

KEYNOTE INTERVIEW

Storing up value



*Energy storage will play a crucial role in the rollout of renewables, says **Alex Leung**, and can be a particularly attractive proposition for investors*

Power grids are poised for profound change over the coming decades as decarbonisation gathers pace and renewables start to dominate the energy mix. Electrical systems will also need to integrate this low-carbon energy smoothly, compromising neither grid efficiency nor performance, if the transition is to be seamless.

This is where energy storage could be the missing piece in the puzzle, argues Alex Leung, infrastructure analyst, research and strategy, at UBS Asset Management.

Pairing energy storage with renewables is a natural fit, providing grid flexibility with variable load balancing that will enable the acceleration of wind and solar capacity.

Q How can energy storage support decarbonisation

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and renewables' buildout efforts?

Energy storage can smooth out the production of renewable energy even when the sun isn't shining or the wind blowing. That is important because if we want clean renewable energy and a 100 percent carbon-free grid, storage is the key ingredient.

Renewable energy and storage can work hand-in-hand in a symbiotic relationship. We often hear about how we need energy storage to absorb the oversupply of renewable generation; for example, excess solar production in California. But on the other side of the equation, we also need more energy storage to support new solar and wind

capacity. Energy storage is an enabler for higher renewable energy penetration.

Q Do you think the European policy shift away from Russian gas will impact renewables and storage in the energy mix?

We are obviously seeing a lot of focus on commodities such as natural gas, especially around US liquefied natural gas supply. But I think it is more important to look longer term.

In the past, when energy prices were high, renewables and clean technologies only became more attractive, and the industry innovated and new technologies emerged. All of this could actually accelerate the energy transition, despite all the attention being put on fossil fuels.

Q Do you see revenue opportunities vary between different markets and geographies?

There are very different business models depending on where you are, and the jurisdictions involved. For example, some markets have more wind capacity that produces mostly at night, while others have more solar that produces during the day.

Therefore, how an energy storage project operates could be very different depending on the location. At a basic level, especially for standalone projects, it is about the arbitrage of price volatility. What a lot of people don't understand is that wholesale electricity prices are very different from other commodities.

If you look at crude oil or natural gas, a 5 or 10 percent daily price change is considered significant. However, if

you look at electricity prices, those can easily move 50 percent, 100 percent or even more over the course of several hours, and it does that almost every single day.

Energy storage can charge during the low-price hours and discharge later in the day when prices increase and earn that arbitrage revenue spread. Energy storage also has a diverse revenue stack.

Price arbitrage is just one revenue stream. Another one is called ancillary services, which includes services that help the grid maintain a certain frequency, provide short-term backup capacity, or other reliability-related services.

Finally, in some markets like California, energy storage projects can secure long-term capacity contracts with utilities. In markets like Texas, projects can enter into financial hedges to

obtain a more stable source of cashflow. The stability of these types of revenue allows projects to take on more leverage, which enhances project returns.

Q Energy storage is reaching a tipping point in the US. How did we get here and what are some of the market opportunities?

Energy storage project costs have fallen by about 80 percent over the past 10 years, according to the National Renewable Energy Laboratory, and has been helped by massive R&D spending, technological improvements and growing economies of scale that came with the popularisation of electric vehicles. But battery cost is just one key driver; government policy is equally important.

For example, the US regulator FERC opened up significant revenue opportunities for storage projects several years ago when it passed Order 841, which allowed battery projects to participate in wholesale electricity markets and improved project economics.

It is a combination of technology, politics, cost and economics that pushed the industry to this tipping point. And I think it is a really appropriate characterisation because last year in the US, installed capacity of energy storage projects more than tripled to over 6GW, and will push past 10GW in 2022 based on EIA data. Investment from institutional investors will also accelerate because the asset class is maturing.

Q How can energy storage fall under the umbrella of sustainable investing?

Energy storage is a great fit for investors pursuing a sustainable investment strategy. In fact, the construction and operation of energy storage projects is explicitly highlighted in the EU taxonomy for sustainable activities.

Energy storage enables higher renewable energy penetration, which directly



Q What does it take to be successful in energy storage?

It is an exciting industry for investors but there is also a steep learning curve. There is the technical and engineering aspect that investors must understand, but also revenue maximisation is complicated.

Energy storage thrives in a volatile commodity price environment, so investors must understand the underlying commodity price dynamics and the other sources of revenue like ancillary services and contracts.

They also need to understand how to optimise revenues, as thousands of decisions are made in real time with the help of advanced software and algorithms – when to charge and discharge, which services to bid for, all while operating within the technical and contractual constraints. You need expertise across power markets, commodity trading, advanced analytics and engineering to maximise the value of a project.

mitigates climate change. That is why energy storage investments are also a good fit for EU SFDR Article 9 funds. Investments under Article 9 must be able to directly mitigate climate change, a more stringent qualification than Article 8 investments, which only need to “promote” environmental and social characteristics.

Q How can storage help and enhance grid reliability as we move towards greater low-carbon energy?

Grid resiliency is clearly a hot topic, especially following the Texas winter freeze and also California’s wildfires in recent years. When there is a disaster or emergency event, the grid can draw electricity from a nearby energy storage project, rather than rely on electricity from generation facilities that could be hundreds of miles away, where transmission lines may have been compromised during the disaster.

Another interesting thing that came out from the Texas winter freeze, which is often overlooked by the media, was the importance of the grid’s frequency. A grid is a delicate system that must maintain a 60Hz frequency. If there is even a small deviation for a short period of time, the entire system can collapse and cause cascading blackouts.

That is what happened in Texas when the grid’s frequency dropped to 59.4Hz for just a few minutes, which forced the grid operator to shut down a large part of the grid. Perhaps if there were enough energy storage projects running during the winter freeze, they could have kept the frequency at 60Hz. This just adds another layer to how batteries can support grid resiliency.

Q How will increased renewables capacity change the economics of energy storage moving forward?

Although renewables are a great resource for decarbonisation, they are also intermittent and volatile. That

means once you have higher renewable penetration, power prices also become more volatile.

All things equal, a significant increase in renewables capacity would therefore improve energy storage economics because of the increased volatility. However, as I mentioned before, the relationship between renewables and energy storage is more symbiotic in reality.

“The current geopolitical situation means that governments and companies are even more willing to explore energy storage”

Q How are supply-chain issues and raw material cost inflation projected to impact the storage sector?

UBS’s commodity analysts estimate that battery costs are going to be around 20 percent higher because of commodity and metal prices. But you need to bear in mind that the battery is just one part of the energy storage system.

The total energy storage system cost is probably only up by 10 percent, when we include balance of system equipment. Finally, if we include construction and other development costs, then the actual project cost inflation is probably in the single digits, which is more manageable if you consider that project costs have already come down 80 percent and will continue to decline for years to come.

It reminds me of when the US imposed a 30 percent tariff on Chinese-made solar panels several years ago. In the beginning, there were a lot of concerns around projects being impacted, but over time, the industry simply learns and adapts to these kinds of shocks.

Q Are deglobalisation trends likely to affect access to the materials needed for storage?

Raw material concerns are nothing new in the world of renewables and storage. If anything, the current geopolitical situation means that governments and companies are even more willing to explore energy storage and other means to become energy self-sufficient. And when there is demand, there will be innovation around the supply chain, chemistries and technologies.

One example of the industry’s adaptability is the shift to lithium iron phosphate batteries in the last several years, in order to avoid using more controversial commodities such as cobalt and nickel used in other battery chemistries. I think it really highlights how we should never underestimate the industry’s ingenuity, especially when backed by strong demand. ■

