Five cutting-edge innovations redefining battery technology

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In 1991, Sony ushered a new era of growth in consumer electronics by commercialising a rechargeable lithium-ion (li-ion) battery and Sony's camcorders were among the first devices to make use of this technology. Since then, li-ion batteries have become so ubiquitous that today we often take their role in our mobile phones and laptops for granted.

However, battery technology is now at another turning point—one that promises to evoke a level of amazement for the world comparable to, if not surpassing, that of 1991. This blog explores five cutting-edge innovations in the realm of battery technology that are captivating the industry, consumers, and investors alike.

The WisdomTree Battery Solutions UCITS ETF (VOLT):
The innovations outlined in this blog are a handful of examples taken from the WisdomTree Battery Solutions UCITS ETF (VOLT). VOLT invests across the battery value chain, which is a function of four key categories: raw materials, manufacturing, enablers, and emerging technologies. Within those categories, the fund gives investors exposure to as many as 37 different subsectors. The most promising technologies and companies are selected based on a systematic process developed in partnership with energy transition industry experts, Wood Mackenzie.

When it comes to rapidly evolving technologies, casting the net wide is a good idea to achieve diversification and helps investors capture a broader mix of potential moonshots – any of which can end up achieving outsized returns if the technology takes off.

1. An electric SUV that flies

Joby Aviation, a Silicon Valley startup, is promoting its electric vertical take-off and landing (eVTOL) aircraft, capable of accommodating up to five passengers, including the pilot, to provide an experience akin to riding in an SUV1 rather than an airplane. These flying SUVs, or eVTOLs, are powered by a li-ion battery and boast a top speed of 200 miles per hour. They fly quietly, emit zero running emissions, and promise a range of 150 miles on a single charge.

On 13 November, the company successfully conducted an exhibition flight over New York City, where it plans to initially introduce its eVTOLs as commercial air taxis by 2025. Markets have been closely

monitoring and expressing considerable enthusiasm for companies like Joby and its close competitor, Archer Aviation, as they make strides toward realising their visions. In just a few years, people might be taking to the skies by simply summoning an Uber. Anyone up for a flying taxi?

2. Batteries on wheels

3. Currents of change – electric naval technology

Boats and ships represent an exciting frontier in battery technology. While large, deep-sea, vessels such as cruise ships and cargo ships may not achieve full electrification in the near future, they have begun embracing hybrid technology to reduce emissions. Hybrid vessels are also exploring the integration of solar panels to enhance efficiency and are utilising ports equipped with renewable energy sources to minimise their overall emissions.

Smaller vessels, like ferries and tugboats, however, do have the potential to transition to fully electric power, given their typically shorter travel distances. Fortunately, the technology necessary to decarbonise vessels of all sizes already exists, with companies such as Wärtsilä and Mitsubishi Heavy Industries leading the charge in the quest to decarbonise sea vessels.

4. No cables required

Wireless charging is another new technology that automakers are exploring to distinguish themselves from competitors. While we're familiar with wireless charging for small gadgets like smartphones and smartwatches, the aim here is to extend the same principle to EVs. BMW has taken the lead by introducing wireless charging pads that establish a magnetic field between the pad and the vehicle to charge the battery.

Wireless charging offers numerous benefits. Firstly, it enhances the customer experience by eliminating the need for bulky cables. It also has the potential to standardise charging methods, allowing all cars to utilise wireless pads instead of the current diversity seen in charging cable connectors. This technology opens avenues for on-the-go charging on smart roads and highways, alleviating range anxiety and potentially reducing EV costs if automakers opt for smaller batteries. Additionally, it complements autonomous driving. When instructing the car to park itself, wireless charging enables the vehicle to charge without human intervention.

5. Going further on a single charge

Conclusion

The list above is far from exhaustive. Many other examples, such as hydrogen fuel cells or recycling, could also be mentioned – technologies in their infancy, but wielding immense potential. The common denominator is that none of these technologies were mainstream a few years ago. Some still aren't. Yet, this is precisely what enthrals thematic investors—identifying the next big thing. And to do that, you don't always have to venture into the unknown. Sometimes, merely observing which way the current is flowing can reveal a lot. Certainly, in the world of batteries, there are many exciting developments charging ahead.

1 Sport utility vehicle

2 Based on the Massachusetts Institute of Technology's 'Unparking' project 2020.

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