TROY TECHNICAL

NEXT-GENERATION ENERGY STORAGE WEEKLY REPORT

November 14 - November 20, 2026 | Issue 2026-W46

Cell-level evidence, manufacturing yield, safety and bankable supply

10	10
ANALYZED ARTICLES	PRIORITY THEMES

Issued 2026-11-20 | English edition | fixed approved cover artwork



Next-Generation Energy Storage: the boundary moved from isolated claims to qualification evidence

10 English articles were reviewed independently from the Japanese edition. Ten themes are retained for management decisions.

SIGNAL 01 | ACTIVE MATERIALS

Moment Energy Nova: Repurposed EV BESS Specs and UL Certification

Moment Energy has introduced Nova, a commercial battery energy storage system (BESS) built from repurposed electric vehicle battery packs. It is the first such system to achieve UL 1973 and UL 9540 certifications, with first deliveries scheduled for Q1 2027.

SIGNAL 02 | CELL DESIGN

Molten Industries: Battery-grade graphite from natural gas specs

Molten Industries has commissioned a 300 tonne/year demonstration plant in Oakland, California, producing battery-grade graphite and hydrogen via methane pyrolysis.

SIGNAL 03 | MANUFACTURING

Yongtai Energy: All-Vanadium Flow Battery Specs and Grid Integration

Yongtai Energy has integrated all-vanadium flow batteries into a hybrid thermal power frequency regulation project, achieving a two-fold increase in the K-index performance metric.

SIGNAL 04 | SYSTEM VALIDATION

Factorial: Lithium-metal aerospace cells reach 450 Wh/kg

Factorial has achieved a gravimetric energy density of 450 Wh/kg with lithium-metal cells designed for aerospace applications, surpassing its year-end target.

DECISION

Focus this week's management attention on cell-level evidence, manufacturing yield, safety and bankable supply. Move only when the linked evidence can be reproduced under your own operating conditions.

THREE MANAGEMENT MOVES

1. Buyers: compare technologies under the same duty cycle, safety envelope and total system cost.
2. Suppliers: connect materials claims to electrode processing, yield, validation and secured capacity.
3. Executives: track cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

EVIDENCE DISCIPLINE

FACT states what the collected English source reports. BUSINESS READ and ACTION are editorial interpretations. UNKNOWN lists information that the source file does not establish. A linked article is not treated as independent confirmation of every claim.

Numbers and evidence anchors that require conditions

95%
A04

SOURCE-BOUND CONDITION
The process claims a natural gas-to-graphite yield above 95% with significantly lower electricity and feedstock costs than conventional synthetic graphite.

450 W
A05

SOURCE-BOUND CONDITION
Factorial has achieved a gravimetric energy density of 450 Wh/kg with lithium-metal cells designed for aerospace applications, surpassing its year-end target.

98.7%
A06

SOURCE-BOUND CONDITION
A three-month trial in Tokyo demonstrated that home EV charging can be automatically shifted to low-cost electricity windows with a 98.7% instruction acceptance rate.

24 hours
A10

SOURCE-BOUND CONDITION
The results showed no thermal runaway propagation to adjacent modules and no re-ignition for 24 hours post-extinguishment, providing empirical data for AI data center safety assessments.

7.4 MW
A01

SOURCE-BOUND CONDITION
Capable of delivering up to 7.4 MW at 34.5 kV AC, the system aims to bypass conventional transformer supply chain bottlenecks for solar, storage, and data center applications.

HOW TO USE THESE NUMBERS
Each value is shown with the condition stated in the collected English article. Do not compare values across different test methods, device sizes, operating temperatures or commercial stages without normalizing those conditions.

Where the value chain moved

Each stage combines one leading theme and one supporting theme. The report treats handoffs as evidence transfers, not decorative arrows.

1

Active materials

P01/P06

Moment Energy has introduced Nova, a commercial battery energy storage system (BESS) built from repurposed electric vehicle.

2

Cell design

P02/P07

Molten Industries has commissioned a 300 tonne/year demonstration plant in Oakland, California, producing battery-grade.

3

Manufacturing

P03/P08

Yongtai Energy has integrated all-vanadium flow batteries into a hybrid thermal power frequency regulation project, achieving.

4

System validation

P04/P09

Factorial has achieved a gravimetric energy density of 450 Wh/kg with lithium-metal cells designed for aerospace.

5

Deployment & recycling

P05/P10

A three-month trial in Tokyo demonstrated that home EV charging can be automatically shifted to low-cost electricity windows.

EVIDENCE REQUIRED AT EACH HANDOFF

Active materials to Cell design	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.
Cell design to Manufacturing	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.
Manufacturing to System validation	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.
System validation to Deployment & recycling	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

COMMON CONTROL POINT

No theme moves to a commercial commitment until a named owner has reproduced the relevant evidence and documented cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

Priority map: maturity and next decision locus



P01	Moment Energy Nova: Repurposed EV BESS Specs and UL Certification Business / rules | cue: Certification
P02	Molten Industries: Battery-grade graphite from natural gas specs Tech / process | cue: no system/business cue
P03	Yongtai Energy: All-Vanadium Flow Battery Specs and Grid Integration System / adoption | cue: Integration
P04	Factorial: Lithium-metal aerospace cells reach 450 Wh/kg Tech / process | cue: no system/business cue
P05	EV Charging Demand Response: Tokyo Trial Results from Panasonic and TG Octopus Energy System / adoption | cue: Trial
P06	Ampace PU100: UL 9540A 6th Edition Fire Test Results for AI Data Centers System / adoption | cue: system
P07	Tesla Powercore: Medium-Voltage Platform Specs and 2027 Timeline System / adoption | cue: Platform
P08	UNSW Battery Health Test: 3-Minute Li-ion Diagnostics for EVs System / adoption | cue: system
P09	CATL Tener Sodium: BESS Specifications and LFP Comparison System / adoption | cue: system
P10	Lithium-Sulfur Structural Batteries: KAIST's Curved Electrode Design System / adoption | cue: integrated

REPRODUCIBLE POSITIONING RULE

Horizontal position uses five discrete stages: Research, Prototype, Joint evaluation, Product adoption and Scale. The vertical bands classify the next decision locus: Tech / process, System / adoption, or Business / rules (including supply systems). Article-title cues take precedence; the overview is used only when the title is silent. These are categories, not impact ranks. Bubble diameter reflects the editorial score.

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P01 Moment Energy Nova: Repurposed EV BESS Specs and UL Certification

A02 | Active materials | Research

2026-11-17

FACT

Moment Energy has introduced Nova, a commercial battery energy storage system (BESS) built from repurposed electric vehicle battery packs. It is the first such system to achieve UL 1973 and UL 9540 certifications, with first deliveries scheduled for Q1 2027.

WHY IT MATTERS

The decision relevance is cell-level evidence, manufacturing yield, safety and bankable supply. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, connect materials claims to electrode processing, yield, validation and secured capacity.

ACTION

Within 30 days, compare technologies under the same duty cycle, safety envelope and total system cost; record the evidence and owner against P01.

UNKNOWN

Still unproven or incompletely stated: cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

EDITORIAL SCORE 22/25 | MATURITY 1/5 | DECISION LOCUS: BUSINESS / RULES

P02 Molten Industries: Battery-grade graphite from natural gas specs

A04 | Cell design | Joint evaluation

2026-11-18

FACT

Molten Industries has commissioned a 300 tonne/year demonstration plant in Oakland, California, producing battery-grade graphite and hydrogen via methane pyrolysis. The process claims a natural gas-to-graphite yield above 95% with significantly lower electricity and feedstock costs than conventional synthetic graphite. This development provides a domestic US alternative to imported anode materials.

WHY IT MATTERS

The decision relevance is cell-level evidence, manufacturing yield, safety and bankable supply. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, connect materials claims to electrode processing, yield, validation and secured capacity.

ACTION

Within 30 days, compare technologies under the same duty cycle, safety envelope and total system cost; record the evidence and owner against P02.

UNKNOWN

Still unproven or incompletely stated: cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

EDITORIAL SCORE 21/25 | MATURITY 3/5 | DECISION LOCUS: TECH / PROCESS

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P03 Yongtai Energy: All-Vanadium Flow Battery Specs and Grid Integration

A07 | Manufacturing | Research

2026-11-19

FACT

Yongtai Energy has integrated all-vanadium flow batteries into a hybrid thermal power frequency regulation project, achieving a two-fold increase in the K-index performance metric. The company has established a full-chain vertical integration from vanadium mineral resources to commercial deployment.

WHY IT MATTERS

The decision relevance is cell-level evidence, manufacturing yield, safety and bankable supply. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, connect materials claims to electrode processing, yield, validation and secured capacity.

ACTION

Within 30 days, compare technologies under the same duty cycle, safety envelope and total system cost; record the evidence and owner against P03.

UNKNOWN

Still unproven or incompletely stated: cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

EDITORIAL SCORE 20/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

P04 Factorial: Lithium-metal aerospace cells reach 450 Wh/kg

A05 | System validation | Research

2026-11-17

FACT

Factorial has achieved a gravimetric energy density of 450 Wh/kg with lithium-metal cells designed for aerospace applications, surpassing its year-end target. This milestone represents a 15% increase over the cells used in the company's record-setting drone flight earlier this year.

WHY IT MATTERS

The decision relevance is cell-level evidence, manufacturing yield, safety and bankable supply. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, connect materials claims to electrode processing, yield, validation and secured capacity.

ACTION

Within 30 days, compare technologies under the same duty cycle, safety envelope and total system cost; record the evidence and owner against P04.

UNKNOWN

Still unproven or incompletely stated: cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

EDITORIAL SCORE 20/25 | MATURITY 1/5 | DECISION LOCUS: TECH / PROCESS

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P05 EV Charging Demand Response: Tokyo Trial Results from Panasonic and TG Octopus Energy

A06 | Deployment & recycling | Joint evaluation

2026-11-19

FACT

A three-month trial in Tokyo demonstrated that home EV charging can be automatically shifted to low-cost electricity windows with a 98.7% instruction acceptance rate. The study confirms that remote control can effectively redistribute load away from peak hours, though actual charging volume delivery reached 83.6%.

WHY IT MATTERS

The decision relevance is cell-level evidence, manufacturing yield, safety and bankable supply. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, connect materials claims to electrode processing, yield, validation and secured capacity.

ACTION

Within 30 days, compare technologies under the same duty cycle, safety envelope and total system cost; record the evidence and owner against P05.

UNKNOWN

Still unproven or incompletely stated: cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

EDITORIAL SCORE 20/25 | MATURITY 3/5 | DECISION LOCUS: SYSTEM / ADOPTION

P06 Ampace PU100: UL 9540A 6th Edition Fire Test Results for AI Data Centers

A10 | Active materials | Research

2026-11-18

FACT

Ampace has received a UL certificate for its PU100 battery system after demonstrating substantial safety margins in large-scale fire testing (LSFT) under UL 9540A, 6th Edition. The results showed no thermal runaway propagation to adjacent modules and no re-ignition for 24 hours post-extinguishment, providing empirical data for AI data center safety assessments.

WHY IT MATTERS

The decision relevance is cell-level evidence, manufacturing yield, safety and bankable supply. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, connect materials claims to electrode processing, yield, validation and secured capacity.

ACTION

Within 30 days, compare technologies under the same duty cycle, safety envelope and total system cost; record the evidence and owner against P06.

UNKNOWN

Still unproven or incompletely stated: cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P07 Tesla Powercore: Medium-Voltage Platform Specs and 2027 Timeline

A01 | Cell design | Research

2026-11-19

FACT

Tesla has introduced Powercore, a consolidated medium-voltage power electronics platform integrating a solid-state transformer, switchgear, and inverter. Capable of delivering up to 7.4 MW at 34.5 kV AC, the system aims to bypass conventional transformer supply chain bottlenecks for solar, storage, and data center applications.

WHY IT MATTERS

The decision relevance is cell-level evidence, manufacturing yield, safety and bankable supply. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, connect materials claims to electrode processing, yield, validation and secured capacity.

ACTION

Within 30 days, compare technologies under the same duty cycle, safety envelope and total system cost; record the evidence and owner against P07.

UNKNOWN

Still unproven or incompletely stated: cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

P08 UNSW Battery Health Test: 3-Minute Li-ion Diagnostics for EVs

A08 | Manufacturing | Joint evaluation

2026-11-14

FACT

Researchers at UNSW have developed a prototype lithium-ion battery health test that is 95.5% faster and over 80% cheaper than current methods. By utilizing short electrical pulses and statistical models, the system enables rapid assessment of retired batteries to facilitate second-life reuse and recycling.

WHY IT MATTERS

The decision relevance is cell-level evidence, manufacturing yield, safety and bankable supply. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, connect materials claims to electrode processing, yield, validation and secured capacity.

ACTION

Within 30 days, compare technologies under the same duty cycle, safety envelope and total system cost; record the evidence and owner against P08.

UNKNOWN

Still unproven or incompletely stated: cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

EDITORIAL SCORE 19/25 | MATURITY 3/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P09 CATL Tener Sodium: BESS Specifications and LFP Comparison

A09 | System validation | Research

2026-11-17

FACT

CATL has detailed the specifications for its Tener Sodium battery energy storage system (BESS), featuring a rated energy of 30+ MWh per block and 95% round-trip efficiency. The system demonstrates significant footprint and EPC cost reductions compared to the EnerX LFP system, with overseas delivery expected by summer 2027.

WHY IT MATTERS

The decision relevance is cell-level evidence, manufacturing yield, safety and bankable supply. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, connect materials claims to electrode processing, yield, validation and secured capacity.

ACTION

Within 30 days, compare technologies under the same duty cycle, safety envelope and total system cost; record the evidence and owner against P09.

UNKNOWN

Still unproven or incompletely stated: cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

P10 Lithium-Sulfur Structural Batteries: KAIST's Curved Electrode Design

A03 | Deployment & recycling | Pilot

2026-11-18

FACT

Researchers at KAIST have developed a monolithically integrated lithium-sulfur battery cathode that maintains electrical stability within curved and hollow structures. By growing nickel cobalt selenide nanowires on woven carbon cloth, the team created a load-bearing energy storage medium capable of powering devices even under severe mechanical strain.

WHY IT MATTERS

The decision relevance is cell-level evidence, manufacturing yield, safety and bankable supply. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, connect materials claims to electrode processing, yield, validation and secured capacity.

ACTION

Within 30 days, compare technologies under the same duty cycle, safety envelope and total system cost; record the evidence and owner against P10.

UNKNOWN

Still unproven or incompletely stated: cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.

EDITORIAL SCORE 19/25 | MATURITY 2/5 | DECISION LOCUS: SYSTEM / ADOPTION

Playbook and 0-5 year roadmap

STAKEHOLDER	NOW | 0-30 DAYS	NEXT | 1-12 MONTHS	LATER | 1-5 YEARS
Operating companies	compare technologies under the same duty cycle, safety envelope and total system cost	Run production-like qualification with explicit acceptance and stop criteria.	Build a portfolio and architecture that can absorb technology and supplier changes.
Materials, equipment and technology suppliers	connect materials claims to electrode processing, yield, validation and secured capacity	Create shared reliability, process-window and failure-analysis data with customers.	Standardize interfaces, traceability, lifecycle support and recovery services.
Trading, investment and legal teams	Map cycle life, fast charge, safety abuse, yield, cost, sourcing and warranty.	Contract for capacity, quality, change notice, liability, alternatives and exit.	Diversify regional, technical and customer concentration risk.

ROADMAP

NOW | 0-30 DAYS
Evidence ledger
Owner: Strategy + quality
Deliverable: claim, source, condition, owner

NOW | 0-30 DAYS
Risk screen
Owner: Procurement + legal
Deliverable: unknowns, alternatives, stop

NEXT | 1-12 MONTHS
Joint qualification
Owner: R&D + supplier
Deliverable: process window and failure data

NEXT | 1-12 MONTHS
Commercial gate
Owner: Business + finance
Deliverable: unit economics and capacity

LATER | 1-5 YEARS
Platform strategy
Owner: Executive team
Deliverable: portfolio and interface roadmap

LATER | 1-5 YEARS
Service layer
Owner: Operations + channel
Deliverable: monitoring, maintenance and recovery

GO / NO-GO GATES

GATE	OWNER	REQUIRED EVIDENCE	NO-GO CONDITION
G1 Evidence	**Quality**	Source, test conditions and reproducibility	No traceable evidence
G2 Integration	**R&D**	Interface, process window and failure analysis	Cannot meet system conditions
G3 Commercial	**Business**	Capacity, total cost, contract and alternatives	Economics or supply cannot be supported
G4 Lifecycle	**Operations**	Monitoring, maintenance, change notice and exit	No accountable operating plan

ANALYZED ARTICLES | ITEMS 01-10

Every title and URL is displayed in full. URLs wrap without shortening and remain clickable. A verified-reference label means the translated HTML did not retain its original source URL.

ID	FULL ARTICLE TITLE	FULL SOURCE / VERIFIED REFERENCE URL - CLICKABLE
A01	Tesla Powercore: Medium-Voltage Platform Specs and 2027 Timeline	https://www.ess-news.com/2026/11/19/tesla-unveils-powercore-medium-voltage-power-electronics-platform/
A02	Moment Energy Nova: Repurposed EV BESS Specs and UL Certification	https://evxl.co/2026/11/17/moment-energy-nova-storage-used-ev-packs/
A03	Lithium-Sulfur Structural Batteries: KAIST's Curved Electrode Design	https://bioengineer.org/engineers-develop-curved-lithium-sulfur-battery-electrodes-for-drone-frame-energy-storage/
A04	Molten Industries: Battery-grade graphite from natural gas specs	https://www.bestmag.co.uk/molten-graphite-production-from-natural-gas/
A05	Factorial: Lithium-metal aerospace cells reach 450 Wh/kg	https://www.bestmag.co.uk/factorial-450-wh-kg-lithium-metal-aerospace/
A06	EV Charging Demand Response: Tokyo Trial Results from Panasonic and TG Octopus Energy	https://www.ess-news.com/2026/11/19/remote-control-moves-home-ev-charging-to-cheaper-hours-in-tokyo-trial/
A07	Yongtai Energy: All-Vanadium Flow Battery Specs and Grid Integration	https://cj.sina.com.cn/articles/view/7651844612/1c815e204020022sqa
A08	UNSW Battery Health Test: 3-Minute Li-ion Diagnostics for EVs	https://www.pv-magazine.com/2026/11/14/unsw-develops-three-minute-lithium-ion-battery-health-test/
A09	CATL Tener Sodium: BESS Specifications and LFP Comparison	https://www.pv-magazine-australia.com/2026/11/17/clarifying-catl-tener-sodium-with-new-specifications-and-availability/
A10	Ampace PU100: UL 9540A 6th Edition Fire Test Results for AI Data Centers	https://finance.yahoo.com/energy/articles/ampace-presents-pu100-fire-test-061100717.html

NextGenEnergyStorage — Selected Articles

Date: 2026-11-21

Articles: 10

Table of Contents

#01 Tesla Powercore: Medium-Voltage Platform Specs and 2027 Timeline

#02 Moment Energy Nova: Repurposed EV BESS Specs and UL Certification

#03 Lithium-Sulfur Structural Batteries: KAIST's Curved Electrode Design

#04 Molten Industries: Battery-grade graphite from natural gas specs

#05 Factorial: Lithium-metal aerospace cells reach 450 Wh/kg

#06 EV Charging Demand Response: Tokyo Trial Results from Panasonic and TG Octopus Energy

#07 Yongtai Energy: All-Vanadium Flow Battery Specs and Grid Integration

#08 UNSW Battery Health Test: 3-Minute Li-ion Diagnostics for EVs

#09 CATL Tener Sodium: BESS Specifications and LFP Comparison

#10 Ampace PU100: UL 9540A 6th Edition Fire Test Results for AI Data Centers

#01 Tesla Powercore: Medium-Voltage Platform Specs and 2027 Timeline

Published November 19, 2026 ESS News USA



OVERVIEW

Tesla has introduced Powercore, a consolidated medium-voltage power electronics platform integrating a solid-state transformer, switchgear, and inverter. Capable of delivering up to 7.4 MW at 34.5 kV AC, the system aims to bypass conventional transformer supply chain bottlenecks for solar, storage, and data center applications.

IN DEPTH

Key Findings

Tesla's Powercore platform consolidates a solid-state transformer, switchgear, and inverter into a single enclosure. The system is rated for a nominal DC voltage of 800 V to 2,000 V and an AC voltage of 10 kV to 34.5 kV, providing up to 7.4 MW (9 MVA) of power at 34.5 kV AC. Manufacturing will take place at Tesla facilities in the United States, with operational deployment planned for 2027.

Technical Details

The platform is designed for extreme environments, operating from −40°C to 55°C, and can be covered by a warranty of up to 25 years. Key technical features include:

- **Safety:** A built-in solid-state circuit breaker capable of clearing electrical faults in 100 microseconds.
- **Solar Integration:** Native support for 1,500 V DC and 2,000 V DC architectures, eliminating the need for secondary inverters and transformers.
- **Energy Storage:** Integration with Tesla Megapack batteries via DC bus connectors for pre-assembled site delivery.
- **Data Center Power:** A single-step conversion from grid feeder to 800 V DC power for servers, bypassing multiple voltage step-down stages.

Background and Context

Tesla is targeting the solar, energy storage, EV charging, and data center segments. A primary driver for this in-house development is the instability of the conventional transformer supply chain, where lead times have reached four years. Tesla's head of energy and charging, AJ Booth, noted that the company has already produced 3 TW of power converters in-house.

Significance and Outlook

Powercore is designed to catalyze growth in Tesla's high-margin energy revenue, which currently accounts for roughly 10% of overall sales. For AI computing, Tesla is working with NVIDIA to certify Powercore into the DSX Ready Program. When paired with Megapack storage, the system utilizes grid-forming controls to provide reactive power support and synthetic inertia, which can stabilize local voltage oscillations and the broader grid network.

Source: https://www.ess-news.com/2026/11/19/tesla-unveils-powercore-medium-voltage-power-electronics-platform/

Collected: November 21, 2026 | Automated Research System (AI)

#02 Moment Energy Nova: Repurposed EV BESS Specs and UL Certification

Published November 17, 2026 EVXL USA



OVERVIEW

Moment Energy has introduced Nova, a commercial battery energy storage system (BESS) built from repurposed electric vehicle battery packs. It is the first such system to achieve UL 1973 and UL 9540 certifications, with first deliveries scheduled for Q1 2027.

IN DEPTH

Key Findings

Moment Energy has launched Nova, a commercial-grade BESS utilizing repurposed EV batteries. The system is the first of its kind to be certified to UL 1973 and UL 9540, meeting the electrical code listing requirements for stationary storage in the United States and Canada. Additionally, the system has been tested to UL 9540A for thermal runaway fire propagation, and the company's Megafactory 1 is certified to UL 1974 for the sorting and grading of EV batteries.

Technical Details

The Nova platform is designed for scalability and flexibility, integrating batteries from various EV types. Key technical specifications include:

- **Capacity:** Each Nova block provides 500 kWh of energy and 200 kW of power.
- **Footprint:** Each block occupies a space of 2.94 m by 1.80 m (9.65 ft x 5.9 ft).
- **Management:** A proprietary AI-powered battery management system (BMS) optimizes batteries across different states of health.
- **Architecture:** A swappable design allows individual battery packs to be replaced as they age without disturbing the enclosure or concrete pad, extending the system's lifespan to over 20 years via capacity augmentation services.

Background and Context

Nova is manufactured in North America and is independently verified as compliant with Foreign Entity of Concern (FEOC) requirements. Moment Energy is also verified as a non-Prohibited Foreign Entity. These certifications make Nova the only third-party verified BESS eligible for the U.S. federal Investment Tax Credit (ITC) from 2027 onwards. The system is intended to reduce reliance on battery imports from China by establishing a domestic supply chain using retiring EV batteries.

Significance and Outlook

The system targets commercial, industrial, and large-scale applications, including hospitals, airports, and manufacturing sites. By repurposing EV batteries, the platform aims to prevent batteries from entering landfills and unlock residual value within a circular economy. First deliveries are planned for the first quarter of 2027.

Source: https://evxl.co/2026/11/17/moment-energy-nova-storage-used-ev-packs/

Collected: November 21, 2026 | Automated Research System (AI)

#03 Lithium-Sulfur Structural Batteries: KAIST's Curved Electrode Design

Published November 18, 2026 BIOENGINEER.ORG South Korea



OVERVIEW

Researchers at KAIST have developed a monolithically integrated lithium-sulfur battery cathode that maintains electrical stability within curved and hollow structures. By growing nickel cobalt selenide nanowires on woven carbon cloth, the team created a load-bearing energy storage medium capable of powering devices even under severe mechanical strain.

IN DEPTH

Key Findings

The research team led by Professor Il-Kwon Oh at the Korea Advanced Institute of Science and Technology (KAIST) has successfully fabricated a structural lithium-sulfur battery cathode that conforms to non-planar geometries. In mechanical deformation tests, the electrode withstood 1,000 bending cycles at a curvature radius of 2.5 millimeters without structural collapse, cracking, or material detachment. Furthermore, when installed in a cylindrical housing, the battery retained 99.8 percent of its initial operational voltage even under external mechanical forces sufficient to fracture the surrounding structural frame.

Technical Details

To address the limitations of conventional slurry coatings—which are prone to delamination under stress—the team grew nickel cobalt selenide nanowires directly onto woven carbon fiber surfaces. This monolithic integration provides several technical advantages:

- **Chemical Stability:** The nickel cobalt selenide compound catalyzes sulfur-related redox reactions and anchors lithium polysulfides, limiting their dissolution and migration into the electrolyte.
- **Electrical Continuity:** Direct growth of nanowires ensures firmly anchored, continuous electrical conduction pathways.
- **Geometric Versatility:** The material was successfully integrated into oval, square, and drone-leg structural components, powering light-emitting diodes in each configuration.

Background and Context

Conventional drone and robotic architectures separate the structural airframe from rigid battery packs, which limits weight reduction. While lithium-sulfur systems offer high theoretical energy capacity at low weight, they typically suffer from poor electrical conductivity of elemental sulfur and the migration of lithium polysulfides. Additionally, standard flat battery configurations cannot be integrated into the curved or tubular surfaces common in robotic support frames and landing gear.

Significance and Outlook

This architecture allows load-bearing parts, such as robotic limbs or landing gear, to function as energy storage components. The researchers suggest that this electrode design could be paired with carbon fiber and resin matrices to build multifunctional airframes. Future research is required to quantify the exact reduction in structural weight and the resulting extension of flight or mission durations.

Source: https://bioengineer.org/engineers-develop-curved-lithium-sulfur-battery-electrodes-for-drone-frame-energy-storage/

Collected: November 21, 2026 | Automated Research System (AI)

#04 Molten Industries: Battery-grade graphite from natural gas specs

Published November 18, 2026 Best Magazine USA



OVERVIEW

Molten Industries has commissioned a 300 tonne/year demonstration plant in Oakland, California, producing battery-grade graphite and hydrogen via methane pyrolysis. The process claims a natural gas-to-graphite yield above 95% with significantly lower electricity and feedstock costs than conventional synthetic graphite. This development provides a domestic US alternative to imported anode materials.

IN DEPTH

Key Findings

Molten Industries has launched a commercial-scale modular reactor in Oakland, California, capable of producing 300 tonnes per year of battery-grade graphite and hydrogen. The company claims this is the world's first facility to produce battery-grade graphite directly from natural gas. The MG Series battery-anode graphite is scheduled to be available for customer sampling starting 1 December.

Technical Details

The production process utilizes methane pyrolysis, heating methane—the primary component of natural gas—in the absence of oxygen. This splits the gas into solid carbon and hydrogen rather than combusting it. Key technical advantages cited by Molten include:

- **Yield:** Natural gas-to-graphite yields exceeding 95%.
- **Energy Efficiency:** The technology eliminates the need for a graphitisation furnace and consumes approximately one-third of the electricity required for conventional synthetic graphite production.
- **Cost:** Natural gas feedstock costs are estimated to be around one-quarter of those for conventional synthetic graphite feedstocks.
- **Emissions:** The process produces zero process CO_2 emissions because methane is not combusted, though this does not include upstream emissions from gas production and transport.

Background & Context

Founded in 2021 by Stanford materials scientists Kevin Bush and Caleb Boyd, Molten has received backing from the US Department of Energy’s ARPA-E programme, the National Science Foundation, and investors including Breakthrough Energy Ventures, Fifty Years, and Union Square Ventures. The project addresses the US's high dependency on imported battery-grade anode materials.

Significance & Outlook

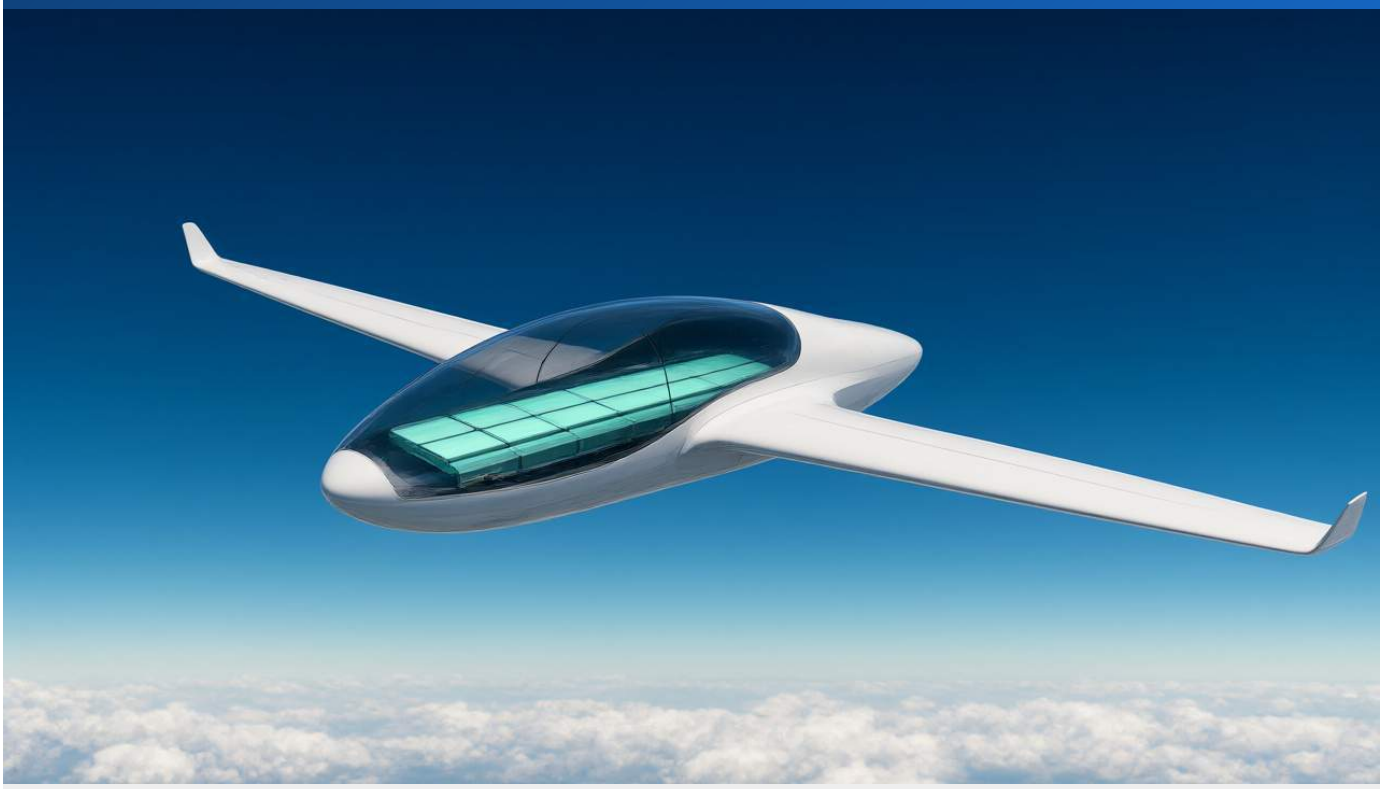
The Oakland facility serves as a building block for larger production facilities, with Molten planning to replicate the modular reactor design to scale capacity. While most initial output will be sent to undisclosed customers for battery cell evaluation, the technology represents a shift toward domestic supply chains. Other North American efforts to reduce graphite dependence include Nouveau Monde Graphite's proposed C$374 million plant in Quebec and research from the University of Kentucky into coal-to-graphite conversion.

Source: https://www.bestmag.co.uk/molten-graphite-production-from-natural-gas/

Collected: November 21, 2026 | Automated Research System (AI)

#05 Factorial: Lithium-metal aerospace cells reach 450 Wh/kg

Published November 17, 2026 Best Magazine USA



OVERVIEW

Factorial has achieved a gravimetric energy density of 450 Wh/kg with lithium-metal cells designed for aerospace applications, surpassing its year-end target. This milestone represents a 15% increase over the cells used in the company's record-setting drone flight earlier this year.

IN DEPTH

Key Findings

Factorial has reached an energy density of 450 Wh/kg for its aerospace-grade lithium-metal cells. This result, disclosed in the company's third-quarter 2026 shareholder letter, exceeds the performance of Factorial's automotive-focused FEST technology. The company intends to further increase the energy density of these aerospace cells in 2027.

Technical Details

The aerospace cells utilize lithium-metal anodes and are based on the FEST quasi-solid-state platform, which employs a quasi-solid polymer electrolyte. This differs from the company's Solstice technology, which uses a fully solid sulfide electrolyte. The 450 Wh/kg cells build upon FEST B-samples delivered to Mercedes-Benz that exceeded 390 Wh/kg.

While the chemistry is broadly similar to Factorial's automotive cells, the aerospace version is optimized for weight reduction. Specific data regarding capacity, cell dimensions, cycle life, and volumetric energy density for the 450 Wh/kg cells have not been disclosed.

Background and Context

Factorial is currently pursuing two parallel solid-state platforms:

- **FEST:** A quasi-solid polymer electrolyte design compatible with up to 80% of conventional lithium-ion manufacturing equipment. Factorial and SK On have signed an MoU to assess manufacturing FEST cells using existing infrastructure.
- **Solstice:** An all-solid-state battery using a sulfide-based electrolyte and dry cathode process. Solstice cells of up to 40Ah have been produced for partner validation, with a potential target of 450 Wh/kg for aerospace, robotics, and space systems.

In the automotive sector, FEST cells validated with Stellantis in 2025 achieved 375 Wh/kg, over 600 cycles, and 15–90% charging in 18 minutes. These are currently undergoing public-road testing in a Dodge Charger Daytona.

Significance and Outlook

The technology has already been demonstrated in flight. A Group I drone powered by Factorial cells flew for 521 minutes and covered approximately 483km in a single mission. Initial flight testing indicated that these lithium-metal cells delivered more than 30% additional range at the system level compared to conventional lithium-ion batteries.

Source: https://www.bestmag.co.uk/factorial-450-wh-kg-lithium-metal-aerospace/

Collected: November 21, 2026 | Automated Research System (AI)

#06 EV Charging Demand Response: Tokyo Trial Results from Panasonic and TG Octopus Energy

Published November 19, 2026 ESS News USA



OVERVIEW

A three-month trial in Tokyo demonstrated that home EV charging can be automatically shifted to low-cost electricity windows with a 98.7% instruction acceptance rate. The study confirms that remote control can effectively redistribute load away from peak hours, though actual charging volume delivery reached 83.6%.

IN DEPTH

Key Findings

Panasonic Electric Works and TG Octopus Energy reported that home EV charging can be shifted automatically based on electricity market prices with minimal user intervention. During a trial conducted from March to May 2026, participants accepted 98.7% of the 30-minute control instructions. In terms of actual energy delivery, 83.6% of the electricity charged was delivered within the assigned schedules. EV charging accounted for approximately 30% of the total electricity consumption in the participating households.

Technical Details

The trial involved 30 detached homes equipped with battery-electric or plug-in hybrid vehicles. The technical stack integrated the following components:

- TG Octopus Energy’s EV Octopus tariff.
- Panasonic Electric Works’ home EV charging application.
- An internet-connected 200 V charging outlet utilizing a control module manufactured by Nature Inc.

Charging was managed remotely in 30-minute blocks. While remote control successfully moved charging to periods of lower market prices, some users manually overrode the system or altered schedules. The available shiftable load varied depending on whether vehicles were away from home or already fully charged.

Background and Context

The trial was announced in November 2025 with an initial target of 100 households, though the final results cover 30. While the stated goals were to shift peaks and lower electricity costs, the companies did not disclose specific cost savings, volumes shifted, or reductions in peak demand. This project exists alongside other Japanese grid resource tests, such as Tohoku Electric Power's use of Sharp PV-linked batteries, Kyushu Electric Power's residential battery pilot with Sharp, and Osaka Gas's pooling of Kyocera home batteries for balancing and capacity markets.

Significance and Outlook

Post-trial surveys indicate a 70% user preference for the service if formally launched. The partners intend to consider a phased commercial rollout based on user feedback and trial data, although a specific timeline has not been provided.

Source: https://www.ess-news.com/2026/11/19/remote-control-moves-home-ev-charging-to-cheaper-hours-in-tokyo-trial/

Collected: November 21, 2026 | Automated Research System (AI)

#07 Yongtai Energy: All-Vanadium Flow Battery Specs and Grid Integration

Published November 19, 2026　同壁财经（新浪财经）　China



OVERVIEW

Yongtai Energy has integrated all-vanadium flow batteries into a hybrid thermal power frequency regulation project, achieving a two-fold increase in the K-index performance metric. The company has established a full-chain vertical integration from vanadium mineral resources to commercial deployment.

IN DEPTH

Key Findings

Yongtai Energy has successfully transitioned its energy storage business from R&D to commercialization, highlighted by the September 2026 commercial operation of a hybrid thermal-storage frequency regulation project at Zhoukou Longda Power Generation Co., Ltd. This project utilizes a hybrid technical route consisting of 5MW/6min supercapacitors, 15MW/30MWh lithium iron phosphate batteries, and 500kW/500kWh all-vanadium flow batteries. This configuration improved the comprehensive frequency regulation performance index K (regulation rate × accuracy × response time) by more than two times compared to previous averages.

Technical Details

The company's vanadium battery technology focuses on reducing costs and expanding temperature adaptability. Key technical achievements include:

- **Material Innovation:** A proprietary positive electrode solid capacity-increasing material allows 1kg of material to replace 1.45 liters of traditional vanadium electrolyte, reducing positive electrode costs to 40%-60% of traditional solutions.
- **Operational Range:** The working temperature range has been expanded to 5°C–70°C, reducing the need for specialized temperature control.
- **Performance Metrics:** A 45kW double-sided inlet vanadium battery stack achieved an average energy efficiency of 82.48% at a current density of 167 mA/cm², exceeding the industry preference line of 80%. This stack passed NB/T 11062-2023 standard tests, including extreme conditions such as temperature shock, vibration, and short circuits.

Background and Context

To secure the supply chain, Yongtai Energy has acquired vanadium mineral resources totaling 163.97 million tons of vanadium pentoxide. On the R&D front, the company collaborated with the National University of Singapore and the Vnergy platform, while also partnering with the Agency for Science and Technology Research (ASTAR) for product certification. The company holds 35 authorized patents across materials, electrolytes, and stacks.

Significance and Outlook

Yongtai Energy has implemented a "four-in-one" closed-loop industry chain: vanadium mineral resources, core technology, equipment manufacturing, and demonstration applications. Following the September 2024 commissioning of a megawatt-level Nanshan solar-storage integrated station, the company is now expanding into industrial park storage, thermal power frequency regulation, and long-duration energy storage scenarios.

Source: https://cj.sina.com.cn/articles/view/7651844612/1c815e204020022sqa

Collected: November 21, 2026 | Automated Research System (AI)

#08 UNSW Battery Health Test: 3-Minute Li-ion Diagnostics for EVs

Published November 14, 2026 pv magazine Australia



OVERVIEW

Researchers at UNSW have developed a prototype lithium-ion battery health test that is 95.5% faster and over 80% cheaper than current methods. By utilizing short electrical pulses and statistical models, the system enables rapid assessment of retired batteries to facilitate second-life reuse and recycling.

IN DEPTH

Key Findings

UNSW researchers in Sydney have developed a prototype battery health test capable of assessing individual cells in under three minutes. The platform demonstrates more than 90% accuracy and is 95.5% faster than existing diagnostic methods. Financially, the researchers are targeting a cost of under AUD 25 per test, a significant reduction compared to the current cost of approximately AUD 120 ($85) per EV battery pack.

Technical Details

The prototype departs from traditional testing, which relies on a full charge-discharge cycle lasting about 10 hours. Instead, the UNSW system sends short electrical pulses through each cell and measures the response, using statistical models to estimate health. The platform is designed to be compatible with existing management systems used by energy storage operators and recyclers. It supports the three primary lithium-ion chemistries used in energy storage and electric vehicles:

- Lithium iron phosphate (LFP)
- Nickel cobalt aluminum (NCA)
- Nickel manganese cobalt (NMC)

The system is specifically designed to handle mixed batches of cells from different manufacturers rather than just ideal lab samples.

Background & Context

Current 10-hour testing cycles present safety risks, as damaged batteries can overheat or catch fire under hours of high-stress cycling. To move the technology toward commercial application, UNSW has partnered with DY New Energy, a Malaysia-headquartered lifecycle management company, on an AUD 1.3 million project. This collaboration involves testing the technology on more than 500 batteries in real-world conditions and developing a machine-learning decision engine to determine if batteries should be reused or recycled. This will be integrated into a battery management system module called iBMS for real-time monitoring.

Significance & Outlook

The technology aims to foster a circular battery economy in Australia by increasing the use of second-life batteries for grid and community energy storage. While up to 95% of battery components can be recovered, only a small fraction of Australian lithium-ion batteries are currently collected for recycling. The project is supported by the Trailblazer for Recycling and Clean Energy (TRaCE) Lab to Market Fund.

Source: https://www.pv-magazine.com/2026/11/14/unsw-develops-three-minute-lithium-ion-battery-health-test/

Collected: November 21, 2026 | Automated Research System (AI)

#09 CATL Tener Sodium: BESS Specifications and LFP Comparison

Published November 17, 2026 pv magazine Australia Australia



OVERVIEW

CATL has detailed the specifications for its Tener Sodium battery energy storage system (BESS), featuring a rated energy of 30+ MWh per block and 95% round-trip efficiency. The system demonstrates significant footprint and EPC cost reductions compared to the EnerX LFP system, with overseas delivery expected by summer 2027.

IN DEPTH

Key Findings

The CATL Tener Sodium BESS is designed for high-capacity storage, with a rated energy of 30+ MWh per block and a power output of 7.5 MW for four hours (0.25P). In a 500 MWh project model, the sodium-ion layout requires 6,630 m², a roughly 32% reduction compared to the 9,700 m² required for the EnerX LFP system. This spatial efficiency contributes to an estimated 9.2% reduction in overall engineering, procurement, and construction (EPC) costs, specifically reducing civil works by 16% and labor by 17%.

Technical Details

The system is configured in pairs of two, four, six, or eight cabinets. A full eight-cabinet block measures 18.2 m wide, 7 m deep, and 3.5 m high, with each cabinet weighing 44 to 45 metric tons. Technical specifications include:

- **Electrical:** Rated at 1,166.88 V DC (range: 612 V to 1,387.2 V) with 95% round-trip efficiency at 25°C.
- **Durability:** 70% state of health after 20 years under a 0.25P duty cycle. Cycle life is reported at 15,000 cycles at 25°C and over 10,000 at 45°C.
- **Environment:** Liquid-cooled operation from −35°C to +55°C, IP55 protection, and operation up to 4,000 m without derating.

The system integrates the Terapower 265 kW converter, a liquid-cooled, IP66-rated bidirectional DC/DC and PCS module. It accepts 600 V to 1,500 V DC and provides a 690 V AC output with a peak efficiency of at least 99.2%.

Background and Context

Compared to the EnerX LFP system, sodium-ion cells generate 27.2% less heat per unit of energy at the beginning of life. For a 50 MWh station, DC-side refrigeration capacity is reduced to 490 kW from 720 kW. CATL also plans an LFP version of the Tener system with a capacity of approximately 50 MWh across eight cabinets, though sodium-ion certification is currently the priority.

Significance and Outlook

While already being delivered in China, the overseas delivery window is set for summer 2027, following an August 2027 production window. The system's lower auxiliary power consumption—estimated at 1% compared to a 2% industry average—and reduced physical footprint position it as a competitive alternative to traditional lithium-ion BESS for large-scale projects.

Source: https://www.pv-magazine-australia.com/2026/11/17/clarifying-catl-tener-sodium-with-new-specifications-and-availability/

Collected: November 21, 2026 | Automated Research System (AI)

#10 Ampace PU100: UL 9540A 6th Edition Fire Test Results for AI Data Centers

Published November 18, 2026 PR Newswire（Yahoo Finance） USA



OVERVIEW

Ampace has received a UL certificate for its PU100 battery system after demonstrating substantial safety margins in large-scale fire testing (LSFT) under UL 9540A, 6th Edition. The results showed no thermal runaway propagation to adjacent modules and no re-ignition for 24 hours post-extinguishment, providing empirical data for AI data center safety assessments.

IN DEPTH

Key Findings

The PU100 large-scale fire test demonstrated that fire propagation was effectively controlled, with no thermal runaway occurring in adjacent modules. Despite 50 percent of the cells in the initiating module being heated simultaneously, adjacent modules maintained normal post-test voltage readings of 53.2 V. Furthermore, the system exhibited post-fire stability, self-extinguishing after 43 minutes with no observed re-ignition over the following 24 hours.

Technical Details

The testing provided measurable evidence regarding thermal exposure and deployment density:

- **Thermal Margins:** Wall temperature rise remained below 80°C (against a 97°C limit), and ceiling steel-beam temperature stayed below 250°C (against a 538°C limit), representing margins of more than 17°C and 288°C, respectively.
- **Compact Deployment:** The test utilized 10 cabinets at 100 percent state of charge. The configuration included zero side-by-side clearance, 20 mm back-to-back spacing, and 850 mm face-to-face spacing. No fire spread to adjacent or target cabinets was observed.
- **Debris Control:** No flaming debris escaped the cabinet, exceeding the assessed criterion of no flaming debris beyond 1.5 m.

Background and Context

Presented at RE+ 2026, these results are intended to assist data center operators in making informed decisions regarding system selection, installation design, and recovery planning. Ampace, established in 2021, provides lithium-ion batteries for various applications, including energy storage, robotics, and e-mobility. According to company records, Ampace has recorded zero safety incidents across its supplied battery packs and cells.

Significance and Outlook

By converting safety questions into measurable evidence—specifically regarding where propagation stops and how much heat reaches surrounding structures—the PU100 results support project-specific engineering assessments for AI data centers. These findings provide a framework for assessing fault isolation and the potential impact of battery failures on surrounding equipment in high-density installations.

Source: https://finance.yahoo.com/energy/articles/ampace-presents-pu100-fire-test-061100717.html

Collected: November 21, 2026 | Automated Research System (AI)