BIZCOMMUNITY

Why the batteries of electric vehicles should be repurposed

By Lance Dickerson

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A few decades ago the mass rollout of electric vehicles (EVs) may have been a pipe dream, but with various European cities setting near-term deadlines on the phasing out of fossil-fuel combustion engines, there's no turning back the clock. Our planet is depending on it.

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However, it is in the far East that we find the shining light of EV mobility. Chinese city Shenzhen leads the charge, with nearly its entire taxi and bus fleet having been converted to electrical. In addition to that, by last year, over 60,000 light delivery vehicles, or 35% of the government's fleet, were electric.

Shenzhen, as a smart mobility torch-bearer, has given the rest of the world a blueprint to fast-track their earth-friendly mobility transformation. Subsidies create near cost parity between EVs and combustion vehicles, subsidies for charging infrastructure have resulted in a rapidly growing network, road restrictions incentivise the use of no-emission vehicles, preferential electricity rates and mandated district targets have driven this rapid transformation. Looking ahead, market forces are expected to take over the EV economy they created.

The ramifications for the global trade system are obviously highly complex and worth many billions of dollars. Much of our modern history has depended on oil and the associated geopolitical implications. However, despite denialists' fervent objections, the global warming evidence continues to stack up and that in order to safeguard our planet, there can be no further delays in pursuing clean, or green, mobility and, importantly, power.

Wind and solar power continue to become more affordable and efficient, and South Africa's government recently reaffirmed its commitment to renewable energy being an important part of the country's energy mix over the medium and long term.

Much like EVs, for all the existing supply chains and industry at stake, the inevitable transformation to a cleaner, or green, power sources cannot be turned back.

The downside of lithium-ion batteries

But it's not all roses. EVs run off lithium-ion batteries. These batteries are replaced after a few years in the vehicle when the output of the battery cannot justify its weight in the vehicle. At this point, the battery is replaced with a new one.

Various estimates and industry experts had predicted that by this year, China would produce 500,000 metric tons of used lithium-ion batteries. By 2030, they say, this number will reach two million metric tons. Most of these will end up in landfills.

As demand for the ingredients that make these batteries surges - mines need to keep up and extract these metals from the earth - our ability to dispose of used batteries or recycle them has not kept pace.

It is a bitter irony that an advancement in technology, one that should be celebrated for its low emission and green motivation, should itself become a culprit in producing waste that's harmful to the planet.

The world has taken note of this imbalance. In March this year, a bill called the Battery and Critical Minerals Recycling Act of 2020 was introduced in the Senate in the US. It seeks to boost the Federal government's investment in lithium-ion battery recycling.

A chance at a second life

However, there is a critical fact about used EV batteries themselves that holds the key to two environmental questions: first, what can we do to keep used EV batteries out of landfills, and then, how can we provide energy storage with lithium-ion performance without providing further strain on the environment?

The answer lies in repurposing old EV batteries for stationary energy storage.

As mentioned already - there comes a time in every EV life that the output of its battery does not justify its weight: after all, EVs need to move. However, for stationary storage, for uninterrupted power supply (UPS) systems or backup to provide constant power from renewable energy sources, weight does not matter.

The next obvious question is whether the used batteries are sub-par, meaning repurposing the cells for stationary storage is simply a case of transporting waste from one place to another.

The answer is unequivocal - used EV lithium-ion batteries have at least a further 3,500 to 5,000 cycles in them, providing a lifespan of about 10 to 15 years, all the while exploiting the performance of lithium-ion, but at a significantly reduced cost.

Repurposing batteries translates to longer life

Automotive cells are built to tolerate higher temperatures during an operation before damage starts occurring. This higher

temperature tolerance allows higher discharge currents. This is significantly higher than batteries built for storage. Limiting discharge in the repurposed batteries translates to longer battery life.

The obvious ramifications of repurposing these EV batteries and giving them a second life is that it gives the planet a breather. Instead of competing with the EV sector for raw materials to build new batteries, repurposing the tons of existing used batteries takes pressure off mining activities and the subsequent supply chains, all of which carry a heavy carbon burden.

In South Africa, which buys in Rands, the business case is compelling, not least because our government has finally seen the light regarding cleaning up our coal-based power grid, but also because the grid is so unreliable and unpredictable that more and more businesses and households are investing in battery backup. This gives them access to lithium-ion performance at a more attractive price point.

We have an opportunity to contribute to the problem of discarded EV batteries in a proactive and carbon-friendly manner. Second life batteries are to energy what recycling is to household and business consumption - a sustainable alternative to give our planet a breathing chance.

ABOUT THE AUTHOR

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