

Investment in energy storage vital if renewables to achieve full potential

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Government subsidies should be used to encourage investment in energy storage systems if renewable power is to be fully integrated into the sector, according to researchers at the University of East Anglia (UEA).

Variable output [renewable energy](#) systems, such as wind turbines and solar panels, are growing across Europe and contribute to supply and price volatility in electricity markets.

Systems for energy storage, for example reversed hydro power plants, large scale compressed air systems and batteries, provide ways to compensate for this variable power supply by storing excess power and releasing it when there is a production shortage.

However, the researchers argue that as the amount of renewable energy entering national power grids increases, so does the potential impact of volatility and therefore the need for storage. As subsidies for setting up renewable energy projects are gradually being removed, because they are reaching market maturity, these funds should instead be used to develop storage systems that could provide viable investment opportunities.

The study, led by Dr Dimitris Zafirakis and Dr Konstantinos Chalvatzis of UEA's Norwich Business School, explored the potential of [energy storage systems](#) to return profits by buying when energy is cheap and selling when it is expensive, known as arbitrage. They tested this in a number of European electricity markets and matched various trading strategies and storage technologies with market characteristics.

The researchers found that this buy cheap, sell expensive approach alone cannot provide adequate revenue to justify investment. However, if the decarbonisation of electricity is to be achieved by increasing renewables, investment in storage has to be encouraged, for example through a combination of arbitrage and state subsidies. The findings are published today in the journal *Applied Energy*.

Dr Chalvatzis, a senior lecturer in business and climate change, said: "It is good to adjust subsidies for [renewable energy technologies](#) that have reached maturity, but you have to start thinking about subsidising storage, as this can take us to using 100 per cent [renewable energy sources](#)."

"We need sufficient storage and more investment in storage systems in order for renewable energy to reach its full potential. Subsidies would encourage investment, which in turn would enable further integration of renewables into the energy sector."

"The fact that for some days countries such as Germany and Portugal are running their entire electricity network exclusively on renewable energy shows how far we have come to rely on it as a power source and this will continue to increase."

Despite this, investment in energy storage has been limited until now, largely due to the high capital costs of most systems. Therefore the researchers suggest that the main focus should be on multiple grid services and associated welfare effects, such as reduced consumer energy costs and increased energy security, that energy storage technologies can provide, triggering in this way state support and market incentives.

The study focused on two types of [storage systems](#) - pumped hydro storage (PHS) and compressed air energy storage (CAES) - examining

different energy trade strategies and representative European power markets, including the APX Power UK.

Provided by University of East Anglia

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