

Energy & Storage

Field Intelligence Report

Vol. 49 | 2026.07.06 — 07.12 | Articles: 168

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

Market Mood

78

/ 100 Optimistic

Energy Transition Accelerates

Breakthroughs in solid-state batteries, perovskite solar, and hydrogen drive a global shift towards sustainable energy solutions.

Solid-State Battery Energy Density	Perovskite-Silicon Tandem Cell Efficiency	Green Hydrogen Production Cost (Germany 2030)	Sodium-Ion Battery Cell Cost (China Q1 2026)
500 Wh/kg	34.82%	€6.50/kg	¥0.35/Wh
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Weekly Summary

This week saw significant advancements across the energy and storage domain. Solid-state battery technology is nearing commercialization with major players like Toyota and Samsung SDI targeting 2027 EV integration, while new material and manufacturing processes promise enhanced performance and cost reduction. Perovskite solar cells continue to break efficiency records, with tandem cells exceeding 34% and flexible, transparent applications emerging. Hydrogen energy projects are scaling up globally, particularly for heavy-duty transport and industrial decarbonization, despite persistent cost challenges. Next-gen storage solutions, especially sodium-ion batteries, are gaining traction for grid-scale applications, offering alternatives to lithium-ion and bolstering supply chain resilience. Recycling initiatives are also expanding to support a circular economy.

4 Sub-Topic Summary

Sub-Topic	Headline	Momentum	Key Insight
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Solid-State Batteries	Solid-State Batteries Advance Towards 2027 EV Integration, Boosting Performance	Accelerating	Breakthroughs in electrolyte materials (halide, sulfide, LLZO oxide) and manufacturing processes (dry electrode, thin-film deposition) are enhancing energy density, cycle life, and safety, with Toyota, Samsung SDI, and ProLogium targeting EV integration by 2027-2028. China's CATL and Dongfeng are aggressively scaling semi-solid and solid-state production, with GBT aiming for 500 Wh/kg cells by 2026.
Perovskite Solar Cells	Perovskite Solar Cells Shatter Efficiency Records, Nearing Commercial Deployment	Accelerating	Perovskite solar cells, especially in tandem with silicon, are achieving record efficiencies (up to 34.82% by JinkoSolar, 34.85% by LONGi) and improved stability (5,000+ hours at 85°C). Innovations in interface engineering, self-assembled monolayers, and roll-to-roll manufacturing are addressing key commercialization hurdles, with Oxford PV shipping commercial modules and the market projected to reach \$5 billion by 2035.
Hydrogen Energy	Green Hydrogen Projects Scale Globally, Driving Decarbonization in Transport and Industry	Building	Green hydrogen initiatives are expanding rapidly, with 125 fuel cell trucks deployed in Europe (H2Accelerate TRUCKS) and India initiating trials across 10 routes. Germany is investing €220 million in refueling infrastructure, while Australia's Orica and Canada's EverWind Fuels advance large-scale production projects. Electrolyzer stack lifetimes are reaching 60,000-100,000 hours, bolstering commercial viability, though high costs and policy uncertainties remain challenges.

Next-Gen Storage	Sodium-Ion Batteries Emerge for Grid Storage, Recycling Efforts Expand Globally	Accelerating	Sodium-ion batteries are rapidly advancing, with CATL commercializing 'TENER Sodium' (1GWh shipments by year-end) and Unigrid launching residential systems in Europe. US companies like Peak Energy and ESS Tech are building gigafactories and identifying \$1 billion in commercial opportunities for grid-scale and data center applications. Recycling infrastructure is expanding (Redwood Materials, BASF, Li-Cycle) with >95% recovery rates, while second-life EV batteries and flow batteries gain traction for long-duration storage.
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Toyota Targets 1,000km Range, 10-Min Charge with Solid-State EVs by 2027-2028

Source: Gemini Grounding (Company Tech News)

Summary: Toyota aims to launch its first-generation solid-state batteries for electric vehicles (EVs) in 2027-2028, targeting a driving range of up to 1,000 km and a rapid charging time of 10-80 percent in approximately 10 minutes. Prototypes are targeting an energy de...

WHY ENGINEERS SHOULD CARE

EV powertrain designers and power electronics engineers should closely monitor Toyota's 2027-2028 solid-state battery integration for implications on thermal management, high-power charging circuit de...

Panasonic Targets 1,000 Wh/L Solid-State Batteries by FY2027 for Industrial Use

Source: Gemini Grounding (Company Tech News)

Summary: Panasonic plans to release its first solid-state battery samples by the fiscal year ending March 2027, with commercialization of lithium metal anode batteries targeted for FY2027. The company aims for a volumetric energy density of 900 Wh/L by the end of FY202...

WHY ENGINEERS SHOULD CARE

Engineers designing power solutions for high-temperature industrial applications, compact robotics, or advanced automotive sensors should evaluate Panasonic's solid-state samples by early 2027. The 1,...

METI Sets 150 GWh Domestic Battery Production Target by Mid-2030s

Source: Gemini Grounding (Govt / Research / Press Releases)

Summary: Japan's Ministry of Economy, Trade and Industry (METI) revised its "Battery Industry Strategy" to "Battery & Power Source Industry Strategy" on June 2, 2026. Key targets include establishing a domestic manufacturing base of 150 GWh per year by 2030-mid 203...

WHY ENGINEERS SHOULD CARE

Supply chain managers and technical planners should factor METI's 150 GWh domestic production target into long-term sourcing strategies for battery cells and related components. This indicates a stron...

This Week's Japan Technology Highlights

Japan's solid-state battery push intensifies, with Toyota targeting 1,000 km EV range by 2028 and TDK achieving 1,000 Wh/L for wearables.

China's Solid-State Battery Ambitions: CATL & BYD Progress

■ China's Move

Chinese battery giants CATL and BYD are targeting small-batch installations of solid-state batteries in vehicles by 2027. CATL's solid-state battery progress has "slowed," with its technology assessed at "level four out of nine technical maturity tiers" and ma...

■ Technical Verification

[CONFIRMED]	Both CATL and BYD are actively developing sulfide-based solid-state battery chemistries. / CATL's solid-state technology is in early validation stages ("level four out of nine technical maturity tie...
[BOTTLENECK]	Manufacturing Scalability & Cost: Transitioning from lab prototypes to mass production at competitive costs remains the primary challenge, as acknowledged by CATL. This includes reliable high-volume...

■ Implications for Western Engineers

- R&D Benchmarking: Evaluate Chinese solid-state battery advancements (especially sulfide-based chemistries) against internal road...
- Supply Chain Monitoring: Track progress in solid electrolyte material suppliers and manufacturing equipment providers in China.
- Competitive Analysis: Assess the potential impact of Chinese solid-state battery commercialization on the long-term competitiven...

China's New Battery Safety Standards & Strategic Material Export Controls

■ China's Move

Effective July 1, 2026, China implemented new mandatory national standards for EV traction battery safety (GB 38031-2025) and electric vehicle safety (GB 18384-2025), requiring "no fire, no explosion" after thermal runaway in a single cell. (MIIT announcement)...

■ Technical Verification

[CONFIRMED]	New national safety standards (GB 38031-2025, GB 18384-2025) are in effect, mandating "no fire, no explosion" after single-cell thermal runaway. / These standards cover safety protocols, performance...
[BOTTLENECK]	Battery Thermal Management Systems (BTMS): Achieving "no fire, no explosion" requires highly sophisticated and robust BTMS, cell-level safety features, and potentially novel cell packaging, which ad...

■ Implications for Western Engineers

- Product Design & Compliance: Re-evaluate EV battery pack designs and safety features to meet or exceed China's new "no fire, no ...
- Cost Analysis: Factor in potential 15-20% cost increases for battery systems sourced from China due to new safety regulations.
- Supply Chain Risk Management: Assess the impact of Chinese export controls on LFP/LMFP production technologies on future materia...

Key Trends This Week (5 Total)

TR-01 HIGH Cross-Domain

Global Race for Next-Gen Battery Dominance Accelerates
Asian and Western Firms Intensify Competition in Solid-State and Sodium-Ion Battery Commercialization

The global race for next-generation battery dominance is intensifying, with Asian giants like Toyota, Samsung SDI, and CATL targeting 2027-2028 for solid-state EV integration and sodium-ion BESS commercialization. Western players like QuantumScape, Solid Power, Unigrid, and Peak Energy are also making significant strides in material science, manufacturing scale-up, and strategic partnerships, driven by demand for higher energy density, faster charging, and enhanced safety across EV and grid storage markets. The US IRA and EU initiatives aim to bolster Western supply chains.

Solid-State EV Integration Target

2027-2028

CATL Sodium-Ion BESS Shipments

1 GWh by 2026-end

Peak Energy US Sodium-Ion Factory

4 GWh by Q1 2027

► Toyota ► Samsung SDI ► CATL ► QuantumScape ► Solid Power ► Unigrid ► Peak Energy

Refs: S1-03 S1-04 S1-06 S1-09 S1-12 S1-14 S1-18 S1-19 S1-21 S1-22 S1-23 S1-24 S4-01 S4-04 S4-05 S4-07 S4-09 S4-10 S4-17 S4-18 S4-32 S4-33 S4-34 S4-46

TR-02 HIGH Cross-Domain

Renewable Energy Integration Demands Advanced Storage and Grid Solutions

Grid Modernization Accelerates with VPPs, Long-Duration Storage, and Hydrogen for Stability

The increasing penetration of intermittent renewable energy sources (solar, wind) is driving urgent demand for advanced energy storage and grid modernization solutions. Virtual Power Plants (VPPs) are integrating distributed battery storage for enhanced flexibility and resilience, while long-duration energy storage (LDES) technologies like CO2 batteries (Energy Dome) and flow batteries (Invinity, Redflow, Form Energy) are scaling up. Green hydrogen is also emerging as a critical solution for long-term energy storage and grid balancing, particularly in regions with abundant renewable resources.

Perovskite-Silicon Tandem Efficiency

34.82%

Victoria CO2 Battery Storage

20MW/200MWh
(10-hour)

Argentina BESS Projects

700.5 MW, \$700M

► Energy Dome ► Invinity Energy Systems ► Form Energy ► ComEd ► OX2 ► Trina Storage

Refs: S2-26 S3-07 S3-29 S3-32 S3-44 S4-02 S4-06 S4-08 S4-12 S4-15 S4-21 S4-23 S4-27 S4-28 S4-29 S4-30 S4-31 S4-48 S4-49 S4-50 S4-51 S4-52

TR-03 MED Next-Gen Storage

Circular Economy Initiatives Drive Battery Recycling and Second-Life Applications

Global Efforts Expand Battery Recycling and Repurposing to Secure Critical Materials and Reduce Waste

The growing volume of end-of-life EV batteries and manufacturing scrap is accelerating the development and deployment of battery recycling and second-life applications. Advanced hydrometallurgical recycling processes are achieving over 95% recovery rates for key metals like lithium, cobalt, and nickel. Companies like Redwood Materials, BASF, and Li-Cycle are expanding recycling capacities in the US and Europe, while initiatives like Canada's Mapview Energy and Moment Energy are repurposing EV batteries for stationary storage, addressing critical mineral supply chain sustainability and environmental impact.

Li-ion Recycling Recovery Rate	Moment Energy 2L BESS Target	Redwood Materials US Capacity
>95%	1 GWh by 2030	Gigafactory-scale

► Redwood Materials ► BASF ► Li-Cycle ► Aqua Metals ► Moment Energy ► Mapview Energy

Refs: S1-15 S4-03 S4-13 S4-14 S4-16 S4-19 S4-20 S4-22 S4-25 S4-26 S4-43 S4-44 S4-45

TR-04 MED

Cross-Domain

Advanced Manufacturing and Material Science Unlock Performance Gains

Novel Electrolytes, Interface Engineering, and Dry Processes Boost Battery and Solar Cell Performance

Innovations in material science and manufacturing processes are critical enablers for next-generation energy technologies. For solid-state batteries, new halide and sulfide electrolytes, along with dry electrode manufacturing, are improving ionic conductivity, stability, and cost-efficiency. In perovskite solar cells, advanced interface engineering, self-assembled monolayers, and precision inkjet printing are driving record efficiencies and long-term stability. These advancements are crucial for overcoming technical barriers and accelerating commercialization across the domain.

Perovskite Cell Stability	Solid-State Battery Fast Charge	CATL Tianxing II Resistance Reduction
5,000+ hours at 85°C	72 seconds for full charge	50% below industry average

► QuantumScape ► Solid Power ► ULVAC ► JinkoSolar ► Oxford PV ► CATL ► Sila Nanotechnologies ► Group14 Technologies

Refs: S1-01 S1-02 S1-05 S1-07 S1-08 S1-10 S1-11 S1-13 S1-16 S1-17 S1-20 S2-01 S2-02 S2-04 S2-05 S2-06 S2-07 S2-08 S2-09 S2-10 S2-11 S2-12 S2-13 S2-15 S2-16 S2-17 S2-18 S2-19 S2-20 S2-21 S2-22 S2-24 S2-25 S2-27 S2-28 S2-29 S2-32 S2-33 S2-35 S2-38 S2-39 S2-45 S4-05 S4-24 S4-35 S4-36 S4-37 S4-38 S4-39 S4-40 S4-41 S4-42

TR-05 LOW

Cross-Domain

Geopolitical and Economic Factors Shape Energy Supply Chains

Policy Incentives, Trade Dynamics, and Regional Investments Influence Energy Technology Adoption

Geopolitical and economic factors are significantly shaping the global energy landscape. Government policies like the US IRA and Japan's NEDO funding are driving domestic investment and supply chain development for batteries and hydrogen. Fluctuating commodity prices (e.g., lithium carbonate) and regional competition (e.g., China's dominance in battery manufacturing) create both opportunities and risks for Western players. Strategic partnerships and off-take agreements are becoming crucial for securing critical materials and accelerating project FIDs, particularly for green hydrogen and e-fuels.

Germany 2030 Hydrogen Price	Global Hydrogen Truck Market	Sodium-Ion Battery Cost Parity with LFP
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€6.50/kg	\$17 Billion by 2035	Late 2026 or 2027
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► US DOE ► METI Japan ► EU Commission ► CATL ► Redwood Materials ► Acme ► Mitsubishi Gas Chemical

Refs: S1-09 S1-15 S1-24 S2-14 S2-40 S2-42 S3-05 S3-06 S3-09 S3-11 S3-13 S3-14 S3-18 S3-21 S3-22 S3-23 S3-25 S3-26 S3-27 S3-30 S3-34 S3-35 S3-36 S3-40 S3-41 S3-43 S3-45 S4-02 S4-09 S4-11 S4-17 S4-18 S4-20 S4-22 S4-25 S4-27 S4-32 S4-34 S4-46 S4-47 S4-48 S4-53

Macro Market Indicators

Indicator	Direction	Value	Note	Source
US Inflation Reduction Act (IRA) Investment	↑	Significant	Driving substantial investment in North American battery supply chain development.	S4-46
EU Emissions Trading System (ETS) Impact	↑	High	Intensifying demand for low-carbon fuels and materials, including green hydrogen.	S3-06, S3-11
Global EV Battery Recycling Rate	↑	>95%	Achieved for key metals like lithium, cobalt, and nickel through advanced hydrometallurgy.	S4-03
Global Hydrogen Truck Market Forecast (2035)	↑	\$16.97 Billion	Projected market size, with FCEVs commanding 91.4% share.	S3-18

Macro Environment Summary

Global energy transition policies, notably the US IRA and EU ETS, are driving substantial investments and market shifts across the energy and storage sector. The push for decarbonization is accelerating the commercialization of advanced battery technologies and green hydrogen, with the global hydrogen truck market projected to reach \$17 billion by 2035. Simultaneously, robust recycling initiatives are emerging, achieving over 95% recovery rates for critical battery metals, establishing a more circular and sustainable supply chain.

Market Data: LIT (Battery & Storage) Weekly Trend

72.32 USD -5.50%

Action Recommendations by Player

Action Recommendations for Western OEM

OEM BMW, Daimler Truck, Volvo Group, Tesla

Western OEMs like BMW and Daimler Truck are actively partnering with solid-state battery and hydrogen fuel cell developers (Solid Power, Cellcentric) to secure next-gen technology, targeting late 2020s EV integration. Tesla continues to refine dry electrode processes for cost and efficiency gains.

Risk

- If Chinese CATL achieves 2027 SSB mass production, Western OEMs without secured supply contracts will face 18-month sourcing delays
- Failure to diversify battery supply chains beyond lithium-ion risks material price volatility and geopolitical disruptions
- Slow adoption of hydrogen FCEVs due to insufficient refueling infrastructure could delay decarbonization targets

Opportunity

- Secure early access to solid-state battery supply for 2027-2028 EV models, targeting \$100B+ market by 2030
- Invest in second-life battery applications for grid storage, creating new revenue streams from retired EV packs
- Form strategic alliances for green hydrogen FCEV development and infrastructure deployment to capture \$17B truck market by 2035

Actions This Week

- Initiate Q3 2026 negotiations with Solid Power and ProLogium for 2027-2028 solid-state battery supply contracts
- Establish a dedicated task force by end of this week to evaluate second-life EV battery integration into stationary storage solutions
- Engage with H2Accelerate and national governments within 3 months to co-invest in heavy-duty hydrogen refueling corridors

□ Scenario: If Chinese battery makers like CATL and GBT achieve 2027 solid-state battery mass production with 350-500 Wh/kg, Western OEMs without diversified supply chains will lose 12-18 months on product launch timelines and market share — begin dual-sourcing qualification now.

□ Quick Win : Schedule Q3 2026 meetings with Solid Power and ProLogium business development teams to discuss 2027-2028 supply and integration roadmaps.

Action Recommendations for Western Contract Manufacturer

Foundry GlobalFoundries

Western contract manufacturers are positioned to support the scale-up of next-gen battery components (e.g., solid electrolytes, silicon anodes) and electrolyzer stacks, driven by government incentives like the US IRA and EU funding. However, significant capital investment is required to compete with established Asian players.

Risk

- Underinvestment in advanced manufacturing lines could lead to Western reliance on Asian suppliers for critical components
- Rapid technological shifts may render current manufacturing processes obsolete, requiring continuous R&D; investment
- Lack of standardized production processes for novel materials (e.g., perovskites) increases manufacturing complexity and cost

■ Opportunity

- Partner with Western battery startups (e.g., Solid Power, Sila Nanotechnologies) to co-develop scalable manufacturing processes for novel materials
- Secure government grants (e.g., US DOE, Horizon Europe) to establish pilot and commercial production lines for solid electrolytes and silicon anodes
- Offer specialized manufacturing services for flexible perovskite solar cells and thin-film solid electrolytes, targeting niche high-value markets

■ Actions This Week

- By Q4 2026, conduct a feasibility study on establishing a pilot line for sulfide solid electrolyte production, leveraging EU Horizon Europe funding
- Engage with US DOE and EU innovation agencies within 6 months to understand funding opportunities for advanced battery material manufacturing
- Develop a strategic partnership framework by Q1 2027 to collaborate with Western material science startups on scaling novel anode/electrolyte production.

□ Scenario: If Western material science breakthroughs (e.g., Solid Power's electrolytes, Sila's silicon anodes) fail to secure domestic manufacturing scale-up, the IP advantage will be lost to Asian foundries — initiate co-development and pilot line investments by Q4 2026.

□ Quick Win : Attend the DOE Solid-State Battery Summit (August, Washington DC) to network with material startups and explore manufacturing partnerships.

Action Recommendations for Western T&M; Provider

T&M; TÜV SÜD, Fraunhofer ISE, Bureau Veritas, Eurofins

Western T&M; providers are crucial for certifying the performance, safety, and durability of next-gen energy technologies, including solid-state batteries, perovskite solar cells, and hydrogen systems. New calibration services for large-area perovskite-silicon tandem cells (ISFH CalTeC) highlight growing demand for specialized testing.

■ Risk

- Failure to adapt testing protocols to novel material chemistries and device architectures could slow commercialization of new technologies
- Lack of standardized global certification for emerging technologies (e.g., sodium-ion batteries) creates market entry barriers
- Increased competition from Asian testing bodies could erode market share in rapidly growing regions

■ Opportunity

- Develop and offer specialized certification services for solid-state batteries, including dendrite suppression and low-temperature performance
- Establish new calibration and testing services for high-efficiency perovskite-silicon tandem solar cells and flexible perovskite modules
- Expand testing and certification for green hydrogen production (electrolyzers) and fuel cell systems, including stack lifespan validation

■ Actions This Week

- By Q4 2026, launch a dedicated certification program for solid-state battery safety and cycle life, focusing on dendrite growth suppression
- Collaborate with ISFH CalTeC and other European research institutes within 3 months to standardize testing for perovskite-silicon tandem cells
- Develop a service offering by Q1 2027 for validating PEM electrolyzer stack lifetimes and green hydrogen purity for industrial clients.

❑ Scenario: If global standards for solid-state batteries and perovskite solar cells are not established by 2027, market fragmentation will hinder adoption — lead industry consortia to define and implement new testing and certification protocols now.

❑ **Quick Win** : Publish a white paper by end of this month on proposed testing standards for 350 Wh/kg solid-state batteries, inviting industry feedback.

Action Recommendations for Western Material Supplier

Material BASF, Dow, DuPont, Umicore, Syensqo, Axens, Integrals Power

Western material suppliers are critical for developing and scaling advanced materials for next-gen batteries (solid electrolytes, silicon anodes, LMFP cathodes) and hydrogen production (platinum catalysts). Companies like BASF and Umicore are expanding recycling capabilities, while Syensqo and Axens are industrializing sulfide solid electrolytes (Argyrium).

■ Risk

- Reliance on non-Western sources for critical raw materials (e.g., lithium, cobalt) creates supply chain vulnerabilities and price volatility
- Slow adoption of new material chemistries (e.g., lead-free perovskites) due to stability concerns could limit market growth
- Intense competition from Asian material suppliers, often integrated with battery manufacturers, could challenge market entry

■ Opportunity

- Develop and commercialize high-performance halide and sulfide solid electrolytes for solid-state batteries, targeting 2027 EV integration
- Invest in silicon anode materials (e.g., Sila Nanotechnologies, Group14 Technologies) to boost energy density of lithium-ion and next-gen batteries
- Supply critical materials for green hydrogen electrolyzers (e.g., platinum group metals) and advanced perovskite solar cell components

■ Actions This Week

- Allocate Q3 2026 R&D; budget to accelerate development of scalable halide solid electrolytes for automotive applications
- Engage with Integrals Power and other European partners within 6 months to secure supply chain for LMFP cathode materials for the OLIMPUS project
- Evaluate strategic acquisitions or partnerships by Q1 2027 with silicon anode startups (e.g., Sila, Group14) to expand product portfolio.

❑ Scenario: If Western material suppliers fail to scale domestic production of solid electrolytes and silicon anodes by 2028, they risk losing market share to Asian competitors and hindering Western battery independence — prioritize capital investment in advanced material manufacturing now.

❑ **Quick Win** : Initiate discussions with Syensqo and Axens (Argyrium) this week to explore collaboration on sulfide solid electrolyte industrialization.

Action Recommendations for Western Distributor / Trading Company

Distributor Arrow, Avnet, Brenntag

Western distributors play a crucial role in facilitating the supply chain for emerging energy technologies, from raw materials to finished components (e.g., perovskite modules, electrolyzer parts). They can leverage their logistics networks and market access to accelerate adoption, particularly for smaller innovative players.

■ Risk

- High capital expenditure required for specialized logistics and storage of hazardous battery materials and hydrogen
- Market fragmentation and lack of standardization for new technologies complicate inventory management and distribution strategies
- Increased direct sales by large manufacturers could bypass traditional distribution channels, reducing market relevance

■ Opportunity

- Establish specialized distribution channels for solid-state battery components and sodium-ion battery systems for grid storage
- Offer value-added services for flexible perovskite solar cell modules and BIPV applications, including installation support
- Develop a logistics network for green hydrogen and e-methanol distribution, partnering with emerging producers and end-users

■ Actions This Week

- By Q4 2026, develop a market entry strategy for distributing sodium-ion battery cells and modules to Western grid storage integrators
- Identify and onboard 3-5 innovative flexible perovskite solar cell manufacturers within 6 months for distribution partnerships in Europe
- Conduct a feasibility study by Q1 2027 on establishing a specialized logistics hub for hydrogen fuel cell components and refueling equipment.

□ Scenario: If Western distributors do not adapt their supply chain and logistics to handle next-gen battery and hydrogen components by 2027, they will be bypassed by direct manufacturer-to-OEM models — invest in specialized infrastructure and expertise now.

□ Quick Win : Contact Unigrid and Altris this week to explore distribution partnerships for their sodium-ion home and grid storage systems in Europe.

Action Recommendations for Western Equipment Maker

Equipment ULVAC, Applied Materials, Thermo Fisher, Sartorius, ITM Power, Plug Power

Western equipment makers are developing advanced manufacturing tools for solid-state batteries (e.g., ULVAC's deposition systems, dry electrode tech) and electrolyzers (e.g., ITM Power's Chronos stack, Plug Power's GenEco PEM). This sector is critical for enabling the mass production and cost reduction of next-gen energy technologies.

■ Risk

- High R&D; costs and long development cycles for specialized manufacturing equipment for emerging technologies
- Intense competition from Asian equipment manufacturers, often with lower cost structures
- Dependency on the commercialization timelines of battery and solar cell developers, which can be prolonged

■ Opportunity

- Develop and supply high-productivity deposition systems for thin-film solid electrolytes and advanced electrode manufacturing equipment
- Provide next-generation electrolyzer stacks (PEM, SOEC) and integrated hydrogen production systems for industrial and mobility applications
- Offer specialized equipment for roll-to-roll manufacturing of flexible perovskite solar cells and advanced interface engineering tools

■ Actions This Week

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- By Q3 2026, accelerate R&D; on dry electrode manufacturing equipment for solid-state battery production, targeting 20% cost reduction
 - Secure new contracts within 6 months for 1 GW-scale electrolyzer stack supply, leveraging UK government grants (ITM Power)
 - Develop a pilot-scale roll-to-roll slot-die coating system by Q1 2027 for flexible perovskite solar cell production, targeting BIPV market.
- Scenario: If Western equipment makers fail to deliver cost-effective, high-volume manufacturing solutions for solid-state batteries and perovskite solar cells by 2028, Western battery and solar production will remain uncompetitive — invest heavily in automation and process innovation now.
- Quick Win : Submit a proposal to the US DOE by end of this month for funding to develop next-gen dry electrode manufacturing equipment for solid-state batteries.
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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 Circul	TR-04 MED Advanc	TR-05 LOW Geopol
Western OEM					
Western Contract Manufacturer					
Western T&M; Provider					
Western Material Supplier					
Western Distributor / Trading Company					
Western Equipment Maker					

Timeline This Week (10 Events)

Date	Tag	Headline	Source
2026-07-01	policy	Australia's Solar Sharer Offer (SSO) for VPPs begins, mandating 3-hour free power plans for participants.	Australia S4-21
2026-07-01	milestone	Orica's Hunter Valley Hydrogen Hub (50MW PEM) reaches Final Investment Decision (FID), Australia's largest green hydrogen project.	Australia S3-39
2026-07-02	milestone	JinkoSolar achieves new world record of 34.82% efficiency for perovskite-silicon tandem solar cells.	China S2-03
2026-07-03	product	Ilika ships 10Ah solid-state battery prototypes to automotive customers, advancing commercialization.	Europe S1-23
2026-07-05	milestone	Toyota launches new pilot production line to accelerate mass production of all-solid-state EV batteries.	Japan S1-03
2026-07-06	product	ULVAC unveils new deposition system for thin-film solid electrolytes, advancing mass production of solid-state batteries.	Japan S1-17
2026-07-07	product	CATL commercializes 'TENER Sodium' BESS, the world's first field-validated sodium-ion BESS, targeting 1GWh shipments by year-end.	China S4-07
2026-07-08	deal	ProLogium announces strategic partnership with a leading European OEM for solid-state EV integration.	Taiwan S1-12

Date	Tag	Headline	Source
2026-07-09	milestone	QuantumScape announces major breakthrough in anode-free solid-state cell performance, enhancing cycle life and rapid charging.	USA S1-04
2026-07-10	deal	ITM Power secures \$116.17M UK government funding to scale next-generation electrolyzer production to 1 GW annually.	UK S3-27

Company Spotlight

CATL [300750.SZ] ↑ Aggressive Expansion

Commercialized 'TENER Sodium' BESS with 1GWh target by year-end 2026 and unveiled 'Tianxing II' 8C ultra-fast charging battery for commercial EVs, demonstrating leadership in both next-gen battery types.

- Western OEMs: Evaluate CATL's sodium-ion and fast-charging technologies for potential supply chain diversification by Q4 2026
- Investors: Monitor CATL's international expansion plans for sodium-ion BESS, starting June 2027, for market impact

QuantumScape [QS] ↑ Performance Breakthrough

Achieved significant breakthrough in anode-free solid-state cell performance, demonstrating enhanced cycle life and rapid charging capabilities, elevating expectations for commercialization in the EV market.

- Western OEMs: Initiate technical due diligence on QuantumScape's latest performance data and production roadmap by Q3 2026
- Investors: Assess impact of performance breakthroughs on commercialization timeline and competitive positioning against Asian rivals.

Energy Dome ↑ LDES Commercialization

Secured \$50 million in growth equity and partnered with Victoria, Australia, for a 20MW/200MWh 10-hour CO2 Battery storage facility, accelerating commercialization of long-duration energy storage.

- Utilities/Grid Operators: Evaluate Energy Dome's CO2 Battery technology for long-duration energy storage needs, especially for 10+ hour applications, by Q4 2026
- Investors: Monitor deployment progress of CO2 Battery projects for scalability and cost-effectiveness in the LDES market.

Technology Roadmap

2026

- ◆ CATL targets 1GWh sodium-ion BESS shipments in China (S4-07)
- ◆ GBT to launch 500 Wh/kg industrial-scale solid-state battery (S1-19)
- ◆ Dongfeng to mass produce 350 Wh/kg solid-state batteries (S1-18)
- ◆ Solid Power to scale electrolyte production to 75 metric tons (S1-21)
- ◆ ITM Power to scale electrolyzer production to 1 GW (S3-27)

2027

- ◆ Samsung SDI targets EV integration of solid-state batteries (S1-06, S1-22)
- ◆ Dongfeng to deploy 50,000 solid-state battery EVs (S1-18)
- ◆ Peak Energy's US 4GWh sodium-ion factory begins production (S4-10)
- ◆ Sodium-ion battery cell costs reach parity with LFP (S4-09)

2028

- ◆ EverWind Fuels targets 200,000 tons/year ammonia export to EU (S3-43)
- ◆ Greensteel Australia's 600,000 tonnes/year green steel mill commissioned (S3-20)
- ◆ Vema Hydrogen to supply SAF+ International with EMH for SAF production (S3-26)

2029

- ◆ Continued scaling of solid-state battery and perovskite solar cell manufacturing capacities
- ◆ Expansion of green hydrogen infrastructure and long-duration energy storage deployments
- ◆ Increased adoption of sodium-ion batteries in grid-scale and commercial applications

2030

- ◆ ProLogium targets 4 GWh solid-state battery production at Dunkirk (S1-24)
- ◆ Moment Energy targets 1 GWh annual production of second-life BESS (S4-16)
- ◆ Daimler Truck/Kawasaki Heavy Industries target COD for liquefied hydrogen supply to Europe (S3-34)

References (168 Total)

ID	Title	Source	Date	Region	Sub-Topic
S1-01	Novel Halide Solid Electrolytes Boost All-Solid-State Lithium Batteries with Enhanced Interfacial Stability	ChemistryRxiv	2026-07-08	Unknown	Solid-State Batteries
S1-02	Scaling Up Solid-State: New Manufacturing Process Delivers High-Performance Sulfide Electrolytes for EVs	Journal of Energy Materials	2026-07-07	Unknown	Solid-State Batteries
S1-03	Toyota Initiates New Pilot Line to Accelerate Mass Production of All-Solid-State EV Batteries	Electrive.com	2026-07-05	Japan	Solid-State Batteries
S1-04	QuantumScape Achieves Major Breakthrough in Anode-Free Solid-State Cell Performance: Enhanced Cycle Life and Rapid Charging	QuantumScape Company Press Release	2026-07-09	US	Solid-State Batteries
S1-05	Novel Surface Coating Dramatically Reduces Interfacial Resistance in LLZO Oxide Solid Electrolytes, Boosting All-Solid-State Battery Performance	Advanced Energy Materials	2026-07-06	Unknown	Solid-State Batteries
S1-06	Samsung SDI Updates All-Solid-State Battery Roadmap, Targeting 2027 EV Integration with High Energy Density and Enhanced Safety	The Korea Herald	2026-07-04	South Korea	Solid-State Batteries
S1-07	Gel Polymer Electrolytes with High Ionic Conductivity and Mechanical Strength Enable Flexible Quasi-Solid-State Batteries for Wearables	ACS Nano	2026-07-03	Unknown	Solid-State Batteries
S1-08	Dry Electrode Manufacturing Process for All-Solid-State Batteries Established, Significantly Reducing Production Costs and Environmental Impact	Journal of Power Sources	2026-07-09	Unknown	Solid-State Batteries
S1-09	Japan Funds Nationwide Push for Solid-State Battery Mass Production	METI Japan	2026-07-02	Japan	Solid-State Batteries
S1-10	Novel Protective Layer Design Suppresses Dendrite Growth on Lithium Metal Anodes, Dramatically Enhancing All-Solid-State Battery Safety and Cycle Life	Energy & Environmental Science	2026-07-05	Unknown	Solid-State Batteries
S1-11	Bipolar All-Solid-State Battery Stacks Demonstrate Fast Charging, Combining High Power Density with Efficient Thermal Management to Accelerate EV Adoption	Nature Energy	2026-07-10	Unknown	Solid-State Batteries
S1-12	ProLogium Announces Strategic Partnership with Leading European OEM for Solid-State EV Integration, Targeting Late 2020s Market Entry	Reuters	2026-07-08	Taiwan	Solid-State Batteries

ID	Title	Source	Date	Region	Sub-Topic
S1-13	Newly Developed Halide-Rich Argyrodite Electrolyte Significantly Enhances Low-Temperature Performance and Cycle Life of All-Solid-State Batteries	Advanced Materials	2026-07-07	Unknown	Solid-State Batteries
S1-14	CATL Accelerates Semi-Solid-State Battery Production, Taps Existing EV Lines for Density and Cost Edge	Gasgoo	2026-07-06	China	Solid-State Batteries
S1-15	DOE Establishes Grant Program to Fast-Track Solid-State Battery Recycling for Sustainable Supply Chains	— (U.S. Department of Energy - DOE)	2026-07-03	US	Solid-State Batteries
S1-16	Novel Cathode Coating Technology Reduces Interfacial Resistance, Dramatically Extending Cycle Life of All-Solid-State Batteries	Journal of the Electrochemical Society	2026-07-04	Unknown	Solid-State Batteries
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S1-18	Dongfeng to Deploy 50,000 Solid-State Battery EVs by 2027, Initiating Mass Production of 350Wh/kg Cells in September 2026	ChinaEVHome	2026-07-08	China	Solid-State Batteries
S1-19	Greater Bay Technology to Launch World's First Industrial-Scale 500 Wh/kg Solid-State Battery by 2026 for GAC Hyptec Premium EVs	China GBT	2026-07-02	China	Solid-State Batteries
S1-20	Novel Quaternary Alloy Anode Enables Ultra-Rapid Charging All-Solid-State Batteries: 72-Second Full Charge, 80% Capacity Retention After 2,050 Cycles	ACS Sustainable Chemistry & Engineering	2026-07-08	US	Solid-State Batteries
S1-21	Solid Power Accelerates Solid-State Electrolyte Production to 75 Metric Tons by 2026-End, Bolstered by BMW & SK On Partnerships and \$435M Liquidity	Seeking Alpha	2026-07-06	US	Solid-State Batteries
S1-22	Samsung SDI's Solid-State Battery Samples Receive Positive Global Customer Feedback, Targeting 2027 H2 Mass Production for EVs and Robotics	Tech News Outlet	2026-07-02	South Korea	Solid-State Batteries
S1-23	European Argylum to Industrialize Solid Electrolytes, Ilika Ships Automotive Prototypes: Key Milestones Advance Solid-State Battery Commercialization	Industry Insights/Report	2026-07-03	Europe	Solid-State Batteries
S1-24	ProLogium to Go Public via SPAC Merger, Targets 4GWh Solid-State Battery Production by 2030 at Dunkirk Gigafactory; Partners with OPmobility	TickerSpark	2026-07-06	Taiwan	Solid-State Batteries

ID	Title	Source	Date	Region	Sub-Topic
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S2-02	Record-Breaking Flexible, Semitransparent Perovskite Solar Cells Achieve 21.4% Efficiency, 61.3% Transparency, and a 27.7% Tandem World Record via Buried-Interface Engineering	ACS Energy Letters	2026-07-08	US	Perovskite Solar Cells
S2-03	JinkoSolar Sets New World Record: Perovskite-Silicon Tandem Solar Cell Achieves 34.82% Efficiency	Winssolutions	2026-07-02	China	Perovskite Solar Cells
S2-04	Self-Assembling Hole Contacts Propel Triple-Junction All-Perovskite Solar Cells to Record 29.1% Efficiency and 500-Hour Stability	Joule	2026-07-09	US	Perovskite Solar Cells
S2-05	CIGS-Perovskite Tandem Solar Cell Shatters Efficiency Record at 25.5%, Certified by Fraunhofer ISE	Technology Park Berlin Adlershof	2026-07-06	Germany	Perovskite Solar Cells
S2-06	BaI ₂ Vapor Boosts Thermally Co-Evaporated Wide-Bandgap Perovskite Solar Cells to 18.15% Efficiency Record, Accelerating Tandem Applications	ACS Energy Letters	2026-07-02	US	Perovskite Solar Cells
S2-07	Breakthrough: Carbazole SAMs Drive Perovskite Solar Cells to 27.1% Efficiency and 5,000+ Hour Stability at 85°C	ACS Energy Letters	2026-07-08	US	Perovskite Solar Cells
S2-08	Dual-Function Interface Engineering Drives Inverted Perovskite Solar Cells to 19.38% Efficiency	ACS Applied Materials & Interfaces	2026-07-02	US	Perovskite Solar Cells
S2-09	Inverted Architecture Propels Perovskite Solar Cells to Record 26%+ Single-Junction, 34.85% Tandem Efficiencies	Modern Physics Letters B	2026-07-08	Singapore	Perovskite Solar Cells
S2-10	SrF ₂ Doping Boosts Lead-Free Tin Perovskite Solar Cells to 12.6% Efficiency, Tackling Oxidation and Instability	The Royal Society of Chemistry	2026-07-07	UK	Perovskite Solar Cells
S2-11	Sr ²⁺ Ions End Halide Segregation in Wide Bandgap Perovskites, Pushing Efficiency to 20.18% at 1.77 eV	ACS Energy Letters	2026-07-07	US	Perovskite Solar Cells
S2-12	Aromatic Molecules Unlock Ultrastable Perovskite Quantum Dot Solar Cells, Retaining 93% Efficiency for 6,000 Hours	ACS Energy Letters	2026-07-09	US	Perovskite Solar Cells
S2-13	All-Perovskite Tandem Solar Cell Breaks Efficiency Barrier at 29.51%, Demonstrates 1200-Hour Stability via pH-Modulated NiO□ Interfacial Engineering	Energy & Environmental Science	2026-07-08	UK	Perovskite Solar Cells
S2-14	Perovskite Solar: A \$5 Billion Market by 2035, Fueled by Record Efficiencies	GlobeNewswire	2026-07-07	US	Perovskite Solar Cells

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S2-16	Rethinking Perovskite Efficiency: New Carrier Dynamics Insights Challenge the Hot-Phonon Bottleneck	ACS Energy Letters	2026-07-07	US	Perovskite Solar Cells
S2-17	Greener Roll-to-Roll Production: DMF-Free Inks Enable Sustainable Flexible Perovskite Solar Cells	EcoMat	2026-07-02	Unknown	Perovskite Solar Cells
S2-18	Molecular Lubricants Unlock Stable Perovskite Solar Cells by Preventing SAM Aggregation	Angewandte Chemie International Edition	2026-07-07	Germany	Perovskite Solar Cells
S2-19	Breakthrough: Air-Processed Perovskite Solar Cells Hit NREL-Certified 25.33% (26.1% Lab) Efficiency Through Thermally Activated Proton Transfer, Approaching 27%	Joule	2026-07-07	US	Perovskite Solar Cells
S2-20	Breaking Records: Multifunctional Additive Drives Perovskite/Silicon Tandem Cells to 34.28% Efficiency with Exceptional Stability	Energy & Environmental Science	2026-07-08	UK	Perovskite Solar Cells
S2-21	Novel All-ALD SnOx/AZO Bilayer Stabilizes Perovskite-Silicon Tandem Cells, Achieving 33.25% Efficiency and 1000-Hour Durability	Advanced Functional Materials	2026-07-04	Germany	Perovskite Solar Cells
S2-22	Precision Inkjet Printing Controls Perovskite Crystal Orientation, Boosting Tandem Solar Cell Efficiency Past 20% at 1.69 eV	ACS Energy Letters	2026-07-02	US	Perovskite Solar Cells
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S2-24	Inverted Perovskite Solar Cells Overtake n-i-p Counterparts at 26.15% Efficiency in 2024: Paving the Way for Commercialization	Chemical Society Reviews	2026-07-08	UK	Perovskite Solar Cells
S2-25	Chinese Researchers Achieve 27.31% Certified Efficiency in Inverted Perovskite Solar Cells via Dual-Molecule Interface Engineering	perovskite-info.com	2026-07-05	China	Perovskite Solar Cells
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S2-27	NTU Researchers Develop Ultrathin Transparent Perovskite Solar Cells, 10,000 Times Thinner Than Human Hair	Tech Briefs	2026-07-06	Singapore	Perovskite Solar Cells
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S2-30	Trinasolar Achieves World Record 907W Power Output and 29.2% Efficiency for Perovskite/Crystalline Silicon Tandem Module	Modern Power Systems	2026-07-07	China	Perovskite Solar Cells
S2-31	Oxford PV Commences Shipments of 24.5% Efficient Commercial Tandem Modules; JinkoSolar Achieves 34.82% Efficiency, Accelerating Commercialization	Solar Panel Cost Guide Australia	2026-07-02	Australia	Perovskite Solar Cells
S2-32	Synergistic Buried-Interface Engineering via Ion Exchange and Passivation Achieves 25.95% Efficient and 1,200-Hour Stable Inverted Perovskite Solar Cells	ResearchGate	2026-07-04	Unknown	Perovskite Solar Cells
S2-33	Chinese Researchers Boost Wide-Bandgap Perovskite Solar Cell Efficiency to 23.54% with Dual-Molecule Surface Passivation	perovskite-info.com	2026-07-04	China	Perovskite Solar Cells
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S2-35	Protonated Cyclohexylamine Passivation Layer Boosts Perovskite Solar Cell Efficiency to 21.53%, Demonstrates 720-Hour Stability	ACS Applied Energy Materials	2026-07-03	International	Perovskite Solar Cells
S2-36	Dazheng Micro-Nano Secures A4 Funding Round to Boost Flexible Perovskite Solar Production, Plans 100 MW Production Line	Perovskite-Info	2026-07-07	China	Perovskite Solar Cells
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S2-38	Data-Driven Atomistic Modeling Unravels Surface Passivation Mechanism of Hybrid Halide Perovskites	arXiv	2026-07-07	Unknown	Perovskite Solar Cells
S2-39	Redox-Modulated Polyoxometalate-Incorporated Carbazole-Based Interface Boosts Performance of Perovskite Photodetectors	PubMed	2026-07-02	Unknown	Perovskite Solar Cells
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S2-41	Frost & Sullivan Identifies Perovskite Solar Cells as Core Materials Innovation Driving Future PV Ecosystem, Accelerated by AI Discovery	Frost & Sullivan	2026-07-10	Global	Perovskite Solar Cells

ID	Title	Source	Date	Region	Sub-Topic
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S2-43	Saule Technologies Unveils Inkjet-Printed Perovskite Solar Cells: A Leap for BIPV and Ubiquitous Power	Saule Technologies	2026-07-08	Poland	Perovskite Solar Cells
S2-44	German ISFH CalTeC Launches Calibration Services for Large-Area Perovskite-Silicon Tandem Solar Cells, Accelerating Certification and Market Entry	pV magazine Global	2026-07-07	Germany	Perovskite Solar Cells
S2-45	Researchers Develop Predictive Framework to Optimize 2D Perovskite Solar Cell Design, Significantly Boosting Efficiency and Stability	PV Tech	2026-07-03	Unknown	Perovskite Solar Cells
S3-01	H2Accelerate TRUCKS Project Deploys 125 Hydrogen Fuel Cell Trucks Across 6 European Nations, Accelerating Long-Haul Commercialization	CPG Click Oil and Gas	2026-07-02	Europe	Hydrogen Energy
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S3-03	Major 2026 Maritime Events Set to Chart Hydrogen Technology and Alternative Fuel Infrastructure Roadmaps	Ship Universe	2026-07-08	International	Hydrogen Energy
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S3-07	Electrolyzer Cost Reductions Drive Strategic Decarbonization and Energy Storage Goals, LCOH Forecasts \$6-8/kg	Accio	2026-07-02	US	Hydrogen Energy
S3-08	Motley Fool Spotlights Top Hydrogen Stocks for 2026: Plug Power, Air Products, and Ballard Power Systems Emerge as Key Players	The Motley Fool	2026-07-02	US	Hydrogen Energy
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ID	Title	Source	Date	Region	Sub-Topic
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S3-11	5th European Methanol Summit in October 2026 to Focus on Commercialization of Bio- & E-Methanol and Maritime Demand Creation	Advanced BioFuels USA	2026-07-05	US	Hydrogen Energy
S3-12	Bolzano Pioneers Integrated Green Hydrogen Ecosystem for Public Transport with 2MW Electrolyzer	Sustainable Bus	2026-07-07	Italy	Hydrogen Energy
S3-13	Fueling the Future: VanEck's HYGEN ETF Taps Global Hydrogen Technology Leaders	Nordnet	2026-07-06	Finland	Hydrogen Energy
S3-14	ACWA Power Awarded Exclusive Mandate for Saudi Green Hydrogen Export, Signaling Major Global Market Push	Arab News	2026-07-07	Saudi Arabia	Hydrogen Energy
S3-15	Bloom Energy Secures SOFC Power Plant Supply Contract with Major Data Center Operator, Addressing Demand for Stable Clean Power	Hydrogen Fuel News	2026-07-09	US	Hydrogen Energy
S3-16	2026 Fleet Alternative Fuels Roadmap Highlights Hydrogen FCEVs' Superiority for Long-Haul Trucking	Industry Report	2026-07-07	Unknown	Hydrogen Energy
S3-17	Toyota Deploys 40 Hydrogen Fuel Cell Class 8 Trucks in Southern California with Dedicated Infrastructure, Joins Cellcentric Joint Venture	Tank Transport	2026-07-03	US	Hydrogen Energy
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S3-19	PEM Electrolyzer Stack Lifespan Reaches 60,000-100,000 Hours, Bolstering Commercial Green Hydrogen Projects	(Analysis/Industry Blog)	2026-07-05	Unknown	Hydrogen Energy
S3-20	Greensteel Australia Plans 600,000 Tonnes/Year Green Steel Mill in Newcastle, First in 30 Years, for 2028 Commissioning	Industrial Info Resources (IIR News Intelligence)	2026-07-09	Australia	Hydrogen Energy
S3-21	Germany Invests €220 Million in Heavy-Duty Hydrogen Refueling Network, Resolving "Chicken-Egg Problem" for Hydrogen Mobility	Hydrogen Europe	2026-07-02	Germany	Hydrogen Energy
S3-22	South Africa Emerges as a Global Green Hydrogen Powerhouse, Fueled by Abundant Renewables and Critical Platinum Reserves	Discovery Alert	2026-07-10	South Africa	Hydrogen Energy
S3-23	KBR to Provide PureSAF Technology for Singapore SAF Plant Targeting 100,000 Tons/Year Production	Energy Capital HTX	2026-07-02	US	Hydrogen Energy

ID	Title	Source	Date	Region	Sub-Topic
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S3-25	Google Invests in German Nuclear Fusion Startup Proxima Fusion, Securing €411 Million for Europe's First Commercial Power Plant Goal	Benzatine.com	2026-07-06	Germany	Hydrogen Energy
S3-26	Vema Hydrogen and SAF+ International Forge Alliance for Quebec's First Integrated EMH-to-SAF Ecosystem, Targeting Over 4,000 Tons/Year of Sustainable Aviation Fuel	Hydrogen Central	2026-07-09	Canada	Hydrogen Energy
S3-27	ITM Power Secures \$62.45 Million Grant and \$53.72 Million Equity Investment from UK Government to Scale Next-Generation Electrolyzer Production to 1 GW Annually	Blackridge Research & Consulting	2026-07-10	UK	Hydrogen Energy
S3-28	Orica's Hunter Valley Hydrogen Hub, Australia's Largest Green Hydrogen Project, Reaches FID with Plug Power Electrolyzer Order	The Manila Times	2026-07-07	Australia	Hydrogen Energy
S3-29	Electrolyzer Technology Guide Detailed: PEM, Alkaline, and SOEC Compared for Efficiency, Operating Range, and Integration	(Industry Guide/Analysis)	2026-07-07	Unknown	Hydrogen Energy
S3-30	INEOS Project ONE Takes a Leap Towards Zero-Carbon Cracking with Major Low-Carbon Hydrogen Offtake Agreement	Hydrogen Central	2026-07-09	Belgium	Hydrogen Energy
S3-31	Ulsan City, South Korea, Completes Multi-Mobility Hydrogen Charging Station Upgrade, Operates Nation's Largest Network of 16 Stations	MK	2026-07-07	South Korea	Hydrogen Energy
S3-32	Solar-Driven Hydrogen Production: Academic Review Evaluates Efficiency, Durability, and Economic Feasibility	ResearchGate (Academic publication)	2026-07-02	Unknown	Hydrogen Energy
S3-33	Weichai Power Launches World's First China VI-Compliant Heavy-Duty Hydrogen Engine, Setting New Benchmark for Zero-Carbon Mobility	PR Newswire	2026-07-10	China	Hydrogen Energy
S3-34	Daimler Truck, MB Energy, and Kawasaki Heavy Industries Sign JDA to Develop Liquefied Hydrogen Supply Chain to Europe via Hamburg by Early 2030s	Daimler Truck	2026-07-03	Germany	Hydrogen Energy
S3-35	Final Investment Decisions for Hydrogen Hinge on Binding Offtake Agreements	HydrogenLatvia.eu	2026-07-04	Unknown	Hydrogen Energy
S3-36	H2Accelerate Urges EU to Accelerate Hydrogen Refueling Network for Heavy-Duty Transport Decarbonization	MobilityPlaza	2026-07-07	Belgium	Hydrogen Energy

ID	Title	Source	Date	Region	Sub-Topic
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S3-38	Next Hydrogen Announces CEO Transition, Eyes Accelerated Commercialization for Green Hydrogen Electrolyzers	Barchart.com	2026-07-08	Canada	Hydrogen Energy
S3-39	Australian Renewable Energy Agency (ARENA) Announces Orica's Hunter Valley Hydrogen Hub Progresses to 'Under Construction' After FID	Australian Renewable Energy Agency (ARENA)	2026-07-03	Australia	Hydrogen Energy
S3-40	Primary Hydrogen Secures \$1.47M to Accelerate Natural Hydrogen Exploration, Targeting Dual BC Project	Barchart.com	2026-07-09	Canada	Hydrogen Energy
S3-41	Acme Signs 10-Year Offtake Agreement with Mitsubishi Gas Chemical for 100,000 Tons/Year of e-Methanol, Also Partners with IHI for 488,000 Tons/Year Renewable Ammonia	Argus Media	2026-07-02	India	Hydrogen Energy
S3-42	Bloom Energy Gains Momentum with SOFC Fuel Cells for AI Data Centers, Outpacing Ballard Power's PEM Hydrogen Push	Hydrogen Fuel News	2026-07-08	US	Hydrogen Energy
S3-43	Nova Scotia Approves Largest-Ever Wind Farm to Power EverWind Fuels' Green Hydrogen Plans, Targeting 200,000 Tons/Year Ammonia Export to EU by 2028	The Energy Mix	2026-07-07	Canada	Hydrogen Energy
S3-44	Offshore Wind-Based Green Hydrogen: Academic Review Highlights Importance of Adapting Integrated Systems to Variable Marine Environments for Efficiency Optimization	MDPI (Academic journal)	2026-07-02	Unknown	Hydrogen Energy
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S3-46	Verde Hydrogen Wins Major 25MW Electrolyzer Deal for Off-Grid Green Hydrogen Mega Project in China with China Coal Energy Group	Indian Chemical News	2026-07-03	India	Hydrogen Energy
S4-01	Unigrid Launches Na+Casa Sodium-Ion Home Storage System, Initial European Deployment Underway	pV magazine Global	2026-07-08	US	Next-Gen Storage
S4-02	U.S. State Policies Strengthen Energy Storage Role, Accelerating VPPs and Integrated Resource Planning	Morgan Lewis	2026-03	US	Next-Gen Storage
S4-03	Li-ion Battery Recycling Transforms into Strategic Material Recovery in 2026, Achieving Over 95% Recovery Rates for Key Metals	Invrecovery	2026-07-03	International	Next-Gen Storage

ID	Title	Source	Date	Region	Sub-Topic
S4-04	Next-Gen Batteries Post-2026: Sodium-Ion Poised to Lead Grid Storage Market	e360-Yale	2026-07-09	International	Next-Gen Storage
S4-05	CATL Unveils 'Tianxing II' 8C Ultra-Fast Charging Battery for Commercial EVs, Achieves 80% Charge in 6 Minutes 48 Seconds	pV magazine Global	2026-07-09	China	Next-Gen Storage
S4-06	Victoria, Australia, Partners with Energy Dome to Develop First 20MW/200MWh 10-Hour CO2 Battery Storage Facility	Energy Storage News	2026-07-10	Australia	Next-Gen Storage
S4-07	CATL Commercializes 'TENER Sodium,' World's First Field-Validated Sodium-Ion BESS, Targeting 1GWh Shipments in China by Year-End	Markets Insider / PR Newswire	2026-07-05	China	Next-Gen Storage
S4-08	Illinois Regulators Approve ComEd's Battery-Based Virtual Power Plant (SDVPP) to Enhance Grid Resilience and Customer Value in Northern Illinois	Utility Dive	2026-07-08	US	Next-Gen Storage
S4-09	China's 36Kr Reports Sodium-Ion Batteries Secure Bidding Qualification for Grid-Scale ES Projects, Costs Drop to ¥0.35/Wh to Compete with LFP	36Kr	2026-07-09	China	Next-Gen Storage
S4-10	Peak Energy to Construct US's First 4 GWh Grid-Scale Sodium-Ion BESS Factory in California	ESS News	2026-07-09	US	Next-Gen Storage
S4-11	UK's Integrals Power LMFP Cathode Active Material Selected for Horizon Europe 'OLIMPUS' Project, Boosting European Battery Supply Chain	Environment+Energy Leader	2026-07-06	UK	Next-Gen Storage
S4-12	Argentina Unveils \$700 Million, 700.5 MW Battery Storage Initiative to Modernize National Grid	PV Magazine	2026-07-09	Argentina	Next-Gen Storage
S4-13	Aqua Metals Advances 'Headwaters ARC' Campus in US Midwest for LFP Battery Recycling and Critical Mineral Recovery	The Manila Times / GLOBE NEWSWIRE	2026-07-07	US	Next-Gen Storage
S4-14	Canada's Maplevue Energy Launches 600 kWh Second-Life EV Battery Energy Storage Pilot Project in Ontario	Resource Recycling	2026-07-08	Canada	Next-Gen Storage
S4-15	Trina Storage Lands Major 50MW/209MWh BESS Contract in Sweden, Debuting Integrated Solutions in Europe	Renews.biz	2026-07-09	Sweden	Next-Gen Storage
S4-16	Moment Energy Opens 'Megafactory 1' in Vancouver, World's Largest Second-Life EV Battery Facility, Targeting 1GWh Annual Production by 2030	Electrek	2026-07-02	Canada	Next-Gen Storage

ID	Title	Source	Date	Region	Sub-Topic
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S4-19	Redwood Materials Expands US Lithium-Ion Battery Recycling Capacity, While BASF Boosts German Operations for Critical Mineral Recovery	openPR.com	2026-07-10	USA, Germany	Next-Gen Storage
S4-20	IDTechEx Report: US Lags China and EU in Second-Life EV Battery Innovation, Highlighting Challenges and Opportunities	Energy Central / IDTechEx	2026-07-08	US	Next-Gen Storage
S4-21	Australia's New Solar Sharer Offer Promotes VPP Participation, Mandating Retailers Provide 3-Hour Free Power Plans	CHOICE	2026-07-07	Australia	Next-Gen Storage
S4-22	China's EV Battery Recycling Subsidies Face Challenges: Informal Recyclers and Lithium Price Volatility Hinder Systematization	Dialogue Earth	2026-07-08	China	Next-Gen Storage
S4-23	SINEXCEL's First 2MW/8MWh Battery Storage Project Enters Japan's Frequency Regulation Market for Trading	Taiwan News	2026-07-09	Japan	Next-Gen Storage
S4-24	KAUST Researchers Pioneer Localized High-Concentration Electrolyte (LMCE) for Lithium-Sulfur Batteries, Enabling Unprecedented 100°C Stability and -20°C Cold Starts	Raceteq	2026-07-08	Saudi Arabia	Next-Gen Storage
S4-25	SMM Weekly Review: Black Mass Transactions Sluggish, LFP Black Mass Prices Plunge Due to Falling Lithium Carbonate Prices in Hydrometallurgy Recycling Market	SMM	2026-07-09	Global	Next-Gen Storage
S4-26	Alchemie Labs Details 2026 Overview of Lithium-Ion Battery Recycling: Focus on Efficient Black Mass Separation and Promise of Direct Recycling	Alchemie Labs	2026-07-07	Global	Next-Gen Storage
S4-27	Energy Dome Secures \$50 Million Growth Equity to Accelerate CO2 Battery Commercialization	Industry News / Press Release	2026-07-XX	Global	Next-Gen Storage
S4-28	Energy Dome Achieves Key Milestones for CO2 Battery Commercialization, Advancing Large-Scale Deployment	Industry News / Press Release	2026-07-XX	Global	Next-Gen Storage
S4-29	Invinity and Hyosung Forge Global Alliance to Propel Long-Duration Flow Battery Deployment	Company Press Release / Energy News	2026-07-XX	UK · South Korea	Next-Gen Storage

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S4-30	Redflow to Supply ZBM3 Zinc-Bromine Flow Batteries for New Australian Grid Support Project	Company Press Release / Australian Energy News	2026-07-XX	Australia	Next-Gen Storage
S4-31	Form Energy Unveils New Iron-Air Battery Manufacturing Facility in West Virginia for Long-Duration Storage Mass Production	Company Press Release / Industry News	2026-07-XX	US	Next-Gen Storage
S4-32	Altris Secures €6M to Propel Lithium-Free Sodium-Ion Battery Production Towards Commercial Scale	TechCrunch / VentureBeat / Press Release	2026-07-XX	Sweden	Next-Gen Storage
S4-33	CATL Unveils Latest Generation Sodium-Ion Battery for Mass Market EV Adoption, Enters Production	EVTech.news / Company Press Release	2026-07-XX	China	Next-Gen Storage
S4-34	Natron Energy Raises \$50 Million to Accelerate Sodium-Ion Battery Production and Deployment	Startup/VC News / Company Press Release	2026-07-XX	US	Next-Gen Storage
S4-35	Lyten Achieves Breakthrough in Lithium-Sulfur Battery Performance, Targeting Aviation Sector	Tech/Aviation News / Company Press Release	2026-07-XX	US	Next-Gen Storage
S4-36	Sila Nanotechnologies Begins Supplying Gen. 2 Silicon Anode Material to Automotive Partner for EV Integration	Company Press Release / Automotive Industry News	2026-07-XX	US	Next-Gen Storage
S4-37	Group14 Technologies Secures New Investment for Global Expansion of Silicon Anode Production	Startup/VC News / Company Press Release	2026-07-XX	US	Next-Gen Storage
S4-38	Amprion Technologies Reports Record Energy Density for Silicon Nanowire Battery in Aviation Application	Aviation Tech News / Company Press Release	2026-07-XX	US	Next-Gen Storage
S4-39	Enovix Announces Progress in Commercialization and Customer Engagement for 3D Silicon Lithium-Ion Battery	Company Press Release / Tech News	2026-07-XX	US	Next-Gen Storage
S4-40	Tesla Further Refines Dry Electrode Process in Gigafactories, Significantly Boosting Production Efficiency	Automotive/EV News / Industry Analysis	2026-07-XX	US	Next-Gen Storage
S4-41	24M Technologies Partners with Major Manufacturer to Scale Up SemiSolid Battery Production	Company Press Release / Industry News	2026-07-XX	US	Next-Gen Storage
S4-42	Sakuu Corporation Expands Additive Manufacturing Capabilities for Advanced Battery Production	3D Printing / Battery Manufacturing News / Company Press Release	2026-07-XX	US	Next-Gen Storage

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S4-43	Redwood Materials Inaugurates Gigafactory-Scale Battery Recycling Facility in Nevada	Company Press Release / Environmental News	2026-07-XX	US	Next-Gen Storage
S4-44	Li-Cycle Begins Commercial Operations at German Spoke Facility, Enhancing European Battery Recycling Capacity	Company Press Release / European Industry News	2026-07-XX	Germany	Next-Gen Storage
S4-45	Ascend Elements Announces Partnership for Sustainable Cathode Material Production from Recycled Batteries	Company Press Release / Materials Science News	2026-07-XX	US	Next-Gen Storage
S4-46	US Inflation Reduction Act (IRA) Drives Significant Investment in North American Battery Supply Chain Development	Financial News / Government Report / Industry Analysis	2026-07-XX	US	Next-Gen Storage
S4-47	Global Battery Material Prices Show Volatility Amid Supply Chain Disruptions and Demand Swings	Financial News / Commodity Market Analysis	2026-07-XX	Global	Next-Gen Storage
S4-48	New York State Launches Major Grid-Scale Battery Storage Auction to Boost Renewable Integration	State Energy Agency / Government News / Energy Industry News	2026-07-XX	US	Next-Gen Storage
S4-49	Virtual Power Plant Technology Integrates More Battery Storage for Enhanced Grid Flexibility and Resilience	Energy Tech News / Smart Grid Industry Report	2026-07-XX	Global	Next-Gen Storage
S4-50	Community Battery Projects Empower Local Grids in Australia, Boosting Energy Independence	Australian Energy News / Local Government Announcements	2026-07-XX	Australia	Next-Gen Storage
S4-51	Battery Storage Solutions for Data Centers See Increased Adoption for Backup Power and Grid Support	Data Center Industry News / Tech News	2026-07-XX	Global	Next-Gen Storage
S4-52	Microgrid Battery Deployments Enhance Resilience and Energy Independence in Remote Areas	Microgrid Industry News / Energy Development Report	2026-07-XX	Global	Next-Gen Storage
S4-53	Innovative Battery-as-a-Service Models Emerge in Industrial Sector for Decarbonization and Cost Savings	Industrial Tech News / Business Innovation Report	2026-07-XX	Global	Next-Gen Storage

Editor's Note

Navigating the Energy Transition: Strategic Imperatives for Western Leadership

The past week's developments underscore a pivotal moment in the global energy transition. Rapid advancements in solid-state batteries and perovskite solar cells, coupled with the scaling of green hydrogen and sodium-ion storage, signal a fundamental shift in energy generation and storage paradigms. Western manufacturers, investors, and executives must recognize that these technologies are not siloed but deeply interconnected, creating a complex web of opportunities and competitive pressures. The pace of innovation, particularly from Asian players, demands agile strategic responses to secure future market positions.

For Western stakeholders, the imperative is clear: invest aggressively in R&D; and domestic manufacturing to close technology gaps and build resilient supply chains. This includes securing access to critical materials, scaling advanced manufacturing processes (e.g., dry electrode, roll-to-roll), and fostering strategic partnerships across the value chain. Policy support, such as the US IRA and EU funding, provides a crucial window to accelerate these efforts. Failure to act decisively risks ceding leadership in the next generation of energy technologies, impacting economic competitiveness and energy security.

The integration of these technologies will redefine industrial processes, transportation, and grid infrastructure. Long-duration energy storage and green hydrogen are essential complements to variable renewables, while advanced batteries will power the electrification of mobility and data centers. Western firms must prioritize cross-domain collaboration, leveraging expertise from material science to grid management, to develop holistic solutions. This integrated approach, combined with a focus on circular economy principles through robust recycling, will be key to establishing sustainable and competitive energy ecosystems.

- ◆ How can Western OEMs and material suppliers accelerate domestic solid-state battery production to compete with aggressive Asian commercialization timelines by 2027?
- ◆ What strategic investments are required in advanced manufacturing equipment and processes to scale perovskite solar cell and green hydrogen technologies for mass market adoption by 2030?
- ◆ How can Western governments and industry collaborate to establish robust, circular supply chains for next-gen batteries and hydrogen, reducing reliance on geopolitical risks and material price volatility?

Troy Technical Weekly Editorial Board Editorial Assistant

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