

Battery-Based Generators, Equipment And E-Mobility Products Were Abundant At CES 2024

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At this year's CES show, which was held January 9-12 at its usual venues in Las Vegas, I saw a similarly wide range of products as in past years, but with growth in certain power-related areas relating to batteries: home energy management; battery-powered tools, appliances and equipment; and e-mobility products such as scooters, e-bikes and motorcycles. While I had seen products in most of these categories at past CESs (my last visit was in 2020 just before the pandemic started), they appeared to be in greater abundance at this year's show.

In particular, I saw a large number of battery-based power generators (or power stations) for recreational and home use. Some of these battery products for energy storage and power generation in the home were displayed alongside solar power products, and marketed as part of home energy solutions. In addition, products for both wired and wireless charging continued to be well represented at CES with the manufacturers of wired adapters continuing to tout the use of GaN power devices within their adapters/chargers, and with wireless charging continuing to spread to higher power applications—even kitchen appliances.

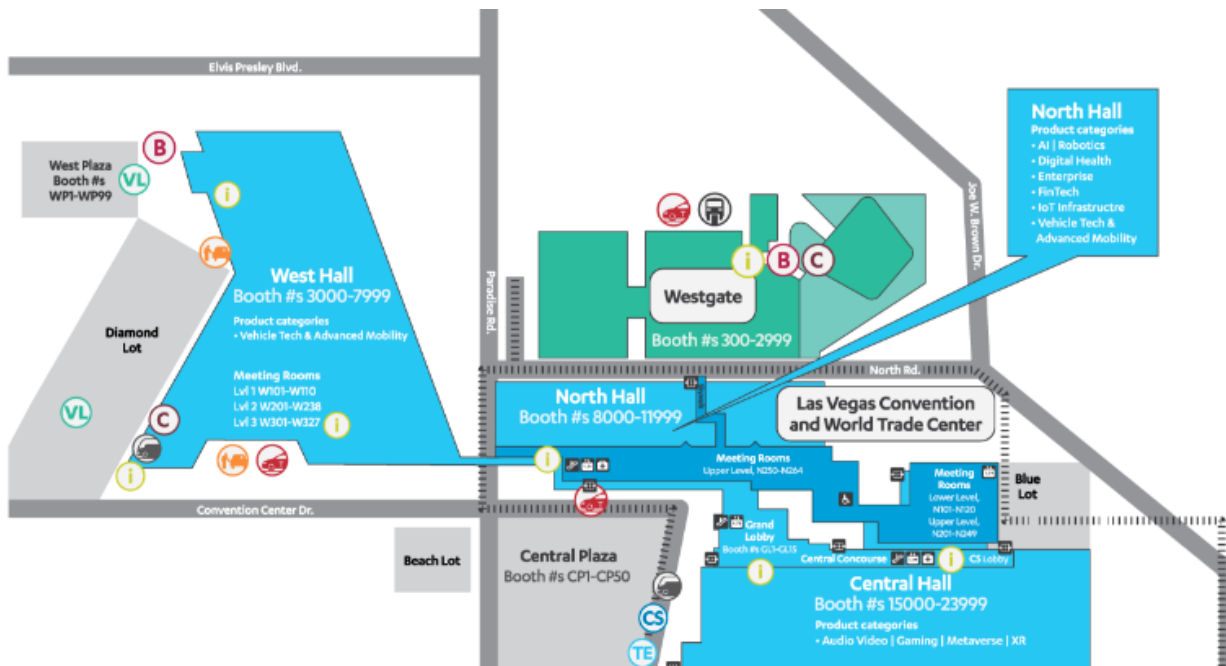
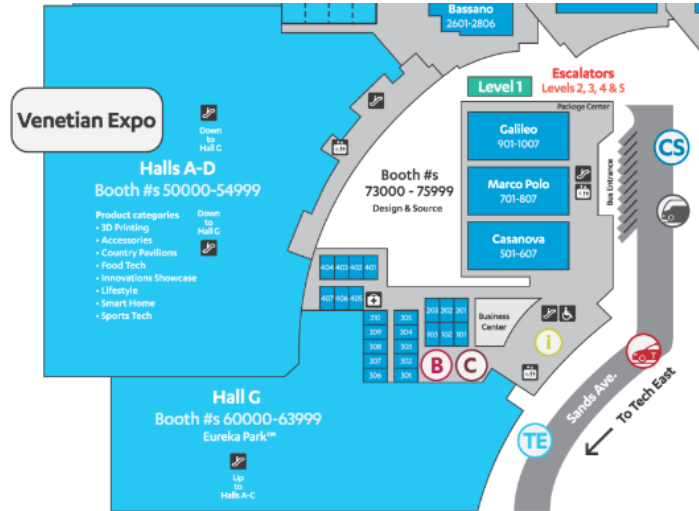
While my somewhat narrow discussion here reflects this publication's focus on power electronics, the CES show encompasses a much more expansive range of electronics-based products and technologies for consumer, automotive, residential, commercial and even industrial applications. And from year to year, it tends to be dominated by whatever broad tech themes are top of mind. This year, it was AI, and the subject was prominent in keynote talks, and conspicuous throughout the exhibition.

While at past shows, there was a tendency simply to label many new products as "smart"—a marketing trend that continued at this CES—many companies have added AI to their product descriptions. Though a discussion of AI-enabled products is beyond the scope of my CES coverage, it's worth exploring some of the reporting on this subject from other publications such as reference 1, which includes descriptions of AI-enabled products and robots, as these highlight possible emerging applications for power components.

In general, robots have been an interesting source of demos at CES for several years. This year was no exception as I encountered displays like Parkie, "the world's first autonomous driving-based parking robot" from HL Mando; ORo "your dog's pawfect companion" from Ogmen Robotics; and even a robotic bartender, ADAM, from Richtek Robotics. However, I also saw a great many robots of a more mundane variety—those for floor cleaning and pool cleaning. Perhaps their proliferation is a sign that some of the more sophisticated robots that have been showcased at CES in recent years will be mainstream too before long.

In this article, I'll offer examples of the battery-based power sources showcased in the CES exhibitions. These were products shown in the Venetian Expo (part of the Tech West show location) and in the North and Central exhibit halls at the Las Vegas Convention Center (part of Tech East). The maps below identify these locations while also noting the product categories within these halls, which encompass a much wider range of products than covered in this article. Among the many products not discussed here were the Vehicle Tech & Advanced Mobility products in the West Hall, which is essentially an auto show and more (see references 2 and 3 for more about these exhibits). These are noted mainly because so many exemplify the trends in vehicle electrification.

I'll write more about the e-mobility and charging products I saw at CES 2024, as well as some of power-related semiconductor products on display in the supplier demo rooms and suites, in upcoming articles.



The products discussed in this article were seen at the Venetian Expo at Tech East (top map) and the Central, North, and West halls of Tech West (bottom map) at this year's CES. While this article focuses mainly on the battery-based products, CES is much broader in scope in terms of the product categories being exhibited and the categories listed above for the exhibit halls offer some sense of this range. Also note Eureka Park, the hall devoted to startups. As with the other halls, it contains a large number of exhibitors, but these tend to have smaller booths than the main exhibit halls. Many of the exhibits in Eureka Park are arranged in sections by country (something that's now also done in the Venetian Expo), and there are many university exhibits here too.

Home Energy Management

There were numerous exhibits showing battery-based generators, power stations or power sources intended for either recreational or home use. Some of these products were offered by companies selling home energy systems. For example, Geneverse offered its battery-based generators for emergency preparedness under the slogan "power your home," and its exhibit showed one of its power sources powering kitchen appliances.

The company also promoted what it described as "the most cost efficient solar energy system"—the Geneverse PowerPillar, a modular home backup system. "Featuring a dc-coupled system, the PowerPillar is purpose-built to

sustain essential loads, maximize self-consumption, and grid arbitrage, offering an impressive 8,000 W of continuous power, surpassing competitors. Each PowerPillar Battery Unit provides 5 kWh of capacity, expandable for up to 20 kWh of usable energy storage," says the vendor.



EcoFlow was another vendor showing a battery-based power source. Its Delta Pro Ultra whole house battery generator received a CES Innovation Award. The company describes the Delta Pro Ultra as "the world's most powerful smart hybrid whole-house battery generator and backup system... With an unrivaled capacity of 6 kWh, 7200-W output and 5.6 kW of solar input, DELTA Pro Ultra can run an entire home. Its stackable design allows for quick expansion of storage and output. While its compatibility with a variety of energy sources, including solar and gas, caters to a wide range of power needs," says the vendor.



Another exhibitor, BlueTTI, showed its Premium series power stations and residential energy storage solutions. The company displayed SolarSwap, "a combination of two products that are designed to work together, the AC180T and the MultiCooler."

"The AC180T is a portable power station that employs a hot-swappable battery design which allows users to swap out its two 7168-Wh batteries without power interruption. The AC180T can operate with either one or both batteries inside, and is interchangeable with the battery that powers BLUETTI MultiCooler. With a total capacity of 1,433 Wh, the AC180T has a 1,800-W continuous output, and can handle peak loads up to 2,700 W" says BLUETTI.



Jackery was one of the vendors exhibiting power generators in combination with solar power for recreational use.



At its booth was a Solar Generator for Rooftop Tent, which it describes as "a complete off-grid solution tailored for overlanding enthusiasts. With 1000-W foldable solar panels, and a 1264-Wh power station included, it's capable of supporting 2 weeks of off-grid living with up to 6-kWh substantial power per day."

The company also displayed its Solar Generator for Home Backup. The company's "Solar Generator Home Kit supports three days of home backup and off-grid living with 10-kWh essential energy. Its automatic transfer switch ensures seamless (≤ 20 -ms) auto-switching for uninterrupted power supply during blackouts."

At its booth in the expo, in the TDK exhibit, Ampace, showed a portable power generator among a few interesting battery products. Ampace is a joint venture of CATL and ATL. CATL, which is described as "the world's biggest EV battery producer," make cells and packs; while ATL is a subsidiary of TDK, and is one of the biggest Li-ion battery makers in the consumer space.

Ampace showed the Andes 2000 portable power station, which is designed for camping and fishing. The 16.5-kg product, which used the LFP Li-ion chemistry, has 2-kWhr capacity with recharge speed of 50 mins for 80% or 1 hour for full charge with close to a 4C rate. The unit offers 3000 cycles of operation.

The Andes 2000 retails for approx. \$1500 U.S. on Amazon. This represents a lower cost than quoted by one other vendor of portable power stations/generators who said the going rate is around \$1/Whr. According to Leon Xu, Ampace is able to achieve a lower price because it is a cell producer, unlike most of its competitors.

Illustrating this point the company also had on display its latest cylindrical cell, the Ampace PN. JP40 21-mm (d) x 700-mm (l) cell. This Li-ion cell, which is also based on the LFP chemistry, supports a cell life of 6000 cycles at the end of which it boasts 70% capacity. In comparison, some competitors are only at 2000 to 3000 cycles and then have just 60% capacity, according to Xu.

Meanwhile this Li-ion cell also supports a fast, 4C charge rate, achieving up to 80% charge in 40 minutes. These cells will go into power tools and e-scooters. The cell is expected to be in mass production in early March or April of this year.

Other battery-based power stations/generators seen at CES included:

- Shinegiant Energy Storage's batteries/power units for camping and solar panels
- Zendure's plug & play home storage system
- RUNHOOD's dual-mode ESS for portable stationary outdoors and home use
- Anker SOLIX's live in power, home energy solution.

References

1. "[The 15 best robots and AI tech we saw at CES 2024](#)" by Sabrina Ortiz, ZDnet, January 12, 2024.
2. "[Sea-to-Sky Vehicle Tech On Tap at CES 2024](#)," CTA Staff, November 16, 2023.
3. "[Top automotive innovations announced at CES 2024](#)" by Steve Greenfield, CBT News, January 12, 2024.