

Charged Up: Are we missing the potential of domestic battery storage for the energy transition?

It's accepted that batteries will play a more and more important role in managing electricity demand as we transition to a greater proportion of renewables, but have we been thinking about them in the wrong way? I read a fascinating article on using batteries to manage weather-dependent renewable yields. This appealed to the nerd in me and, importantly, it gave a different view on the use of batteries for standalone domestic use – without requiring homeowners to install local renewable generation. Some patent searching with the new AI-powered vector search in Patently showed in minutes these concepts have been around since the 1990s.

However, I did find relatively few applications. Perhaps this is an area where more R&D is needed, and there's space for a disruptive new entrant. The potential seems immense as battery technology advances.

There's a lot written about how batteries flatten the “duck curve” of solar power, storing excess energy from solar in the day and then delivering it at night. This makes perfect sense in California and other reliably sunny countries.

But what about the UK, where our renewable energy is much less unreliable? Solar power plummets if it's cloudy and wind can also vary hugely. There's a reason for the cliché about British people discussing the weather. The crucial point made in the article was to suggest in the UK we look ahead and control the batteries to charge them in advance of an anticipated drop in renewable output.

Weather forecasting has become highly accurate in a 24-hour window and is only set to

improve. The key insight in the article was to look ahead and see that tomorrow will be cloudy so solar output will drop. In that case, rather than operate the battery to store excess from the home solar generation (there might well be none), charge the battery the night before, creating a demand for baseload and/or wind energy, typically the greenest energy mix.

I thought this was a great idea, and it shows how domestic batteries are useful even without renewable generation on site. We now have smart tariffs and times when you are paid to reduce consumption in the UK. Price here is the signal of excess / not enough generation and a low price is heavily dependent on renewables pushing out more expensive forms of generation to reduce the marginal price.

From Patently's vector search, I found that weather dependent battery-charging with associated solar power have been proposed in patent applications some time ago (e.g. JP H04200245A from 1992), but the link between weather in the future and battery storage seems not have been considered often. Perhaps now it's time has come. The existence of this old publication gives some freedom to use the concept free of the risk of patent infringement, but it does not mean that innovators in the field cannot protect their developments.

With much of the world having to adjust to less reliable weather-dependent renewables, could domestic batteries be the way forward? In the UK there's a push to install heat pumps, this shifts demand from gas to electricity. Might we adjust our thinking of domestic batteries to associate it with demand, smoothing peaks by charging in advance when renewable energy is more abundant?