

TROY TECHNICAL

NEXT-GENERATION ENERGY STORAGE WEEKLY REPORT

October 10 - October 16, 2026 | Issue 2026-W41

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

9

ANALYZED ARTICLES

9

PRIORITY THEMES

Issued 2026-10-16 | English edition | fixed approved cover artwork



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

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

SIGNAL 01 | BUSINESS / RULES

Sodium-Ion Batteries: Performance and Aging in Microgrid and Off-Grid Systems

Primary-source report: A study of 5.0-Ah sodium-ion pouch cells demonstrates that application duty cycles significantly impact storage efficiency and degradation.

SIGNAL 02 | SYSTEM / ADOPTION

CATL and Intilion: Sodium-ion storage roadmap for DACH region

Collected report (not independently verified): CATL and German integrator Intilion have agreed to develop up to 3 GWh of sodium-ion battery energy storage projects in Germany, Austria, and Switzerland over the next five years.

SIGNAL 03 | TECH / PROCESS

Sakuu Carbon Battery Cell: Dry-Printed Metal-Free Design Specs

Collected report (not independently verified): Sakuu has produced a functional, metal-free battery test cell featuring 100% dry-printed anodes and cathodes.

SIGNAL 04 | BUSINESS / RULES

Truman Data: Revenue-share VPP platform for building batteries

Collected report (not independently verified): Finnish startup Truman Data has launched Energy Coop, a virtual power plant (VPP) platform that uses a revenue-sharing model instead of long-term battery-as-a-service contracts.

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.

Five numbers or evidence anchors that require conditions

5.0 Ah

A04

SOURCE-BOUND CONDITION

Sodium-ion study pouch cells

91.6%

A04

SOURCE-BOUND CONDITION

Microgrid duty; round-trip efficiency

79.8%

A04

SOURCE-BOUND CONDITION

Off-grid; capacity SOH after 500 EFC

<=3 GWh

A05

SOURCE-BOUND CONDITION

CATL/Intilion plan, not shipped volume

OPEN

A04

SOURCE-BOUND CONDITION

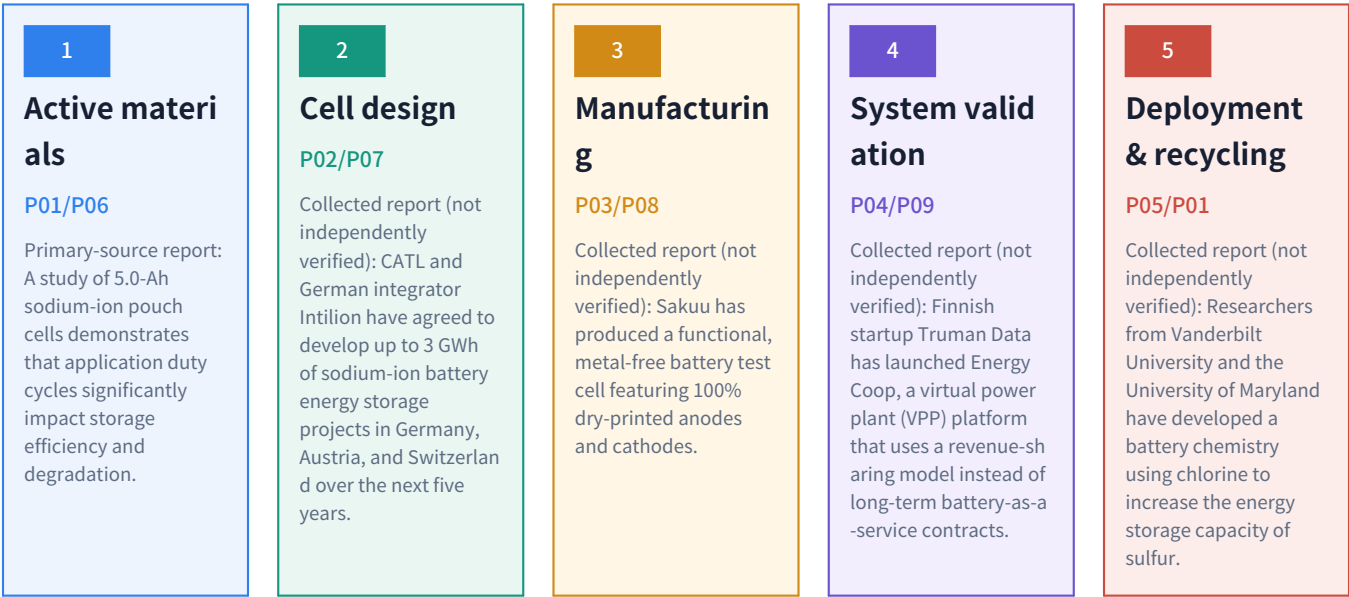
Application-specific temperature-dependent efficiency, reproducibility and deployment terms remain unproven. Published claims are not customer-qualified performance.

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.



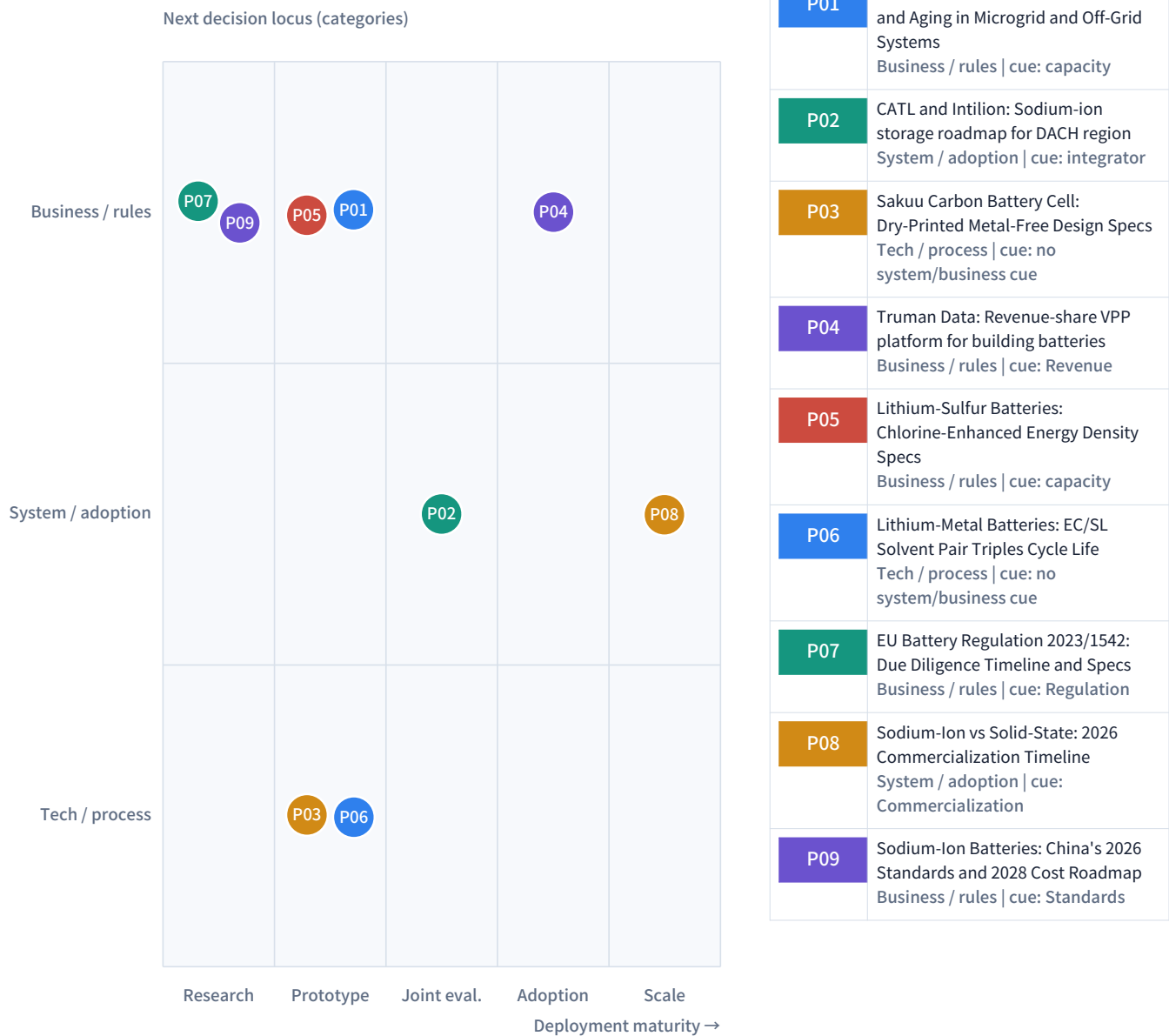
EVIDENCE REQUIRED AT EACH HANDOFF

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



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.

For legibility, scores of 18 or below use an 18-pt bubble diameter; underlying scores are unchanged.

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

P01

Sodium-Ion Batteries: Performance and Aging in Microgrid and Off-Grid Systems

A04 | Business / rules | Prototype

2026-10-12

FACT

Primary-source report: A study of 5.0-Ah sodium-ion pouch cells demonstrates that application duty cycles significantly impact storage efficiency and degradation. While the microgrid system achieved 91.6% round-trip efficiency, the off-grid system showed higher degradation with a capacity state of health of 79.8% after 500 equivalent full cycles.

WHY IT MATTERS

In practical terms, Sodium-Ion Batteries needs separate tests of duty-cycle aging and temperature-dependent efficiency before the result becomes an adoption case.

BUSINESS READ

For Sodium-Ion Batteries, compare duty-cycle aging and temperature-dependent efficiency under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Sodium-Ion Batteries on duty-cycle aging against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific temperature-dependent efficiency, reproducibility and deployment terms remain unproven. Published claims are not customer-qualified performance.

EDITORIAL SCORE 17/25 | MATURITY 2/5 | DECISION LOCUS: BUSINESS / RULES

P02

CATL and Intilion: Sodium-ion storage roadmap for DACH region

A05 | System / adoption | Joint evaluation

2026-10-13

FACT

Collected report (not independently verified): CATL and German integrator Intilion have agreed to develop up to 3 GWh of sodium-ion battery energy storage projects in Germany, Austria, and Switzerland over the next five years. This partnership expands the companies' existing cooperation into a new battery chemistry to reduce environmental impacts and raw material dependence.

WHY IT MATTERS

In practical terms, CATL and Intilion needs separate tests of duty-cycle aging and temperature-dependent efficiency before the result becomes an adoption case.

BUSINESS READ

For CATL and Intilion, compare duty-cycle aging and temperature-dependent efficiency under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare CATL and Intilion on duty-cycle aging against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific temperature-dependent efficiency, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 16/25 | MATURITY 3/5 | DECISION LOCUS: SYSTEM / ADOPTION

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

P03

Sakuu Carbon Battery Cell: Dry-Printed Metal-Free Design Specs

A09 | Tech / process | Prototype

2026-10-13

FACT

Collected report (not independently verified): Sakuu has produced a functional, metal-free battery test cell featuring 100% dry-printed anodes and cathodes. By combining carbon composite materials with a polymeric current collector, the company has developed a flexible, lightweight cell designed to eliminate fire risks associated with conventional lithium-ion configurations.

WHY IT MATTERS

In practical terms, Sakuu Carbon Battery Cell needs separate tests of cell quality and mechanism and immune safety and reproducibility before the result becomes an adoption case.

BUSINESS READ

For Sakuu Carbon Battery Cell, compare cell quality and mechanism and immune safety and reproducibility under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Sakuu Carbon Battery Cell on cell quality and mechanism against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific immune safety and reproducibility, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 14/25 | MATURITY 2/5 | DECISION LOCUS: TECH / PROCESS

P04

Truman Data: Revenue-share VPP platform for building batteries

A07 | Business / rules | Product adoption

2026-10-08

FACT

Collected report (not independently verified): Finnish startup Truman Data has launched Energy Coop, a virtual power plant (VPP) platform that uses a revenue-sharing model instead of long-term battery-as-a-service contracts. A municipal pilot involving 70 buildings demonstrated an 11.4% reduction in annual electricity costs through optimization.

WHY IT MATTERS

In practical terms, Truman Data needs separate tests of round-trip efficiency and duty cycle before the result becomes an adoption case.

BUSINESS READ

For Truman Data, compare round-trip efficiency and duty cycle under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Truman Data on round-trip efficiency against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific duty cycle, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 17/25 | MATURITY 4/5 | DECISION LOCUS: BUSINESS / RULES

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

P05

Lithium-Sulfur Batteries: Chlorine-Enhanced Energy Density Specs

A01 | Business / rules | Prototype

2026-10-08

FACT

Collected report (not independently verified): Researchers from Vanderbilt University and the University of Maryland have developed a battery chemistry using chlorine to increase the energy storage capacity of sulfur. The approach achieved a stack-level specific energy of 477 watt-hours per kilogram, a 37% increase over conventional lithium-sulfur systems.

WHY IT MATTERS

In practical terms, Lithium-Sulfur Batteries needs separate tests of round-trip efficiency and duty cycle before the result becomes an adoption case.

BUSINESS READ

For Lithium-Sulfur Batteries, compare round-trip efficiency and duty cycle under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Lithium-Sulfur Batteries on round-trip efficiency against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific duty cycle, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 15/25 | MATURITY 2/5 | DECISION LOCUS: BUSINESS / RULES

P06

Lithium-Metal Batteries: EC/SL Solvent Pair Triples Cycle Life

A06 | Tech / process | Prototype

2026-10-13

FACT

Collected report (not independently verified): A joint South Korean research team has developed a high-performance electrolyte using a combination of ethylene carbonate (EC) and sulfolane (SL) that triples the cycle life of lithium-metal batteries under demanding conditions.

WHY IT MATTERS

In practical terms, Lithium-Metal Batteries needs separate tests of round-trip efficiency and duty cycle before the result becomes an adoption case.

BUSINESS READ

For Lithium-Metal Batteries, compare round-trip efficiency and duty cycle under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Lithium-Metal Batteries on round-trip efficiency against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific duty cycle, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 15/25 | MATURITY 2/5 | DECISION LOCUS: TECH / PROCESS

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

P07

EU Battery Regulation 2023/1542: Due Diligence Timeline and Specs

A02 | Business / rules | Research

2026-10-11

FACT

Collected report (not independently verified): EU Regulation 2023/1542 mandates that all batteries entering the EU from 18 August 2027 must provide verified evidence of responsible sourcing for cobalt, lithium, nickel, and natural graphite. The rules apply directly to operators with a net turnover of at least €40 million, creating a trickle-down effect that forces smaller suppliers to provide audit data to maintain market access.

WHY IT MATTERS

In practical terms, EU Battery Regulation 2023/1542 needs separate tests of interface function and aging and process window before the result becomes an adoption case.

BUSINESS READ

For EU Battery Regulation 2023/1542, compare interface function and aging and process window under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare EU Battery Regulation 2023/1542 on interface function against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific aging and process window, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 15/25 | MATURITY 1/5 | DECISION LOCUS: BUSINESS / RULES

P08

Sodium-Ion vs Solid-State: 2026 Commercialization Timeline

A03 | System / adoption | Scale-up

2026-10-09

FACT

Collected report (not independently verified): Sodium-ion batteries have reached commercial scale in 2026, though they maintain a price premium over LFP. Meanwhile, "solid-state" shipments remain limited to semi-solid hybrid designs, with all-solid-state mass production targets shifted to 2027 and beyond.

WHY IT MATTERS

In practical terms, Sodium-Ion vs Solid-State needs separate tests of duty-cycle aging and temperature-dependent efficiency before the result becomes an adoption case.

BUSINESS READ

For Sodium-Ion vs Solid-State, compare duty-cycle aging and temperature-dependent efficiency under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Sodium-Ion vs Solid-State on duty-cycle aging against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific temperature-dependent efficiency, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 16/25 | MATURITY 5/5 | DECISION LOCUS: SYSTEM / ADOPTION

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

P09

Sodium-Ion Batteries: China's 2026 Standards and 2028 Cost Roadmap

A08 | Business / rules | Research

2026-10-16

FACT

Collected report (not independently verified): China released two national standards for sodium-ion batteries in August 2026, establishing stricter safety and performance metrics than those for lithium batteries. Industry projections suggest cell costs could drop to RMB 0.35/Wh by late 2028, achieving cost parity with lithium and enabling large-scale commercialization.

WHY IT MATTERS

In practical terms, Sodium-Ion Batteries needs separate tests of duty-cycle aging and temperature-dependent efficiency before the result becomes an adoption case.

BUSINESS READ

For Sodium-Ion Batteries, compare duty-cycle aging and temperature-dependent efficiency under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Sodium-Ion Batteries on duty-cycle aging against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific temperature-dependent efficiency, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 15/25 | MATURITY 1/5 | DECISION LOCUS: BUSINESS / RULES

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 01-09

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	Lithium-Sulfur Batteries: Chlorine-Enhanced Energy Density Specs	https://batteriesnews.com/new-battery-chemistry-could-help-lithium-sulfur-batteries-store-more-energy/
A02	EU Battery Regulation 2023/1542: Due Diligence Timeline and Specs	https://www.insumenergy.com/eu-battery-supply-chain-due-diligence-2026-buyers-guide/
A03	Sodium-Ion vs Solid-State: 2026 Commercialization Timeline	https://battery-tech.net/why-sodium-ion-won-2026-and-all-solid-state-is-still-a-2027-bet/
A04	Sodium-Ion Batteries: Performance and Aging in Microgrid and Off-Grid Systems	https://www.frontiersin.org/journals/chemistry/articles/10.3389/fchem.2026.2007977/full
A05	CATL and Intilion: Sodium-ion storage roadmap for DACH region	https://www.ess-news.com/2026/10/13/catl-intilion-target-up-to-3-gwh-of-sodium-ion-storage-in-europe/
A06	Lithium-Metal Batteries: EC/SL Solvent Pair Triples Cycle Life	https://www.techtimes.com/articles/328945/20261013/cheap-solvent-pair-triples-lithium-metal-battery-life-breaking-electrolyte-design-rules.htm
A07	Truman Data: Revenue-share VPP platform for building batteries	https://www.ess-news.com/2026/10/08/finnish-startup-launches-revenue-share-vpp-for-building-batteries/
A08	Sodium-Ion Batteries: China's 2026 Standards and 2028 Cost Roadmap	https://finance.biggo.com/news/63789b0e-d9ee-4d5a-8bd9-41a54b82d812
A09	Sakuu Carbon Battery Cell: Dry-Printed Metal-Free Design Specs	https://battery-tech.net/battery-markets-news/sakuu-dry-metal-free-cell/

Scope: retrieving a source does not independently validate performance, cost or clinical utility. The claim ledger distinguishes announcements, papers and secondary reporting. Material published before the reporting week is continuing context, not a new event. Editorial inferences and actions are not investment or medical advice.

NextGenEnergyStorage — Selected Articles

Date: 2026-10-18

Articles: 9

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#01 Lithium-Sulfur Batteries: Chlorine-Enhanced Energy Density Specs

Published October 08, 2026 Batteries News USA



OVERVIEW

Researchers from Vanderbilt University and the University of Maryland have developed a battery chemistry using chlorine to increase the energy storage capacity of sulfur. The approach achieved a stack-level specific energy of 477 watt-hours per kilogram, a 37% increase over conventional lithium-sulfur systems.

Key Findings

A new battery chemistry has demonstrated the ability to increase sulfur's charge-storage capacity by approximately 58% and raise average operating voltage from 2.05 volts to 2.54 volts. In experimental cells, this combination allowed one kilogram of sulfur to store more than 1,700 watt-hours of energy. When accounting for all major battery components, the researchers estimate a stack-level specific energy of 477 watt-hours per kilogram.

Technical Details

The team expanded sulfur's redox capability by introducing chlorine into the chemistry. While conventional lithium-sulfur batteries allow each sulfur atom to exchange two electrons, this new system enables the exchange of a third electron, which occurs at a higher voltage.

To ensure the reaction remained reversible, the researchers focused on electrolyte design using molecular simulations. The resulting electrolyte prevents the sulfur-chlorine compound from dissolving and traveling to the lithium-metal electrode, keeping the reaction localized within the positive electrode. Spectroscopy confirmed that sulfur repeatedly moved through this new chemical state during charge and discharge cycles.

Background and Context

Lithium-sulfur batteries are considered an experimental alternative to lithium-ion batteries due to the abundance and low cost of sulfur, as well as its high theoretical charge storage by weight. However, practical application has been hindered by durability issues and relatively low operating voltages, as total energy storage depends on both charge capacity and voltage.

Significance and Outlook

The researchers validated the chemistry in a small, single-layer pouch cell, which retained 78% of its initial capacity after 100 charging cycles. While this proves the chemistry works outside of standard coin cells, the team notes that significant work is required for commercialization. Current prototypes utilize a lithium-metal electrode and levels of sulfur and electrolyte that would be impractical for commercial products. The primary significance of the study is the demonstration that sulfur's available chemistry can be expanded rather than simply optimizing conventional reactions.

Source: <https://batteriesnews.com/new-battery-chemistry-could-help-lithium-sulfur-batteries-store-more-energy/>

Collected: October 17, 2026 | Automated Research System (AI)

#02 EU Battery Regulation 2023/1542: Due Diligence Timeline and Specs

Published October 11, 2026 Insum Energy Germany



OVERVIEW

EU Regulation 2023/1542 mandates that all batteries entering the EU from 18 August 2027 must provide verified evidence of responsible sourcing for cobalt, lithium, nickel, and natural graphite. The rules apply directly to operators with a net turnover of at least €40 million, creating a trickle-down effect that forces smaller suppliers to provide audit data to maintain market access.

Key Findings

From 18 August 2027, any battery entering the European Union must be backed by verified evidence that its cobalt, lithium, nickel, and natural graphite were sourced responsibly. This requirement, established under Chapter VII (Articles 47–53) of Regulation (EU) 2023/1542, was previously set for August 2025 but was postponed by the “stop-the-clock” Regulation (EU) 2025/1561.

Technical Details

Operators exceeding the turnover threshold must implement a third-party-verified system based on four pillars:

- **Management System:** A board-approved sourcing policy integrated into company risk management with an accountable senior manager.
- **Risk Identification:** Mapping the supply chain from mine and refiner to cell maker, utilizing on-the-ground assessments to screen for environmental harm and human rights abuses.
- **Risk Management:** Documented plans to mitigate risks and a process to suspend or exit non-remediating suppliers.
- **Verification:** Annual due diligence reports independently audited by a notified body.

Additionally, the digital battery passport is scheduled for implementation on 18 February 2027. Recycling efficiency targets are also tightening: lithium-based batteries must reach 65% efficiency by the end of 2025 (70% by 2030), with lithium recovery rates rising from 50% by the end of 2027 to 80% by 2031.

Background & Context

The regulation directly targets economic operators with a net turnover of at least €40 million. While a proposal under the Omnibus IV review suggests raising this to €150 million, the €40 million limit remains the current planning benchmark. This differs from the Corporate Sustainability Due Diligence Directive (CSDDD), which targets larger groups (roughly 5,000+ employees and €1.5 billion turnover) and is expected around 2028–2029.

Significance & Outlook

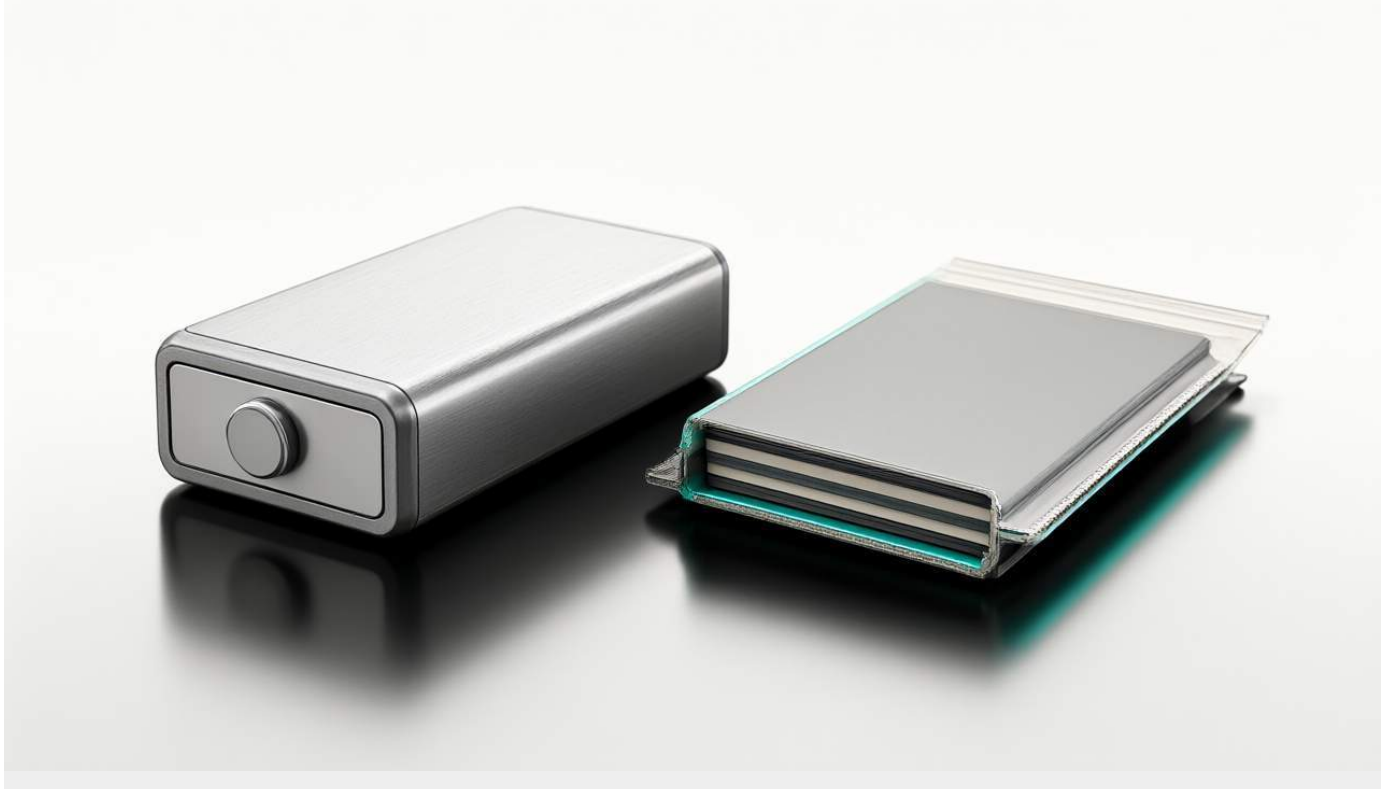
Non-compliance after August 2027 will result in market withdrawal and border rejections. This creates an indirect mandate for smaller wholesalers and installers; large brands auditing their chains will de-list any suppliers unable to provide smelter lists, audit certificates, and EPR registration numbers. Furthermore, access to 2026 support schemes, such as Germany's KfW 270 loans and France's MaPrimeRénov' 2026, effectively requires CE conformity and traceable supply chains.

Source: <https://www.insumenergy.com/eu-battery-supply-chain-due-diligence-2026-buyers-guide/>

Collected: October 17, 2026 | Automated Research System (AI)

#03 Sodium-Ion vs Solid-State: 2026 Commercialization Timeline

Published October 09, 2026 Battery-Tech Network USA



OVERVIEW

Sodium-ion batteries have reached commercial scale in 2026, though they maintain a price premium over LFP. Meanwhile, "solid-state" shipments remain limited to semi-solid hybrid designs, with all-solid-state mass production targets shifted to 2027 and beyond.

Key Findings

Sodium-ion batteries achieved commercial scale in 2026, primarily driven by Chinese manufacturers, while all-solid-state batteries remain in the pilot and test stages. In a September 2026 storage tender in Renqiu, Hebei, sodium-ion systems were bid at an average of \$153 per kWh, significantly higher than the \$79 per kWh bid for lithium iron phosphate (LFP).

Technical Details

Current "solid-state" shipments are exclusively semi-solid hybrid designs. EVTank reports 8.0 GWh of solid-state shipments in 2025, all of which were semi-solid. Notable deployments include WeLion's 150 kWh semi-solid pack in NIO vehicles and Qingtao cells in the SAIC MG4. All-solid-state cells are not yet shipped at commercial scale; Samsung SDI plans mass production of sulfide cells in Ulsan for H2 2027, and BYD plans small-batch trials of sulfide technology in approximately 1,000 vehicles around 2027.

Sodium-ion technology is seeing deployment in specific niches. CATL's Naxtra cells reach up to 175 Wh/kg, with a target of 1 GWh cumulative storage shipments by the end of 2026. Other applications include HiNa Battery's 676 kWh mining truck and FAW Jiefang's heavy truck, which maintained over 90% capacity at -40 °C.

Background & Context

Both technologies have faced timeline slippages. Toyota shifted its all-solid-state target from 2020 to 2023, then 2026, and now 2027–2028. QuantumScape, which uses a solid ceramic separator with a liquid cathode electrolyte, originally aimed for 2024 production but opened its Eagle pilot line in February 2026. Sodium-ion has also seen volatility; US-based Natron Energy ceased operations on 3 September 2025 after failing to fund a \$1.4 billion factory.

Significance & Outlook

The adoption of sodium-ion is currently limited by cost. HiNa's general manager estimates sodium-ion costs at \$74–104 per kWh compared to \$45–74 for lithium, with convergence expected in 2027 or 2028. For solid-state, the transition from semi-solid hybrids to all-solid-state production remains a manufacturing challenge, with EVTank forecasting all-solid-state cells to make up nearly 20% of a projected 607.2 GWh total solid-state shipment volume by 2030.

Source: <https://battery-tech.net/why-sodium-ion-won-2026-and-all-solid-state-is-still-a-2027-bet/>

Collected: October 17, 2026 | Automated Research System (AI)

#04 Sodium-Ion Batteries: Performance and Aging in Microgrid and Off-Grid Systems

Published October 12, 2026 Frontiers UK



OVERVIEW

A study of 5.0-Ah sodium-ion pouch cells demonstrates that application duty cycles significantly impact storage efficiency and degradation. While the microgrid system achieved 91.6% round-trip efficiency, the off-grid system showed higher degradation with a capacity state of health of 79.8% after 500 equivalent full cycles.

Key Findings

The research indicates that the specific application duty cycle materially influences the efficiency, reliability, and degradation of sodium-ion batteries. After 500 equivalent full cycles, the capacity state of health varied by application: 85.2% for reference cycling, 81.9% for microgrid cycling, and 79.8% for off-grid cycling. Corresponding resistance growth was recorded at 39%, 58%, and 74% for these three categories, respectively.

Technical Details

The evaluation utilized 24 5.0-Ah sodium-ion pouch cells. Researchers performed baseline electrochemical characterization and identified a second-order Thevenin electrochemical-thermal model. Discharge behavior was tested across rates of 0.20–2.00 C and temperatures from 10–40 °C, with pulse and impedance measurements covering 10–90% state of charge. Results showed that increasing the discharge rate reduced usable capacity and energy efficiency, though coulombic efficiency remained above approximately 99%.

The calibrated model was applied to two simulated scenarios over 365 days at 15-minute resolution:

- **Grid-connected microgrid (504-kWh):** Achieved 91.6% round-trip efficiency, 18.7-kW tracking RMSE, and 4.3% renewable curtailment.
- **Standalone off-grid system (120.96-kWh):** Achieved 89.8% round-trip efficiency, 6.4% curtailment, and a 1.6% annual loss-of-power-supply probability.

Background & Context

Sodium-ion batteries are increasingly considered for stationary energy storage. This study aimed to determine how experimentally measured electrochemical behavior translates to realistic grid-connected and standalone duty cycles. The model used in the study reproduced measured voltage response with millivolt-scale prediction errors and captured resistance trends dependent on temperature and state-of-charge.

Significance & Outlook

The data demonstrates that sodium-ion batteries are viable for stationary storage, but their longevity and performance are highly dependent on the operational environment. The higher degradation and resistance growth observed in off-grid configurations compared to microgrid or reference cycling highlight the need for application-specific management when deploying sodium-ion technology in standalone energy systems.

Source: <https://www.frontiersin.org/journals/chemistry/articles/10.3389/fchem.2026.2007977/full>

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#05 CATL and Intilion: Sodium-ion storage roadmap for DACH region

Published October 13, 2026 ESS News USA



OVERVIEW

CATL and German integrator Intilion have agreed to develop up to 3 GWh of sodium-ion battery energy storage projects in Germany, Austria, and Switzerland over the next five years. This partnership expands the companies' existing cooperation into a new battery chemistry to reduce environmental impacts and raw material dependence.

Key Findings

CATL and Intilion have signed an agreement to jointly develop up to 3 GWh of sodium-ion battery energy storage projects across the DACH markets (Germany, Austria, and Switzerland) over a five-year period. This figure represents a development target rather than confirmed deliveries; specific projects, contract values, and procurement commitments have not been disclosed.

Technical Details

The partnership utilizes CATL's TENER Sodium energy storage system, which was unveiled in Munich in June 2026. Technical specifications for the system include:

- **Cycle Life:** 15,000 cycles at 25 C and more than 10,000 cycles at 45 C.
- **Efficiency and Retention:** Round-trip efficiency exceeding 96.5% and capacity retention above 92% at -20 C (with Intilion noting retention above 90% at low temperatures).
- **System Architecture:** Modular energy blocks offering more than 30 MWh per block, supporting storage durations from one to eight hours.
- **Management:** Dedicated bidirectional DC voltage regulation and battery management systems tailored for sodium-ion characteristics.

Background & Context

Intilion, a member of the HOPPECKE Group based in Paderborn, specializes in integrating battery technologies for utility-scale and commercial/industrial systems. The two companies previously partnered in May 2025 to target up to 10 GWh of storage projects in the DACH region using CATL's TENER products, though it is unspecified if the sodium-ion target is part of that framework.

CATL is aggressively expanding its sodium-ion footprint through other partnerships, including a 5 GWh plan with Alfen in Europe and a 60 GWh agreement with HyperStrong in China. CATL expects sodium-ion storage shipments to reach 1 GWh in 2026, with international deliveries starting in June 2027.

Significance & Outlook

The shift toward sodium-ion technology is driven by the potential to lower noise emissions at storage sites and reduce the environmental impacts of raw material extraction. For Intilion, the agreement diversifies its portfolio beyond lithium-ion, while CATL gains an established European integration partner to facilitate the international commercialization of its sodium-ion technology.

Source: <https://www.ess-news.com/2026/10/13/catl-intilion-target-up-to-3-gwh-of-sodium-ion-storage-in-europe/>

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#06 Lithium-Metal Batteries: EC/SL Solvent Pair Triples Cycle Life

Published October 13, 2026 Tech Times South Korea



OVERVIEW

A joint South Korean research team has developed a high-performance electrolyte using a combination of ethylene carbonate (EC) and sulfolane (SL) that triples the cycle life of lithium-metal batteries under demanding conditions. By utilizing "cooperative solvation" to weaken the solvent-ion bond, the team has challenged long-standing electrolyte design rules using inexpensive, off-the-shelf chemicals.

Key Findings

Researchers from UNIST and KAIST have developed an electrolyte formulation that triples the cycle life of lithium-metal batteries compared to conventional electrolytes tested under identical conditions. The formulation consists of two inexpensive, commodity solvents—ethylene carbonate (EC) and sulfolane (SL)—mixed at a 3-to-7 weight ratio, combined with a lithium salt and a small quantity of an SEI-stabilizing additive. This result was reported in ACS Nano on August 11, 2026.

Technical Details

The performance gain is attributed to a mechanism called "cooperative solvation." While EC and SL individually bind too strongly to lithium ions to be suitable for lithium-metal anodes, mixing them creates strong intermolecular hydrogen bonds between EC's hydrogen atoms and SL's oxygen atoms. This interaction pulls the solvent molecules toward each other rather than toward the lithium ion.

- **Desolvation:** The hydrogen bonding reduces the total binding energy, making it easier for lithium ions to shed their solvent shell (desolvation) before depositing on the anode.
- **Solvation Sheath:** Computational modeling verified that both solvents appear simultaneously in the first solvation sheath in a new configuration, sharing the coordination of the lithium ion.

Background & Context

Lithium-metal batteries theoretically offer significantly higher energy density per kilogram than graphite-anode batteries, potentially doubling or increasing range up to ten times. However, lithium metal is highly reactive, leading to the continuous growth and cracking of the solid electrolyte interphase (SEI) and the formation of needle-like dendrites. To combat this, engineers previously relied on expensive fluorinated solvents or very high salt concentrations to weaken the solvent's grip on lithium ions.

Significance & Outlook

By using two low-cost, industrially produced solvents that were previously considered unsuitable, this research provides a new design principle that overturns conventional wisdom. The ability to achieve high performance without expensive materials could accelerate the commercialization of compact grid-scale energy storage and longer-range electric vehicles.

Source: <https://www.techtimes.com/articles/328945/20261013/cheap-solvent-pair-triples-lithium-metal-battery-life-breaking-electrolyte-design-rules.htm>

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#07 Truman Data: Revenue-share VPP platform for building batteries

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OVERVIEW

Finnish startup Truman Data has launched Energy Coop, a virtual power plant (VPP) platform that uses a revenue-sharing model instead of long-term battery-as-a-service contracts. A municipal pilot involving 70 buildings demonstrated an 11.4% reduction in annual electricity costs through optimization.

Key Findings

Truman Data has released its Energy Coop VPP platform to its first customers in Finland. Unlike traditional battery-as-a-service models that often require five- to 10-year fixed-price contracts, Truman Data employs a revenue-sharing model. The company does not own or sell battery hardware; instead, it earns a percentage of the revenue generated by the customer and assists in arranging financing for battery systems.

Technical Details

The Energy Coop platform utilizes AI to predict the flexibility available from each building and battery within a portfolio. The system manages loads for heating, ventilation, EV charging, and batteries based on customer-defined limits. This flexibility is then packaged into trades linked to Nord Pool day-ahead and intraday market prices. Truman Data provides property owners with calculations regarding potential savings and earnings before they select a battery supplier.

Performance Data

Data from a municipal pilot involving 70 buildings showed the following results:

- Annual electricity costs were reduced by 11.4% through optimization.
- Flexibility trading was modeled to generate additional revenue equal to 4.2% of the annual bill.
- Truman Data projects that integrating three to seven small and mid-size battery systems per building could increase total benefits to over 25%.

Market Context

The launch occurs amid significant energy infrastructure growth in Finland. According to the transmission system operator Fingrid, signed grid connection agreements for data center projects total just under 5 GW, while electric boiler projects exceed 3 GW. If completed, these could increase Finland's electricity consumption by nearly 40% from 2025 levels over at least five years. Additionally, connection agreements have been signed for more than 4 GW of storage. As of mid-2025, Finland had approximately 250 MW of operational battery storage, with another 300 MW expected within two years, including a 125 MW/300 MWh project by Covenengo and Delta Capacity.

Source: <https://www.ess-news.com/2026/10/08/finnish-startup-launches-revenue-share-vpp-for-building-batteries/>

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#08 Sodium-Ion Batteries: China's 2026 Standards and 2028 Cost Roadmap

Published October 16, 2026 BigGo Finance China



OVERVIEW

China released two national standards for sodium-ion batteries in August 2026, establishing stricter safety and performance metrics than those for lithium batteries. Industry projections suggest cell costs could drop to RMB 0.35/Wh by late 2028, achieving cost parity with lithium and enabling large-scale commercialization.

Key Findings

Sodium-ion battery commercialization is accelerating through a "lithium-sodium complementary" strategy, targeting niche scenarios where lithium is less effective. Industry experts project that cell costs will reach RMB 0.35/Wh by the end of 2028, marking the inflection point for mass adoption. Currently, sodium batteries are seeing deployment in AI data centers (AIDC), telecommunications base stations, grid-side energy storage, and two-wheelers.

Technical Details and Standards

Two national standards released in August 2026—GB48072 (safety) and GB48098 (performance)—impose stricter requirements than existing lithium frameworks:

- **Safety:** The nail penetration test requires full penetration rather than the shallow penetration (10mm or one-third depth) used for lithium. Drop tests are mandated from 1.5 meters for cells and 2 meters for modules onto concrete.
- **Performance:** Standards require energy efficiency of at least 92% and capacity retention of no less than 90% over 1,000 cycles.
- **Temperature:** Low-temperature capacity requirements are categorized into three tiers: -40°C, -30°C, and -20°C.

While currently recommended, these will transition to mandatory standards. Additionally, four international standards are under development to facilitate overseas market entry.

Background and Context

The shift toward sodium is driven by resource security; China's external dependence on lithium resources is 72%. According to Professor Li Jinghong of Tsinghua University, lithium's share of new-type energy storage fell from 97.5% at the end of 2025 to 94% in the first half of 2026.

Commercial Deployment and Significance

Practical applications are leading the breakthrough in harsh environments. China Tower is piloting 48V100Ah and 48V50Ah products in Tibet, Heilongjiang, and Xinjiang to prevent the "freezing and losing power" issues associated with lithium iron phosphate batteries. In the AIDC sector, Veken Technology's HR50 laminated product supports 3C charging (and 6C discharging in extreme cases) with an expected life of 8,000 cycles under 1C conditions. These deployments indicate a shift where third-party certification has moved from an optional bonus to a mandatory entry ticket for market access.

Source: <https://finance.biggo.com/news/63789b0e-d9ee-4d5a-8bd9-41a54b82d812>

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#09 Sakuu Carbon Battery Cell: Dry-Printed Metal-Free Design Specs

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OVERVIEW

Sakuu has produced a functional, metal-free battery test cell featuring 100% dry-printed anodes and cathodes. By combining carbon composite materials with a polymeric current collector, the company has developed a flexible, lightweight cell designed to eliminate fire risks associated with conventional lithium-ion configurations.

Key Findings

On October 12, 2026, Sakuu announced the production of a functional, metal-free battery test cell. The cell was manufactured at the company's Silicon Valley research and development facility using the Kavian platform. This prototype utilizes 100% dry-printed anodes and cathodes, resulting in a lightweight and flexible form factor.

Technical Details

The cell's architecture integrates carbon composite materials, a carbon fiber veil, and polymeric current collector technology. Unlike conventional lithium-ion cells that use parallel-connected configurations, Sakuu employs individually sealed, series-connected layers. Current is carried vertically through the stack across contact surfaces via a thin conductive polymer film.

To prevent the thin polymer films from wrinkling, Sakuu incorporated a carbon fiber veil. These fibers penetrate the current collector and are embedded directly into the dry-powder anode and cathode. According to Sakuu, this specific configuration provides several technical advantages:

- Improved contact between adjacent layers.
- Enhanced mechanical reinforcement.
- Increased electrical conductivity.
- Low contact resistance and mechanical integrity.

Safety and Manufacturing

The polymeric current collector architecture is designed for safety; in the event of a puncture, defect, or short circuit, energy dissipates slowly. Sakuu states this prevents the generation of sufficient heat to produce a fire. The production process leverages the company's additive manufacturing platform, which is capable of dry-printing electrodes for both carbon fiber batteries and supercapacitors.

Significance and Outlook

The combination of flexible electrode and current collector layers enables the potential for structurally integrated battery designs. Sakuu identifies several target applications for this technology, including aerospace, transportation, wearables, data centers, and energy storage systems. The company is currently developing equipment to transition these capabilities to commercial-scale manufacturing, including the possibility of regionalized production for batteries and supercapacitors.

Source: <https://battery-tech.net/battery-markets-news/sakuu-dry-metal-free-cell/>

Collected: October 17, 2026 | Automated Research System (AI)