aesthetic, with exposed steam beams, bulkhead lighting and inviting vintage furniture. Aquila can now be rented via the short-stay website Unique Homestays, with prices starting at £1,495 a week for up to six guests.

Sheltering from horizontal hail, I can barely hear the hum of the technology that is keeping me warm as I look out over the choppy, slate-grey water. In addition to the solar panels, Tesla has installed one of its Powerwall home battery systems and a charging point for electric cars. The unusual setup seeks to showcase the low-emission lifestyle so the eco-curious can try before they buy.

"It sips electricity," O'Sullivan says. "The building has been insulated to modern standards and has underfloor heating powered by an air-source heat pump. With the Powerwall and the solar system now fitted, I expect it to run entirely on solar power throughout the summer. Even in winter, we should have periods when the property runs only on solar."

Off-grid Aquila may seem, but it's only a short drive from Askham Hall, a hotel with a Michelin-starred restaurant. Tesla charging points are going in there, too, as the local community increasingly embraces sustainable living. Gliding past mossy trees in a fast, eerily quiet electric car is like travelling by magic carpet.

Tesla's broader aim is to help the owners of electric vehicles harness solar energy and draw power from the grid at times when it is plentiful, storing it for when need arises. It's not unlike the thinking that created the reservoir – except it's more of a challenge because of the lack of sunlight. If Tesla can make solar power work here, then it can work anywhere.

The Powerwall battery exploits the same technology as those the company has honed for its cars. It is guaranteed to be working at more than 80% of its stated capacity after 10 years, and the latest model offers 13.5 kilowatt hours (kWh) of storage, amply covering the daily energy needs of an average household. With a Backup Gateway that maintains supply during power cuts, the Powerwall unit is priced at £7,750, excluding installation.

"You may pay less for an alternative brand, but they will be smaller units," says Chris Jardine, an Oxford University academic who co-founded the clean-tech energy firm Joju Solar. "Tesla represents by far the lowest price per kilowatt hour of storage, and you have peace of mind that it will perform well over time."

The battery looks like a large, sleek domestic radiator, and at Aquila it has been placed defiantly on the outside of the house. It is silent (unlike the wind whistling as I venture out), with only a green pulse to indicate it's active. For those wishing to delve deeper, an app shows how energy flows from the various inputs (solar, Powerwall, grid), displayed visually and in real time. It's easy to see how checking it could become addictive. This might sound like a gimmick, but its users put a lot of stock in no longer being beholden to the seemingly opaque tariffs of the big-six energy suppliers.

Some energy firms have been quick to work with Tesla. Octopus has used its dynamic pricing technology to offer a new tariff for those with a Tesla car and Powerwall. This currently offers 8p per kWh drawn from the grid and 8p per kWh sold back. That export rate represents about 40% more than the best rates available under the government's new smart export guarantee scheme.

Electricity prices are widely expected to rise this decade, and not just because of demand from electric vehicles. The cost of providing baseload power from new nuclear stations such as Hinkley Point C is proving to be extraordinarily expensive. Those staying on conventional energy tariffs should not expect rates to fall.

Still, the upfront cost of a Powerwall, solar panels and installation for a standard home – anything from £12,000 to £20,000 or more – make this a big-ticket purchase. Based on what we know about likely energy savings, investing north of £12,000 implies a payback period of 10 or more years, although this will depend on individual circumstances. I am certainly a convert, but a leap of faith may be required for those who wish to lead the charge.

uniquehomestays.com; tesla.com

WONDER WALL

Richard Graham is a mechanical engineer in his fifties who lives with his partner in a three-bedroom semi near Kendal, Cumbria. Their children left home several years ago. Uncomfortable with the "relentless" rises in tariffs from their big-six energy provider, he decided to take action after he bought an electric car in 2018.

Graham had solar panels installed for £4,500 and bought a Tesla Powerwall battery, which at that time cost £6,000 for 13.5kWh of storage, but had no backup capability for power cuts. The total investment came to £11,000.

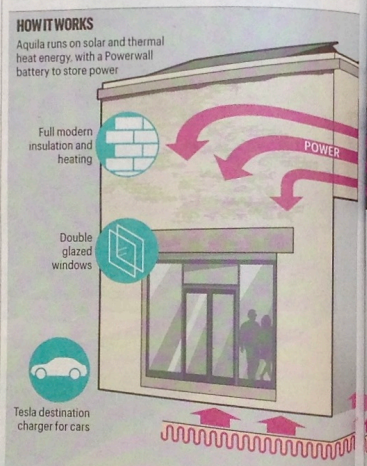
The couple use gas for heating and hot water, and, on average, consume 6kWh of power daily for household electrical use. Graham typically uses an additional 4kWh to charge his car, which would double were he not charging it at work during the day.

The couple were late beneficiaries of the old feed-in tariff scheme, which guarantees them 4.5p per kWh for energy sold back to the grid. They also have a dual-rate meter that allows them to take advantage of cheaper Economy 7 tariffs.

It seems the investment has paid off: in 2019, the couple's annual electricity bill dropped by 89% to just £52, nearly all of which was for off-peak usage that went into the battery. They made £300 selling power back to the grid, resulting in a net income of £248. Graham estimates that his old tariff would have gone up by 20% to about £570, so they are more than £800 a year better off.

He expects conventional tariffs to keep rising – and so, too, his annual saving. On this basis, he has calculated that his payback period will be 10 years or less. Further energy savings could come from converting to electric heating and hot water, or from his partner getting an electric car, but these would require follow-on investments in a new heating unit, car and battery with sufficient capacity.

Graham has no regrets. "It's hard to overstate the sense of freedom from no longer feeling like I'm being held hostage by my energy provider," he says. "Living in such a beautiful, natural part of the world, I also feel good about doing my bit for the environment. It puts a spring in my walking boot."



Aquila, above and right, is a showcase for the low-emission lifestyle