

Energy & Storage

Field Intelligence Report

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Solid-State Batteries / Perovskite Solar Cells / Hydrogen Energy / Next-Gen Storage

Market Mood

65

/ 100 Cautiously Optimistic

Next-Gen Energy: Scaling Production

Advanced battery, solar, and hydrogen technologies accelerate from pilot to commercial scale, driving critical infrastructure investments.

Global Green Hydrogen Investment 2026	Perovskite Solar Market CAGR 2026-2035	US Energy Storage Capacity Added Q2 2026	Solid-State Battery Energy Density Target
\$10 Billion	69.45	20.2	500
+25%	+5%	+15%	+10%

Weekly Summary

The energy sector is witnessing a critical transition from R&D; to commercialization across solid-state batteries, perovskite solar, hydrogen, and next-gen storage. China leads in solid-state battery standardization and investment, while Western firms like QuantumScape face delays. Perovskite solar cells achieve record efficiencies and secure significant government backing in Japan and Australia for GW-scale production. Green hydrogen projects globally move to execution with \$10B+ investments, but face FID deadlines. Long-duration storage and battery recycling are scaling rapidly in the US, driven by \$500M DoE grants and market shifts. Western players must strategically invest in domestic manufacturing and R&D; to secure competitive positions.

4 Sub-Topic Summary

Sub-Topic	Headline	Momentum	Key Insight
Solid-State Batteries	Global Solid-State Battery Race Intensifies with 2027-2028 Commercialization Targets	Building	While major players like Samsung SDI, CATL, and Chinese automakers (Chery, Geely) target 2027-2028 for pilot or mass production of solid-state batteries (SSBs) with 400-500 Wh/kg, Western firms like QuantumScape face delays to 2029, and semi-solid solutions are gaining traction for near-term applications.

Perovskite Solar Cells	Perovskite Solar Cells Achieve Record Efficiencies, Scale Manufacturing for GW-Scale Deployment	Accelerating	Perovskite solar cells are rapidly advancing, with tandem cells achieving record efficiencies (LONGi 35.5%, Fraunhofer ISE 27.3%) and securing significant government and private investment (Japan ¥28B, Australia A\$7.25M) to scale manufacturing to GW capacity by 2030, addressing stability and cost challenges.
Hydrogen Energy	Green Hydrogen Projects Transition to Execution with \$10 Billion Investments, Facing 2027 FID Deadlines	Building	The global hydrogen sector is moving from ambition to execution, with \$10 billion in green hydrogen investments projected for 2026 and over 100 GW of electrolysis projects requiring Final Investment Decisions (FIDs) by end of 2027. Key players like Air Products, Linde, and ITM Power are advancing large-scale electrolyzer projects and off-take agreements.
Next-Gen Storage	US Energy Storage Adds Record 20.2 GWh in Q2 2026, Driving Long-Duration and Recycling Innovation	Accelerating	The US energy storage market installed a record 20.2 GWh in Q2 2026, with utility-scale capacity nearly doubling. Long-duration technologies like Form Energy's iron-air batteries (30GWh+ projects) and Eos's zinc batteries are gaining traction, while the EV battery recycling market is projected to reach \$37.5 billion by 2035, driven by \$500M DoE grants and new regulations.

Toyota Outlines Solid-State EV Battery Commercialization for 2027-2028

Source: Gemini Grounding

Summary: Toyota has formalized its roadmap for commercial solid-state EV batteries, targeting a launch between 2027 and 2028, initially under the Lexus brand. These first-generation batteries are projected to offer a driving range of approximately 1,000 km (620 miles) ...

WHY ENGINEERS SHOULD CARE

Evaluate the 2027-2028 timeline for solid-state EV adoption, as it directly impacts demand for high-voltage power semiconductors, fast-charging infrastructure components, and advanced battery manageme...

TDK Develops Solid-State Battery Material with Record 1,000 Wh/L Energy Density

Source: Gemini Grounding

Summary: TDK has successfully developed a new material for next-generation solid-state batteries, achieving a volumetric energy density of 1,000 Wh/L. This represents an approximately 100-fold increase over its conventional solid-state battery technology (CeraCharge, 1...

WHY ENGINEERS SHOULD CARE

This significant leap in volumetric energy density (1,000 Wh/L) for solid-state materials could influence component miniaturization and power delivery for highly constrained form factors. For designer...

Panasonic Aims for 25% Battery Capacity Increase and FY2027 Solid-State Samples

Source: Gemini Grounding

Summary: Panasonic plans to release initial samples of its new solid-state batteries by the fiscal year ending March 2027, primarily for industrial robots and automotive sensors. The company also aims to achieve "world-leading battery capacity" by the end of 2027, targ...

WHY ENGINEERS SHOULD CARE

For EV power system architects, Panasonic's 25% volumetric energy density improvement for existing Li-ion by FY2027 offers a near-term upgrade path for range and packaging. For next-gen designs, monit...

This Week's Japan Technology Highlights

Japan's battery sector is accelerating, with TDK achieving 1,000 Wh/L solid-state material and Toyota targeting 1,000 km EV range by 2028.

CATL & BYD Solid-State Battery Pilot Production: Energy Density & Scalability Challenges

■ China's Move

Chinese battery giants CATL and BYD are targeting small-scale trial production of all-solid-state batteries for electric vehicles (EVs) in 2027 (CATL, BYD). BYD aims for mass production by 2030, while CATL expects widespread adoption after 2030 (CATL, BYD). BY...

■ Technical Verification

[CONFIRMED]

Both CATL and BYD have publicly announced targets for small-scale solid-state battery pilot production in 2027. / CATL has verified solid-state cell technology (500 Wh/kg) in a 4-tonne commercial ai...

[BOTTLENECK]

Scalability and Cost-Effectiveness: Transitioning from lab/pilot-scale production (MWh-GWh) to mass production (tens-hundreds of GWh) while maintaining high yield, cycle life, safety, and achieving ...

■ Implications for Western Engineers

- Battery R&D Teams: Prioritize independent validation of energy density, cycle life, and safety claims for solid-state prototypes...
- EV Powertrain Engineers: Evaluate the real-world implications of announced energy densities on vehicle range and charging times,...
- Manufacturing & Process Engineers: Benchmark current solid-state manufacturing challenges against announced Chinese pilot capaci...

China's Tightening Grip on Battery Supply Chain & Export Controls

■ China's Move

Effective September 1, 2026, China reinstated a 2% consumption tax on lithium-ion batteries, increasing to 4% from September 1, 2027, with temporary exemptions for sodium-ion, solid-state, and fuel cells until the end of 2028 (China Policy). China is also deve...

■ Technical Verification

[CONFIRMED]

The implementation of new consumption taxes on Li-ion batteries and exemptions for emerging chemistries are confirmed government policies. / China's government has officially announced and implement...

[BOTTLENECK]

Access to Advanced Materials & Manufacturing Know-how: Western companies face increasing difficulty in sourcing advanced LFP/LMFP production technology and high-energy-density battery components fro...

■ Implications for Western Engineers

- Battery R&D Teams: Accelerate R&D into alternative cathode chemistries (e.g., sodium-ion, non-LFP/LMFP options), advanced anode ...
- Manufacturing & Process Engineers: Evaluate the feasibility and cost of establishing full domestic supply chains for battery com...
- Procurement & Supply Chain Professionals: Conduct thorough risk assessments for all battery-related components and technologies ...

Key Trends This Week (5 Total)

TR-01 HIGH Cross-Domain

Global Race for Next-Gen Battery Dominance Accelerates
China, Japan, and US Intensify Solid-State Battery R&D; and Production Investments

The global competition for solid-state battery (SSB) leadership is intensifying, with China aggressively pushing standardization, tax incentives, and automaker investments (Chery \$1.5B, Geely 500 Wh/kg by 2027). Japan is investing \$2.4B in domestic battery capacity, including SSBs. Western firms like QuantumScape face commercialization delays, while semi-solid solutions (NIO, Belkin) offer near-term market entry. This race is critical for EV and grid storage future.

Chery Investment	Japan Battery Subsidies	QuantumScape Delay
\$1.5 Billion	\$2.4 Billion	2029

► Western OEM ► Western Material Supplier ► Western Equipment Maker ► Western CDMO/CRO

Refs: S1-01 S1-02 S1-06 S1-07 S1-08 S1-13 S1-17 S1-19 S1-20 S1-21 S1-23

TR-02 HIGH Cross-Domain

Renewable Energy Integration Drives Advanced Storage
Record US Energy Storage Deployment and Long-Duration Battery Innovation Bolster Grid Resilience

The integration of intermittent renewable energy sources (solar, wind) is driving unprecedented demand for advanced energy storage. The US added a record 20.2 GWh of storage in Q2 2026, nearly doubling utility-scale capacity. Long-duration technologies like Form Energy's 100-hour iron-air batteries (30GWh+ projects) and Eos's zinc batteries are critical for grid stability and data center power. This trend reinforces the need for robust, flexible storage solutions to support decarbonization goals.

US Storage Q2 2026	Form Energy Funding	Form Energy Projects
20.2 GWh	\$750 Million	30 GWh+

► Western OEM ► Western Material Supplier ► Western Equipment Maker ► Western T&M; Provider

Refs: S4-01 S4-02 S4-03 S4-04 S4-06 S4-09 S4-10 S4-11 S4-12 S4-22 S4-24 S4-26

TR-03 MED Perovskite Solar Cells

Perovskite Solar Cells Scale Towards Commercialization
Perovskite Solar Achieves 35.5% Efficiency, Secures Billions in Subsidies for GW-Scale Production

Perovskite solar cell technology is rapidly maturing, with record efficiencies (LONGi 35.5% tandem, Fraunhofer ISE 27.3% solvent-free) and significant investments. Japan is quadrupling perovskite subsidies to ¥28 billion, aiming for 20 GW deployment by 2040, while Australia funds a 500 MW factory. Commercial shipments have begun (Oxford PV 2024), and manufacturing innovations like roll-to-roll and screen printing are addressing scalability and cost, despite ongoing stability challenges.

LONGi Efficiency	Japan Subsidies	Australian Factory
35.5%	¥28 Billion	500 MW

► Western OEM ► Western Material Supplier ► Western Equipment Maker ► Western CDMO/CRO

Refs: S2-01 S2-02 S2-03 S2-04 S2-06 S2-07 S2-09 S2-10 S2-13 S2-15 S2-19 S2-21 S2-24 S2-26 S2-27 S2-28 S2-29 S2-30 S2-32 S2-33 S2-37 S2-38

TR-04 MED Hydrogen Energy

Green Hydrogen Economy Accelerates with Project Execution

Global Green Hydrogen Projects Advance to Execution Phase, \$10 Billion Investment in 2026

The green hydrogen economy is gaining momentum, with global investments projected to reach \$10 billion in 2026. Over 100 GW of electrolysis projects require Final Investment Decisions (FIDs) by end of 2027, indicating a critical transition from planning to deployment. Major projects like Air Products/Nobian's 100MW in Rotterdam and NextEra/Linde's 200MW in Louisiana are progressing. Government backing (UK for ITM Power) and strategic restructuring (Siemens Energy spin-off) aim to scale electrolyzer manufacturing and accelerate adoption.

Green Hydrogen Investment 2026	Electrolysis Projects FID Deadline	Rotterdam Project
\$10 Billion	100+ GW by 2027	100 MW

► Western OEM ► Western Equipment Maker ► Western Material Supplier ► Western T&M; Provider

Refs: S3-04 S3-05 S3-06 S3-07 S3-09 S3-10 S3-11 S3-15 S3-17 S3-19 S3-20

TR-05 LOW Next-Gen Storage

Circular Economy for Batteries Gains Traction

Battery Recycling Market to Reach \$37.5 Billion by 2035, Driven by DoE Grants and EU Regulations

The battery recycling market is poised for explosive growth, projected to reach \$37.5 billion by 2035, with second-life battery capacity expanding to 330-350 GWh by 2030. The US DoE allocated \$500 million for battery recycling and materials, while the EU mandates stringent recycling targets. Innovations in hydrometallurgy (Precision Periodic, R3 Lithium) achieve high recovery rates (95% Li/Co, 97% Ni). However, the US faces a 65,000-ton black mass refining capacity shortfall despite an export ban, highlighting infrastructure gaps.

Recycling Market 2035	Second-Life Capacity 2030	US Refining Shortfall
\$37.5 Billion	330-350 GWh	65,000 Tons

► Western Material Supplier ► Western Foundry ► Western OEM ► Western Equipment Maker

Refs: S4-05 S4-07 S4-13 S4-14 S4-15 S4-16 S4-17 S4-18 S4-19 S4-20 S4-24

Macro Market Indicators

Indicator	Direction	Value	Note	Source
US DoE Battery Grants	↑	\$500 Million	New funding for battery minerals, manufacturing, and recycling.	S1-23, S4-16
Japan Perovskite Subsidies FY2027	↑	¥28 Billion	Quadrupled support, phasing out silicon subsidies.	S2-07, S2-15
China Li-ion Battery Consumption Tax	↑	2%	Imposed on Li-ion, exempting solid-state and sodium-ion batteries.	S1-02
Global Critical Minerals Investment 2025	↓	Down 9%	First significant drop since 2020, impacting supply chain stability.	S4-23

Macro Environment Summary

Global energy transition efforts are intensifying, marked by significant government subsidies and strategic investments in next-generation technologies. The US DoE allocated \$500 million for battery materials and recycling, while Japan quadrupled perovskite solar cell support to ¥28 billion, phasing out silicon subsidies. China is using tax incentives to accelerate solid-state battery adoption and standardization. However, global critical mineral investment saw a 9% drop in 2025, indicating market volatility and the need for stable policy frameworks to de-risk supply chains and accelerate deployment.

Market Data: LIT (Battery & Storage) Weekly Trend

74.18 USD -2.48%

Action Recommendations by Player

Action Recommendations for Western OEM

OEM Tesla, GM, Volvo

Western OEMs like Tesla are initiating Megapack 3 production and cutting prices to compete, while GM is entering the energy storage market with sodium-ion batteries (S4-03, S4-25). Volvo (Geely subsidiary) is eyeing 500 Wh/kg solid-state battery integration by 2027 (S1-19).

Risk

- If Chinese CATL achieves 2027 SSB mass production, Western OEMs without secured supply contracts will face 18-month sourcing delays.

Opportunity

- Partner with Western solid-state battery developers (QuantumScape, Solid Power) to secure early access to 400+ Wh/kg cells for 2028+ EV models.

Actions This Week

- By Q4 2026: Initiate strategic partnerships with 2-3 Western solid-state battery developers to co-develop next-gen cells for 2028-2030 vehicle platforms.

□ Scenario: If Chinese SSB production scales rapidly by 2027, then Western OEMs must accelerate domestic R&D; and supply chain diversification to avoid critical technology dependence.

□ Quick Win : This week: Task R&D; and procurement teams to evaluate semi-solid battery suppliers (e.g., WeLion, ProLogium) for near-term product enhancements.

Action Recommendations for Western Contract Manufacturer

Foundry R3 Lithium, Precision Periodic

Western contract manufacturers are seeing increased demand for domestic battery production and recycling, driven by US DoE grants (\$500M) and policy shifts (black mass export ban) (S1-23, S4-16, S4-18, S4-19). However, US black mass refining capacity is only 7,000 tons/year, facing a 65,000-ton shortfall (S4-19).

Risk

- If domestic refining capacity does not scale rapidly, Western foundries will face raw material shortages for battery production.

Opportunity

- Invest in advanced hydrometallurgical recycling facilities to capture a share of the \$37.5B battery recycling market by 2035.

Actions This Week

- Within 6 months: Develop a detailed CAPEX plan for a 10,000-ton/year black mass refining facility, targeting DoE grant applications by Q2 2027.

□ Scenario: If US black mass export ban remains without sufficient domestic refining, then Western foundries must prioritize vertical integration into recycling to secure critical mineral supply.

□ Quick Win : By end of this week: Engage with R3 Lithium and Precision Periodic to understand their 'lithium-first' and 'Clean Refinery' processes for potential licensing or partnership.

Action Recommendations for Western T&M; Provider

T&M; TÜV SÜD, UL Solutions, Fraunhofer ISE, Cubic Instruments

Western T&M; providers are critical for validating next-gen energy technologies, with TÜV SÜD and UL Solutions certifying perovskite solar cells (S2-02, S2-16) and solid-state batteries (S1-05, S1-16). Fraunhofer ISE is standardizing battery recycling black mass (S4-05) and certifying perovskite efficiency (S2-01, S2-04,

S2-13). Cubic Instruments launched a laser Raman analyzer for hydrogen monitoring (S3-01).

Risk

- If new global standards for SSB and perovskite cells are dominated by non-Western bodies, Western T&M; providers may lose market influence.

Opportunity

- Develop specialized testing and certification services for long-duration storage (iron-air, zinc) and advanced hydrogen systems (fuel cells, electrolyzers).

Actions This Week

- By Q1 2027: Launch a new certification program for 100-hour duration battery systems, collaborating with Form Energy and Eos Energy.

□ Scenario: If rapid technology evolution outpaces standard development, then Western T&M; providers must proactively engage in international standardization bodies (IEC) to shape future testing protocols.

□ Quick Win : This week: Review India's new BESS fire safety regulations (effective April 2027) to identify new service opportunities for Western certification bodies.

Action Recommendations for Western Material Supplier

Material Aclara Resources, BASF, Umicore

Western material suppliers are crucial for next-gen battery electrolytes (solid, gel polymer) and perovskite precursors, with R&D; breakthroughs in GPEs (S1-03) and low-temperature sintering for oxide solid electrolytes (S1-04). The US DoE offers \$500M grants for battery minerals and materials (S1-23, S4-16).

Risk

- If China's sulfide solid electrolyte oversupply (24% price drop, 5.82% operating rate) impacts global pricing, Western suppliers may face margin pressure.

Opportunity

- Western solid electrolyte suppliers can target a \$4B+ market by 2030; BASF and Umicore have near-term entry advantages.

Actions This Week

- Within 3 months: Secure R&D; partnerships with 2-3 leading Western solid-state battery developers to co-optimize novel electrolyte materials for 2028 pilot lines.

□ Scenario: If critical mineral investment continues to decline (down 9% in 2025), then Western material suppliers must diversify sourcing and invest in domestic extraction/refining to ensure supply chain resilience.

□ Quick Win : By end of this week: Research DoE grant application deadlines for battery materials and recycling to secure funding for advanced electrolyte R&D.;

Action Recommendations for Western Distributor

Distributor Arrow Electronics, Avnet

Western distributors face increasing complexity in sourcing and supplying next-gen energy components, from solid-state battery materials to perovskite precursors and electrolyzer components. Geopolitical shifts (US black mass export ban) and regional manufacturing pushes (Japan's perovskite supply chain) create new challenges and opportunities (S1-02, S2-07, S2-08, S4-19).

Risk

- If China's dominance in critical materials and manufacturing continues, Western distributors will face supply chain vulnerabilities and price volatility.

Opportunity

-
- Establish specialized distribution channels for emerging perovskite solar components and green hydrogen equipment in US/EU markets.

■ Actions This Week

- By Q1 2027: Conduct a market study on the demand for perovskite solar cell components in the EU BIPV market, identifying 3-5 potential supplier partners.
- Scenario: If global supply chains fragment due to geopolitical tensions, then Western distributors must build regional sourcing hubs and strategic inventory to mitigate disruption risks.
- Quick Win : This week: Identify 3-5 Western perovskite solar component manufacturers (e.g., Oxford PV, Fraunhofer ISE partners) for initial partnership discussions.

Action Recommendations for Western Equipment Maker

Equipment ITM Power, thyssenkrupp nucera, Siemens Energy

Western equipment makers are crucial for scaling next-gen energy technologies. ITM Power secured UK government backing for electrolyzer stack manufacturing (S3-09), while Siemens Energy is spinning off its electrolyzer business (S3-07). However, thyssenkrupp nucera reportedly halted mass production plans in Germany due to market uncertainties (S3-17).

■ Risk

- If large-scale green hydrogen projects face continued FID delays, demand for electrolyzer manufacturing equipment will be impacted.

■ Opportunity

- Develop and supply advanced manufacturing equipment for roll-to-roll perovskite solar cell production and low-temperature solid electrolyte sintering.

■ Actions This Week

- Within 6 months: Allocate R&D; budget to develop a pilot roll-to-roll manufacturing line for perovskite solar cells, targeting 2028 commercialization.
 - Scenario: If Chinese equipment makers achieve cost leadership in next-gen energy manufacturing, then Western equipment makers must focus on high-precision, high-throughput, and proprietary process technologies to maintain competitive advantage.
 - Quick Win : By end of this week: Schedule meetings with Oxford PV and Fraunhofer ISE to discuss equipment needs for their next-gen perovskite manufacturing scale-up.
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Impact Matrix (Players × Trends)

++ = Strong Tailwind + = Tailwind 0 = Neutral – = Headwind -- = Strong Headwind

Player	TR-01 HIGH Global	TR-02 HIGH Renewa	TR-03 MED Perovs	TR-04 MED Green	TR-05 LOW Circul
Western OEM	++	+	+	++	++
Western Contract Manufacturer	+	+	+	++	+
Western T&M; Provider	++	++	++	++	++
Western Material Supplier	++	++	+	++	++
Western Distributor	+	+	+	+	+
Western Equipment Maker	++	++	++	++	++

Timeline This Week (9 Events)

Date	Tag	Headline	Source
2026-08-27	milestone	ITM Power Commences Hydrogen Delivery to First Customer	UK S3-10
2026-08-28	milestone	Germany Achieves 27.1% Efficiency with Solvent-Free Perovskite-Silicon Tandem Solar Cell	Germany S2-01
2026-08-31	policy	Japan Quadruples Perovskite Solar Cell Support to ¥28 Billion for FY2027	Japan S2-07, S2-15
2026-09-01	product	QuantumScope Launches 'Eagle' Solid-State Battery Pilot Line	International S1-01
2026-09-02	policy	China Leads Global Solid-State EV Battery Standardization (IEC Approval)	China S1-02
2026-09-02	policy	US DoE Announces \$500 Million Grants for Battery Minerals and Materials	USA S1-23, S4-16
2026-09-02	product	ProLogium Initiates Mass Production of Gen 3.5 Lithium Ceramic All-Solid-State Batteries	Taiwan S1-05, S1-16
2026-09-03	milestone	US Adds Record 20.2 GWh of Energy Storage in Q2 2026	USA S4-22
2026-09-04	milestone	R3 Lithium Launches First Commercial-Scale Lithium Carbonate Recovery Plant in Georgia	USA S4-14

Company Spotlight

Form Energy ↑ \$750M Funding Round

Secured \$750M, totaling \$2B+, to accelerate 100-hour iron-air battery commercialization, with 30GWh+ projects for data centers.

- Western OEMs: Evaluate Form Energy's long-duration iron-air batteries for grid-scale and data center backup applications by Q1 2027.
- Western Investors: Assess Form Energy's market penetration and manufacturing scale-up for potential investment opportunities within 6 months.

Oxford PV ↑ Commercial Shipments Started

Began commercial shipments of perovskite-silicon tandem modules in Sept 2024, achieving 26.9% efficiency in residential panels.

- Western Equipment Makers: Engage Oxford PV to understand their manufacturing process and equipment needs for GW-scale expansion by Q2 2027.
- Western Material Suppliers: Explore partnerships with Oxford PV for advanced perovskite precursor materials and encapsulation solutions this quarter.

R3 Lithium ↑ First Commercial Plant Launch

Launching US's first commercial-scale lithium carbonate recovery plant in Georgia, targeting over 50% of domestic production.

- Western Foundries: Contact R3 Lithium for black mass processing partnerships and secure lithium carbonate supply contracts by Q1 2027.
- Western Material Suppliers: Investigate R3 Lithium's 'lithium-first' extraction process for potential technology licensing or joint ventures within 3 months.

Technology Roadmap

2026

- ◆ Perovskite Solar Commercial Shipments Begin (Oxford PV)
- ◆ Green Hydrogen Investments Hit \$10B
- ◆ US Adds Record 20.2 GWh Storage

2027

- ◆ China Targets Solid-State Battery Pilot/Mass Production (CATL, Chery, Geely)
- ◆ India's BESS Fire Safety Regulations Effective
- ◆ 100+ GW Green Hydrogen Projects Face FID Deadline

2028

- ◆ PXP Aims for Mass Production of Perovskite-Chalcopyrite Tandem Solar Cells
- ◆ Solid-State Batteries Enter EV Market (early estimates)

2029

- ◆ QuantumScape Targets Solid-State Battery Commercial Readiness

2030

- ◆ Samsung SDI Targets Solid-State Battery Mass Production

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- ◆ GIST Aims for 30% Tandem Perovskite Efficiency and Roll-to-Roll Manufacturing
 - ◆ Perovskite Solar Market Reaches 200-300 MW Production (EneCoat)

References (109 Total)

ID	Title	Source	Date	Region	Sub-Topic
S1-01	Major Players Accelerate Solid-State Battery Pilot Line Operations in 2026: QuantumScape Launches Eagle, Solid Power Prepares Continuous Electrolyte Production	Exoswan Insights	2026-09-01	International	Solid-State Batteries
S1-02	China Leads Global Solid-State EV Battery Standardization, Accelerating Tax Incentives and Domestic Pilot Line Expansion	CarNewsChina	2026-09-02	China	Solid-State Batteries
S1-03	Innovative Highly Concentrated Gel Polymer Electrolytes Enable 4.7V Lithium Metal All-Solid-State Batteries and 511.2 Wh/kg Pouch Cells	ACS Publications	2026-09-01	US	Solid-State Batteries
S1-04	Novel 'Silver-Zipping' Mechanism Enables Low-Temperature Sintering of Oxide Solid Electrolytes, Promising Cost-Effective Solid-State Battery Manufacturing	Chemical Engineering Journal	2026-08-28	International	Solid-State Batteries
S1-05	ProLogium Initiates Mass Production of Gen 3.5 Lithium Ceramic All-Solid-State Batteries, Achieving 381 Wh/kg Energy Density	GlobeNewswire	2026-09-02	Taiwan	Solid-State Batteries
S1-06	Chery Commits \$1.5 Billion Investment in Solid-State Battery Development, Targeting Vehicle Real-World Tests by 2027	Car News China	2026-09-03	China	Solid-State Batteries
S1-07	Geely Developing Next-Gen Solid-State Batteries Up to 500 Wh/kg, Targeting Pilot Deployment by 2027	CarBuzz	2026-08-29	China	Solid-State Batteries
S1-08	Solid-State Batteries to Hit EV Market by 2027-2028? CATL Chairman Cautious on Mass Production Before 2030	BlueGoldSolar	2026-08-31	International	Solid-State Batteries
S1-09	Greater Bay Technology Achieves 375 Wh/kg with 77 Ah Solid-State Battery, Demonstrating 15-90% Charge in 18 Minutes	Intelligent Living	2026-08-30	US	Solid-State Batteries
S1-10	Donut Lab's 409 Wh/kg Battery Test Results Deemed Not a Breakthrough for Solid-State Batteries, Falls Within Existing Li-ion Performance	Electrek	2026-09-02	US	Solid-State Batteries
S1-11	Samsung SDI Accelerates Next-Gen Battery Development for Robotics and UAM, Advancing Proprietary Solid Electrolyte and Anode-Free Technologies	SAMSUNG SDI (Newsroom)	2026-09-03	South Korea	Solid-State Batteries
S1-12	Belkin Unveils 'UltraCharge Pro' Portable Chargers Featuring 'BoostSolid Cell' Semi-Solid Technology	Belkin (Press Release)	2026-09-03	US	Solid-State Batteries
S1-13	Japan Approves \$2.4 Billion in Battery Subsidies to Boost Domestic Manufacturing Capacity, Fueling Solid-State Battery Development	East Asia Brief	2026-08-28	Japan	Solid-State Batteries

ID	Title	Source	Date	Region	Sub-Topic
S1-14	Tianneng and Weilan Launch 314Ah Semi-Solid Batteries for Grid-Scale Energy Storage, Expanding to e-Motorcycles and Robotics	Shanghai Metals Market	2026-09-03	China	Solid-State Batteries
S1-15	SES AI Corp to Exit S&P;/TSX Composite Index Following GFL Environmental Merger, Consolidating Operations for Accelerated Growth	GuruFocus	2026-09-02	US	Solid-State Batteries
S1-16	ProLogium Initiates GWh-Scale Mass Production of Gen 3.5 Lithium Ceramic All-Solid-State Batteries: Achieves 381 Wh/kg, 903 Wh/L, Certified to China Standard GB/T 43568-2026	Metrix	2026-09-04	Taiwan	Solid-State Batteries
S1-17	Chery to Invest \$1.5 Billion in Solid-State Batteries, Initiate Vehicle Road Tests in 2026, Targeting 400 Wh/kg Rhino Battery for 2027 Production Vehicles	BigGo Finance	2026-09-04	China	Solid-State Batteries
S1-18	China's Sulfide Solid Electrolyte Production Lags, Reaching Only 20% of Annual Target Amidst 24% Price Drop and 5.82% Operating Rate in August 2026	Shanghai Metals Market (SMM)	2026-09-04	China	Solid-State Batteries
S1-19	Geely to Pilot 1,000km Range, 500 Wh/kg All-Solid-State Battery in 2027, Eyeing Integration into Volvo Vehicles	The Cool Down	2026-09-03	China	Solid-State Batteries
S1-20	QuantumScape Shares Plunge 96%, Solid-State Battery Commercialization Remains Unclear with Delays from 2024 to 2029 Target	The Motley Fool	2026-09-02	US	Solid-State Batteries
S1-21	Xpeng's Humanoid Robot 'Iron' Shifts from All-Solid-State to Semi-Solid Batteries Due to Mass Production Schedules and Cost Challenges	CnEVPost	2026-09-03	China	Solid-State Batteries
S1-22	Tri-Layer Solid Electrolyte Method Boosts Lithium-Metal Battery Safety and Longevity: Polydopamine-Coated LLZO and Triblock Polymer Network Suppress Dendrites	Tech Xplore	2026-09-04	Global	Solid-State Batteries
S1-23	US DoE Announces \$500 Million Grants for Battery Minerals and Materials: Prioritizing Next-Gen Anodes, DLE, Electrolytes, and Recycling	Benchmark Source	2026-09-02	US	Solid-State Batteries
S2-01	German Researchers Achieve 27.1% Efficiency and 6800-Hour Stability with Solvent-Free Perovskite-Silicon Tandem Solar Cell	PV Magazine	2026-08-28	Germany	Perovskite Solar Cells
S2-02	Chinese Team Achieves 24.0% World Record Efficiency in Large-Area 810 cm² Perovskite Solar Module	The Cooldown	2026-09-03	China	Perovskite Solar Cells

ID	Title	Source	Date	Region	Sub-Topic
S2-03	Australian Manufacturer Partners with University of Sydney to Plan 500MW Perovskite-Silicon Tandem Solar Module Factory	pv magazine Global	2026-09-01	Australia	Perovskite Solar Cells
S2-04	Oxford PV and Sunmaxx Achieve 26.6% World Record Efficiency for Large Perovskite-Silicon Tandem Solar Module	Solar Power Portal	2026-08-27	UK, Germany	Perovskite Solar Cells
S2-05	Perovskite Connect 2026 Conference Preview: Showcasing Manufacturing Technologies and Applications to Accelerate Perovskite Solar Cell Commercialization	Perovskite-Info	2026-09-02	Germany	Perovskite Solar Cells
S2-06	Kyoto University Spinoff EneCoat Achieves Over 30% Tandem Cell Efficiency with Toyota, Aims for 200-300 MW Production by 2030	Perovskite-Info	2026-08-28	Japan	Perovskite Solar Cells
S2-07	Japan Quadruples Perovskite Solar Cell Support to JPY 28 Billion for FY2027, Ending Silicon Subsidies	Perovskite-Info	2026-08-31	Japan	Perovskite Solar Cells
S2-08	US and Japan Move to Curb China's Influence in Electrification: Japan Prioritizes Next-Gen Perovskite Solar Cells	Seoul Economic Daily	2026-08-30	South Korea	Perovskite Solar Cells
S2-09	Perovskite Solar Industry Leaders Accelerate Production: LONGi Achieves 35.5% Efficiency Record, Sekisui Chemical and Tandem PV Boost Manufacturing Investment	Exoswan Insights	2026-09-01	Global	Perovskite Solar Cells
S2-10	Perovskite-Silicon Tandem Solar Cells Accelerate Future of Solar Power with High Efficiency Breakthroughs	Medium	2026-08-28	US	Perovskite Solar Cells
S2-11	Perovskite Solar Cells Target 10-15 Year Operational Lifespan with Material Substitution and Multi-Layer Encapsulation for Enhanced Stability	Medium	2026-08-31	US	Perovskite Solar Cells
S2-12	Korean KIER Achieves World-Record 26.7% Efficiency in Perovskite/CIGS Tandem Solar Cells	EurekAlert!	2026-09-02	US	Perovskite Solar Cells
S2-13	Fraunhofer ISE and University of Freiburg Achieve 27.3% Efficiency with First Fully Solvent-Free Perovskite-Silicon Tandem Solar Cell	Perovskite-Info	2026-09-03	Israel	Perovskite Solar Cells
S2-14	Novel Interfacial Engineering Achieves 21.34% Efficiency and Superior Defect Passivation in Inverted Perovskite Solar Cells	ACS Publications	2026-09-03	US	Perovskite Solar Cells
S2-15	Japan to Quadruple Perovskite Solar Cell Support to ¥28 Billion in FY2027, Phasing Out Silicon Subsidies to Boost Decarbonization	Perovskite-Info	2026-08-31	Japan	Perovskite Solar Cells

ID	Title	Source	Date	Region	Sub-Topic
S2-16	Chinese Researchers Achieve World Record 24.0% Efficiency for 810 cm² Large-Area Perovskite Solar Modules	The Cool Down	2026-08-31	US	Perovskite Solar Cells
S2-17	Ultrathin Boron Nitride Boosts Perovskite QLED Stability and Efficiency, Extending Lifespan from 102 to Projected 25,263 Hours	AZoNano	2026-09-04	Australia	Perovskite Solar Cells
S2-18	Japanese Researchers Boost Tin Perovskite Solar Cell Efficiency to 9.07% and Longevity with Novel 2-ABZ Additive	EurekAlert!	2026-09-02	Japan	Perovskite Solar Cells
S2-19	LONGi Achieves World-Record 35.5% Conversion Efficiency for 2-Terminal Perovskite-Silicon Tandem Solar Cell, Independently Certified	LONGi (Official News)	2026-08-31	China	Perovskite Solar Cells
S2-20	Chinese Researchers Achieve 27.39% Efficiency in Inverted Perovskite Solar Cells with Novel 'SGDC' Molecular Design, Demonstrating Over 5,000 Hours of Stability	PV Magazine	2026-09-03	Germany	Perovskite Solar Cells
S2-21	Unlocking Gigawatt Perovskite: Berlin Conference Charts Path for Mass Production	Perovskite-Info	2026-09-02	Israel	Perovskite Solar Cells
S2-22	University of Freiburg and Fraunhofer ISE Develop Semi-Transparent OPV Modules with Industrial Process, Hinting at Perovskite Applications	Fraunhofer ISE	2026-09-01	Germany	Perovskite Solar Cells
S2-23	U.S. DOE Launches \$12 Million Program to Accelerate Perovskite Solar for Space Applications	Perovskite-Info	2026-09-02	Israel	Perovskite Solar Cells
S2-24	Roll-Coated Flexible Perovskite Solar Cells Achieve 21% Efficiency with Atmospheric Processing: A Fully Scalable Manufacturing Route	The Royal Society of Chemistry	2026-09-01	UK	Perovskite Solar Cells
S2-25	Deep-Blue Perovskite Light-Emitting Diodes Achieve 5.2% External Quantum Efficiency and Enhanced Spectral Stability with Novel Dopant Strategy	Applied Physics Letters AIP Publishing	2026-08-31	US	Perovskite Solar Cells
S2-26	Nanjing Tech University Achieves 22.41% Efficiency in Open-Air Screen-Printed Perovskite Solar Cells, Breakthrough for Mass Production	Electronics For You	2026-08-28	India	Perovskite Solar Cells
S2-27	PXP to Mass Produce World's First Perovskite-Chalcopyrite Tandem Solar Cells by 2028, Aiming for 28% Efficiency and Ultra-Lightweight Applications	note	2026-08-28	Japan	Perovskite Solar Cells
S2-28	University of Sydney Secures A\$7.25 Million from Australian Government to Accelerate Commercialization of Perovskite-Silicon Tandem Solar Cells, Building on 30% Efficiency Toward Enhanced Reliability	The University of Sydney	2026-09-02	Australia	Perovskite Solar Cells

ID	Title	Source	Date	Region	Sub-Topic
S2-29	South Korea's GIST Establishes Perovskite Solar Cell Commercialization Council, Targeting 30% Efficiency for Large-Area Tandem Modules and Roll-to-Roll Manufacturing by 2030	The Korea Post	2026-08-31	South Korea	Perovskite Solar Cells
S2-30	Perovskite Stock Watch 2026: Sekisui Chemical Targets 100MW Line by 2027, Oxford PV Begins Commercial Shipments in Sept 2024, Hanwha Solutions Achieves IEC/UL Certification for Tandem Tech	Exoswan Insights	2026-09-01	Global	Perovskite Solar Cells
S2-31	OAE Publishing Reports 25.39% Average Efficiency in Perovskite Solar Cells Through Hole Transport Layer Regulation of Polaron Formation	OAE Publishing	2026-08-31	Global	Perovskite Solar Cells
S2-32	Nanjing University and Renshine Solar Set World Record with 24.0% Certified Efficiency for 810 cm ² Large-Area Perovskite Solar Modules	Tech Frontier Vault	2026-08-31	China	Perovskite Solar Cells
S2-33	Highly Efficient and Stable Perovskite/Silicon Tandem Solar Cells Achieve 32.66% Efficiency and 91% Output Retention After 1000 Hours via Surface-Initiated Gradient Doping	Energy & Environmental Science	2026-09-03	Global	Perovskite Solar Cells
S2-34	Becquerel and Ximu Technology Partner to Accelerate Perovskite Material Development with AI	Perovskite-Info	2026-08-29	China	Perovskite Solar Cells
S2-35	Perovskite Solar Cells Shatter Efficiency Records: NREL Validates 25.7% Single-Junction, 29.8% Tandem Performance as Industry Ramps Up Stability and Certification Efforts	Solar Plus Garden	2026-08-31	クロアチア	Perovskite Solar Cells
S2-36	GCL Perovskite and Wuhan Lingyun Partner for Joint Development of BIPV Curtain Walls and PV Windows	Perovskite-Info	2026-09-04	China	Perovskite Solar Cells
S2-37	SNS Insider Report: Perovskite Solar Cell Market Projected to Reach \$73 Billion by 2035 with 69.45% CAGR	SNS Insider	2026-09-03	International	Perovskite Solar Cells
S2-38	Oxford PV Achieves 26.9% Efficiency in Residential Panels; University of Queensland Sustains 16.65% Lead-Free Perovskite for Over 1000 Hours	Facebook	2026-08-29	UK/Australia	Perovskite Solar Cells
S3-01	Cubic Instruments Launches LRGA-3100 Laser Raman Analyzer for Real-Time Hydrogen Monitoring in Gas Turbines, Enhancing Efficiency and Safety	Hydrogen Technology World Expo 2026 Exhibitor Press Releases	2026-09-04	Denmark	Hydrogen Energy

ID	Title	Source	Date	Region	Sub-Topic
S3-02	Ballard Power Systems Completes \$275 Million GeoPura Acquisition to Strengthen Off-Grid Fuel Cell Power Market Position	Modern Power Systems	2026-08-28	Canada	Hydrogen Energy
S3-03	Chile's Renewable Energy Share Soars to 41.9%, Bolstering Global Green Hydrogen Ambitions	Renewables Now	2026-08-28	Chile	Hydrogen Energy
S3-04	Global Hydrogen Projects Transition from Ambition to Execution, Demonstrating Concrete Pipeline Progress	Global Hydrogen Hub	2026-08-28	Global	Hydrogen Energy
S3-05	Air Products and Nobian Secure 100MW Green Hydrogen Offtake Agreement in Rotterdam to Decarbonize Chemical Production	Global eFuels	2026-09-02	Netherlands	Hydrogen Energy
S3-06	NextEra Energy Resources and Linde Complete FEED for 200MW Electrolyzer Green Hydrogen Facility in Louisiana, USA	Global eFuels	2026-08-30	US	Hydrogen Energy
S3-07	Siemens Energy Announces Strategic Restructuring, Spinning Off Industrial Energy Business Including Electrolyzer Operations	H2 International	2026-08-28	Germany	Hydrogen Energy
S3-08	Morocco's \$11 Billion Green Hydrogen Vision: Tangier Project Targets Europe, Fuels African Ambition	HibaPress English	2026-08-29	モロッコ	Hydrogen Energy
S3-09	ITM Power Secures UK Government Backing for Next-Generation Electrolyzer Stack Manufacturing, Boosting Domestic Production	Kalkine Media	2026-08-30	UK	Hydrogen Energy
S3-10	ITM Power Commences Hydrogen Delivery to First Customer, Marking Crucial Milestone Towards Commercialization	Kalkine Media	2026-08-27	UK	Hydrogen Energy
S3-11	thyssenkrupp nucera Positions to Become World's Largest Electrolyzer Manufacturer, Driving Gigawatt-Scale Production	Factopia2 (Facebook)	2026-09-01	Germany	Hydrogen Energy
S3-12	Avaada Energy Secures \$1.3 Billion for Renewable Energy Projects, Advancing 5GW Floating Solar Deployment	Indoen	2026-09-01	India	Hydrogen Energy
S3-13	Teragen Energy Raises \$6 Million in Pre-Seed Funding for Fuel Cell Technology to Power Data Centers	Dealroom.co	2026-08-30	US	Hydrogen Energy
S3-14	Hydroxpand Provides Insights into Leading Electrolyzer Manufacturers and Their Role in the Expanding Hydrogen Market	Hydroxpand Blog	2026-09-03	Global	Hydrogen Energy
S3-15	Surging Electrolyzer Demand Analyzed as Key Long-Term Growth Catalyst for Plug Power	TradingView (Zacks)	2026-09-01	US	Hydrogen Energy
S3-16	OMV Petrom Transforms Petrobrazi Refinery into Low-Carbon Hydrogen Hub, Pioneering Eastern European Decarbonization	Hydrogen Fuel News	2026-08-27	—	Hydrogen Energy

ID	Title	Source	Date	Region	Sub-Topic
S3-17	thyssenkrupp nucera Reportedly Halts Electrolyzer Mass Production Plans in Arnstadt, Germany, Impacting Factory Prospects	Blackout News	2026-08-27	Germany	Hydrogen Energy
S3-18	Researchers Identify Naturally Occurring 'White Hydrogen' as Potential New Clean Energy Resource, Unraveling Geological Formation Mechanisms	Oil Price News (Facebook)	2026-08-28	Global	Hydrogen Energy
S3-19	Green Hydrogen Investments Projected to Hit \$10 Billion in 2026, Yet 100+ GW Projects Face Critical 2027 FID Deadline	GreentechLead	2026-08-28	US	Hydrogen Energy
S3-20	Ballard Power Systems Acquires UK-Based GeoPura for ~\$400 Million, Pivoting to Integrated Hydrogen Power Solutions and Energy-as-a-Service	Energy News	2026-08-31	UK	Hydrogen Energy
S4-01	Australia's Battery Storage Sector Shifts to Energy Arbitrage as FCAS Revenue Collapses, Driving AC vs. DC Coupling Rethink	Energy-Storage.News	2026-08-31	Australia	Next-Gen Storage
S4-02	Google Partners with MN8 Energy, Eos to Deploy Large-Scale Solar-Plus-Zinc Battery Storage Project in West Virginia Powering Regional Data Centers	IDCNOVA	2026-09-04	US	Next-Gen Storage
S4-03	Tesla Commences Megapack 3 Production in Texas, Cuts Prices to Boost Market Share Amid GM's Sodium-Ion Battery Entry	Energy-Storage.News / CleanTechnica / Facebook	2026-09-04	US	Next-Gen Storage
S4-04	Form Energy Secures \$750M Funding to Accelerate 100-Hour Iron-Air Battery Commercialization, Drives Over 30GWh of Data Center Projects in U.S.	MIT News / EnergyTech / FutureTechDose / SNS Insider / openPR.com	2026-08-31	US	Next-Gen Storage
S4-05	Fraunhofer Institute Launches 'Project SHERLOCK' to Standardize Battery Recycling Black Mass, Boosting EU Circular Economy Goals	Automotive Technology Insight Forecasts Industry News	2026-09-03	Germany	Next-Gen Storage
S4-06	Fluence Energy Faces \$400M Revenue Deferral to FY2027 Due to Manufacturing & Construction Delays; Barclays Downgrades Stock	Zacks Equity Research / Seeking Alpha / TipRanks	2026-08-31	US	Next-Gen Storage
S4-07	India's Central Electricity Authority Introduces New BESS Fire Safety Regulations Effective April 2027, Bolstering Fault Tolerance and Thermal Runaway Prevention	Energy-Storage.News / The Battery Magazine	2026-09-03	India	Next-Gen Storage
S4-08	Fluence Energy Appoints Siemens Smart Infrastructure CEO Stephan May to Board, Strengthening Strategic Partnership	Stock Titan	2026-09-01	US	Next-Gen Storage

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S4-09	Greenergy Powers Up and Divests 'Gabriela': \$320M, 1.1 GWh Solar-Storage Hybrid Lights Up Chilean Desert	Energy-Storage.News	2026-09-03	Chile	Next-Gen Storage
S4-10	US Avantus Secures \$300M Tax Equity Financing from Truist Bank for 150MW Solar-Plus-452MWh Storage Project in California	Viridian Energy	2026-08-29	US	Next-Gen Storage
S4-11	Sungrow's Battery Storage Revenue Surpasses PV Business in H1 2026, Achieving 25GWh in Shipments, Signaling Strategic Shift	Energy-Storage.News	2026-09-02	China	Next-Gen Storage
S4-12	Westbridge Renewable Energy Enters Definitive Agreement to Sell 225MW Solar-Plus-100MW Battery Storage Project in Canada	PV Tech	2026-09-01	Canada	Next-Gen Storage
S4-13	Environmental Crisis: Unregulated Battery Recycling Poisons Pakistan, Threatening Livelihoods and Health	DAWN.COM	2026-08-27	Pakistan	Next-Gen Storage
S4-14	R3 Lithium Launches First Commercial-Scale Lithium Carbonate Recovery Plant in Georgia, Targeting Over Half of U.S. Domestic Production	Resource Recycling	2026-09-04	US	Next-Gen Storage
S4-15	EV Battery Recycling Market to Skyrocket from \$6.9 Billion in 2026 to \$37.5 Billion by 2035, Alongside Massive Second-Life Expansion	Invrecovery	2026-09-04	Unknown	Next-Gen Storage
S4-16	U.S. Department of Energy Allocates \$500 Million in Grants to Advance Battery Minerals, Manufacturing, and Recycling	Benchmark Source	2026-09-02	US	Next-Gen Storage
S4-17	Lithium-ion Battery Recycling Faces Deepening Challenges and Opportunities in 2026: Rising Fire Risks Amidst Critical Mineral Demand	Alchemie Labs	2026-09-04	Unknown	Next-Gen Storage
S4-18	Seven North American Battery Recycling Companies Scale Up Operations to Meet Surging EV Battery and Manufacturing Scrap Volumes	Battery Technology	2026-08-31	US	Next-Gen Storage
S4-19	U.S. Black Mass Export Ban Alone Insufficient for Domestic EV Battery Recycling: 65,000-Ton Refining Capacity Shortfall Identified	GreenLi-ion	2026-09-03	US	Next-Gen Storage
S4-20	Precision Periodic to Refine Battery-Grade Materials from Black Mass Using DoE-Validated Low-Energy Hydrometallurgy	Precision Periodic	2026-09-04	US	Next-Gen Storage

ID	Title	Source	Date	Region	Sub-Topic
S4-21	University of Washington Opens First West Coast Public-Access Battery Manufacturing Lab with \$7.5M Investment, Accelerating U.S. Battery Innovation	GeekWire	2026-09-03	US	Next-Gen Storage
S4-22	U.S. Adds Record 20.2 GWh of Energy Storage in Q2 2026, Achieving 30.8 GWh Total in H1; Utility-Scale Capacity Nearly Doubles Under Trump Administration	Solar Energy Industries Association (SEIA)	2026-09-03	US	Next-Gen Storage
S4-23	IEA's 'Global Critical Minerals Outlook 2026': Lithium Demand to Triple by 2040, Yet 2025 Investment Drops 9%	International Energy Agency (IEA)	2026-09-04	International	Next-Gen Storage
S4-24	Second-Life Batteries Extend Life by Reusing 70-80% Capacity After EV Use, Expanding Sustainable Energy Storage Market	TBS	2026-09-04	Unknown	Next-Gen Storage
S4-25	IEA's 'Global EV Outlook 2026' Reveals Shift Towards LFP Battery Chemistry, Growing Interest in Sodium-ion Batteries	International Energy Agency (IEA)	2026-09-04	International	Next-Gen Storage
S4-26	Chariot Defense Develops Next-Gen Software-Defined Power Distribution System for Military Microgrids, Aiming to Decouple from Diesel Dependency via Environmental Energy Capture	CleanTechnica	2026-08-29	US	Next-Gen Storage
S4-27	Benchmark Forecasts \$64 Billion CAPEX and Over 3 Million Tons LCE Supply Expansion Required to Meet 2040 Lithium Demand	Benchmark Source	2026-09-04	Unknown	Next-Gen Storage
S4-28	AI and Critical Materials Drive Future Battery Supply Chains: Aclara Resources and Argonne National Lab Partner for Optimization	Semiconductor Engineering	2026-08-31	US	Next-Gen Storage

Editor's Note

Navigating the Energy Transition: Strategic Imperatives for Western Leadership

The current landscape of energy and storage technologies presents a dual challenge and opportunity for Western manufacturers, investors, and executives. While rapid advancements in solid-state batteries, perovskite solar, and green hydrogen promise a decarbonized future, the pace of commercialization and geopolitical competition, particularly from Asia, demands a proactive and integrated strategy. The shift from R&D; to large-scale production, exemplified by record US energy storage deployments and significant government subsidies in Japan, underscores the urgency for strategic positioning.

Western players must prioritize domestic supply chain resilience, investing in critical mineral extraction, advanced material manufacturing, and robust recycling infrastructure to mitigate dependencies. The \$500 million DoE grants and EU recycling mandates offer a clear policy signal for these investments. Furthermore, fostering technology complementarity—such as integrating advanced storage with renewable generation and leveraging AI for material optimization—will be crucial for creating superior, cost-effective solutions.

To secure a competitive edge, Western firms should focus on high-value, high-performance niches, such as long-duration energy storage and specialized testing/certification services, while strategically partnering with academic institutions and startups. The delays faced by some Western solid-state battery developers highlight the need for realistic commercialization timelines and diversified technology portfolios, including semi-solid solutions for near-term market entry.

- ◆ How can Western governments and industry collaborate to close the 65,000-ton US black mass refining capacity gap by 2030?
- ◆ What specific incentives are needed to accelerate Western investment in GW-scale perovskite solar manufacturing to compete with Asian leaders?
- ◆ How can Western OEMs and material suppliers de-risk solid-state battery supply chains given the 2027-2028 Chinese mass production targets and current Western delays?

Dr. Evelyn Reed Chief Technology Strategist

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