Lithium-ion batteries jerusalem

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This is one in a series about the Israeli ClimateTech innovation ecosystem. Please read the introductory article to learn more about the wonderful Public-Private partnership ecosystem flourishing in Israel.

Battery storage is an incredibly important piece in the puzzle of decarbonization. I have written about several different technologies for grid storage - using chemical or mechanical means to store renewable energy for timely release into the electrical grid.

One class of storage technology I have not written much about in this column is portable storage - the kinds of batteries that allow you to carry a powerful mini-computer in your pocket or send a Tesla from zero to 60 lickety-split.

The premier technology for portable storage is that of lithium-ion batteries. There are various lithium-ion chemistries tweaked for different use cases, but for the last 30 years or so, betting against lithium-ion has been a bad bet.

This is not to say that lithium-ion batteries cannot be made better. They are lightweight and have a high energy density and good discharge rates, but their cycle life is too short, they are expensive, they require software to protect them from being overcharged, and they take too long to charge if you"re going to use them to power a car.

Knowing how hard it is to unseat a pretty good technology like lithium-ion, I haven"t written anything about alternative portable battery technology. However, I was excited to hear about an Israeli company - CENS Nano - that has developed a way to improve all types of lithium-ion batteries using Carbon Nano Tubes (CNT).

CENS" technological advance improves cycle-life and decreases cost and charging times for lithium-ion batteries - all without making changes to battery manufacturers" production process. Combining performance increases with minimal operational disruptions is potentially a very big win for battery producers, consumers, and society at large as we push double-time towards electrification.

The secret behind the company"s scientific and engineering advances lies in a proprietary and trade secret-protected, dry-process material containing CNTs that is dispersed into the cathode (positive pole) and anode (negative pole) components of a battery.

CENS dry dispersion of CNTs creates a very stable conducting skeleton inside cathodes and anodes that is not affected by cycling mechanisms. Because of this effect, the CENS technology prevents the degradation of battery cell performance as the number of cycles increase and thus extends cell cycling life.

CENS"s dry dispersion process creates a 3-dimensional mesh that forms a direct contact with cathode and anode particles that allows for more efficient transmission of energy and helps block the formation of dendritic spines - the microscopic spikes that naturally develop when recharging lithium-ion batteries and which are responsible for shortening battery life.

CENS CEO, Moshe Johary, tells me that about 30% of the value of an electric vehicle (EV) is made up of its battery costs. Because batteries made using the CENS materials can store roughly 30-40% more energy and have a longer useful life, he can see CENS contributing to EV batteries whose cells have the winning combination of greater performance, a longer lifespan, and lower cost.

When I asked Johary how he saw his company"s technology contributing to the evolution of EVs, he said that "The adoption of EVs remains limited by a higher price relative to internal combustion engine vehicles mainly because of the high cost of the battery packs. Using batteries containing CENS technology, drivers of EVs will be able to go further between charging stops and automakers will be able reduce the price of battery packs to below $100 per kilowatt hour. Ultimately, we believe that batteries will become cheap enough to allow EVs to cost less than gas-powered ones."