CANARY MEDIA

Redwood Materials built record grid storage project using old EV batteries

The EV battery recycler determined it could make good money by repurposing old battery packs for the grid, and found an eager data center customer.

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Redwood Materials is powering a data center outside Reno, Nevada, with a large solar array and over 700 used EV batteries, pictured above. (Courtesy of Redwood Materials)

RENO, Nev. — I was supposed to be looking at the largest energy-storage installation ever assembled from used electric-vehicle batteries, the tantalizing new side project of former Tesla Chief Technology Officer JB Straubel's recycling juggernaut, Redwood Materials. Instead, all I saw was a dusty field strewn with oddly shaped boxes wrapped in some kind of plastic sheeting. The boxes were propped up on cinder blocks, in the manner of rusted cars in a forgotten yard. It looked a bit like a garbage dump.

My Redwood tour guide assured me, however, that we were in the right place. Underneath those white shrouds were 792 individual EV battery packs, wired up in long rows and spread across two acres on the firm's campus outside Reno, Nevada. The plastic wrapping was meant to protect them from the dust. Nearby was a field of solar panels laid flat on the ground, making it hard to gauge just how far back they went. These panels convert sunlight to electricity and store it in the array of old car batteries, to power a miniature data center that a startup named Crusoe built in the same field as the batteries. Any surplus power flows to Redwood's own facilities surrounding the installation.

Redwood hailed the installation as a breakthrough in the sleepy field of second-life batteries, which has been around for a while but failed to move beyond initial proofs of concept to repeated, large-scale deployments. The firm has indeed broken a record for that stunted sector, certainly in the U.S. and likely the world, delivering 63 megawatt-hours of second-life grid storage in its own backyard. That's a very deep reservoir of storage for the diminutive onsite data center, which has just 1 megawatt of computing load. The goal is to guarantee 24/7 clean power even with days of inclement weather.

Given the initial success, Straubel sees the energy storage business as a key growth area for Redwood, which was founded in 2017 to recycle battery materials into the domestic supply chain.

"This is, in a way, a first of its kind, and to be able to have a profitable project as a first one is pretty cool," Straubel said prior to a sunset celebration of the project, held on the desert outcropping above it. "You will absolutely see much larger deployments of this in well under a year, and we are actively engineering and working on those projects today."

Assuming the concept scales up further, it could be a game changer for data centers that prize speedy new energy construction. But it could further reshape the clean energy transition. Dozens of startups have toiled for years to invent new batteries for long-duration storage. Redwood has already beaten them to a large-scale deployment, without inventing anything new and risky — all it took was some clever reimagining of what others viewed as waste.

A radical new approach to second-life battery design

Using old EV batteries to store energy for the grid makes intuitive sense. Diminished battery capacity is a bigger deal for a vehicle than it is for grid storage; stationary stuff doesn't need to work as hard as EV batteries, and it can take up a lot more space. A battery with just 80% of its original capacity left may get plucked from a vehicle, but it can still function fine for storing solar power. In theory, these secondhand batteries should be cheaper than new ones, reducing the cost of much-needed grid storage to accompany the rise of renewables.

Yet few second-life grid storage installations exist.

Most of the people who have actually installed second-life batteries have approached it as a small-scale research project, typically grant-funded. A scrappy company called B2U Storage Solutions broke that mold in 2020, when it built an array of old packs to deliver solar power into California's energy markets in the most lucrative evening hours. I verified that with my own eyes in 2021, since it went far beyond the sector's accomplishments at the time. B2U has since expanded the capacity to 28 megawatt-hours, but I haven't seen a repeat project at that scale yet (though the company did build a 12-MWh project elsewhere in California).

Another startup called Element Energy obtained a bounty of lightly used packs, quite possibly through their investor LG, which endured a billion-dollar recall for units it supplied to General Motors a few years back. Element installed a couple dozen containers in West Texas last year, filled with 53 megawatt-hours of second-life storage. Next, it plans to build a factory to mass-produce enclosures for second-life installations.

Now, Redwood has entered the scene with its sprawling Nevada installation.

All of these developers have had to grapple with the same initial challenges. They need to get their hands on old EV packs and then sort out the ones that aren't going to catch fire. Then they have to figure out how to safely control a patchwork fleet of batteries cobbled together from several manufacturers.

Redwood immediately stands out for its ability to handily source old packs. The company is, officially, a battery recycler, and it says it receives more old batteries than any of its U.S. competitors. All week long, trucks drop off pallets of everything from toothbrush batteries to electric-truck packs, which workers sort and stash in a 32-acre open-air depot. (Redwood says the safety benefits of super-dry air outweigh any risks associated with the bludgeoning Nevada sunshine.)

"If you ever used a lithium-ion battery, it's probably going to end up coming through here in one way, shape, or form," Straubel said. EV packs have been shooting up as a portion of total intake, from less than 1 gigawatt-hour per year in 2023 to more than 5 now, he added.

"That's really one of the keys, is having the scale and having the access to the partnerships and the ability to move and transact and just physically harness that much material," Straubel said.

Another differentiator might as well be called moxie. Founder Straubel sets the tone as a clean-energy nerd who just likes to give things a shot. He tried second-life microgrids at home before making it a focus for the workplace. His engineers hacked together a universal controller box that connects to each type of EV pack and operates it according to its unique needs. When the time came to test the concept, Straubel oversaw construction of the biggest second-life storage project in the world, all in five months from clearing ground to completion. No grant applications required.

A pioneering ‘second-life’ battery startup begins major Texas expansion

The solar array that powers Crusoe’s data center, tucked in between Redwood’s recycling facilities. The open-air depot where Redwood receives and stores battery deliveries is visible in the back right. (Courtesy of Redwood Materials)

Lastly, the Redwood approach bucks conventional opinion in ways that save time and money.

The storage industry, as a rule, puts its batteries in big metal boxes. Redwood engineers saw that as unnecessary, given how painstakingly ruggedized the packs had to be for vehicular use. No big boxes means no pouring concrete pads. The approach saves on labor, time, and materials.

"There's almost no poured concrete, frankly — it's a very light touch on the ground," Straubel said. "You can pick up and move everything. You can deploy it very fast. Solar was the same way. We actually used this type of architecture specifically because we could deploy it very fast."

On the solar side, Redwood went with a company that shares the "just throw it on the ground" mentality: Erthos, a scrappy new alternative to the highly engineered trackers that eke every last electron out of the day's solar arc. This flat-on-the-ground installation also allows a handful of cleaning robots to circumnavigate the array daily and wipe the dust away; their little headlights peeked through the night as Redwood's celebration cast laser lights across the battery field.

AI market heats up while battery recyclers struggle

Redwood launched Redwood Energy, its business line for second-life storage, at a precarious time for the battery recycling industry, which has promised to recover nearly all the useful materials from old EV batteries.

Redwood succeeded in raising nearly $2 billion in equity investment since its founding in 2017. It seems to have plenty of resources for the time being. But a leading competitor, Li-Cycle, declared bankruptcy this year after failing to raise the money to complete its recycling facility in upstate New York. Another top contender, Ascend Elements, has pushed back its timeline for a facility in Kentucky, citing delays from its anchor customer.

The actual task of economically recovering the most valuable battery materials appears to have proven harder in practice than it looked in the pitch decks. Setting aside the technical challenges, there are serious business obstacles. Many key battery commodities have fallen steeply from high prices a few years back, undercutting the value of the recycled products. And there isn't yet a critical mass of cathode makers to sell to in the U.S., so any recovered materials are just going to generic metals markets for now.

"In a way, we started Redwood almost too early," Straubel admitted. He was talking about how used EV packs were hard to come by a few years ago. But Redwood and the other recyclers are also now too early for the domestic EV-battery-materials market they would like to sell into.

While that market for recycled materials develops, Redwood can pull in "almost an order of magnitude" more value from its batteries by deploying them for energy storage needs.

“Every battery that we can possibly redeploy, even for as short as a few months, we see a compelling financial case to do that,” Straubel said. In fact, he noted, “This definitely has the potential to grow faster and even to contribute more revenue than the core recycling business.”

That’s somewhat jarring to hear from the battery recycling startup with the most money behind it. The investors funded a battery materials business, not a second-hand battery purveyor. But Straubel stressed that he sees the energy business as additive, not competitive with the original business.

“We’re not getting rid of that material — we’re actually keeping ownership of it,” he said. “We’re keeping the rights to recycle it, and we’re excited to recycle it when it’s done doing its second life in energy storage.”

Redwood Energy is talking with AI customers around the country, but it’s also well-positioned in a desert valley east of Reno that has become something of an industrial and telecom hub. A particularly energetic trick-or-treater could leave Redwood’s campus and knock on the doors of Google, Apple, and Switch, the owner of a fortress-like data center. Microsoft just acquired 300 acres in the neighborhood.

“Those would be logical targets,” Straubel allowed.

A clarification was made on July 7, 2025: This article has been updated to clarify that B2U built a 12-MWh second-life storage facility in California, in addition to its initial 28-MWh installation.