

Energy & Storage

Field Intelligence Report

Vol. 49 | 2026.06.29 — 07.05 | Articles: 119

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

Market Mood

65

/ 100 Cautious

Accelerating Energy Transition Technologies

Breakthroughs in batteries, solar, and hydrogen drive commercialization, but Western players face intense global competition.

Solid-State Battery Energy Density	Perovskite Solar Cell Efficiency	Green Hydrogen Production Cost Target	European BESS Deployment
500	34.85	\$2	11
—	—	—	—

Weekly Summary

This week's report highlights significant advancements across solid-state batteries, perovskite solar cells, hydrogen energy, and next-gen storage. Key developments include Chinese firms accelerating SSB mass production, record efficiencies in perovskite tandem cells, major green hydrogen project commissions, and the commercialization of sodium-ion batteries. Western players must strategically invest in R&D, secure supply chains, and leverage policy support to maintain competitive positions against strong Asian innovation and deployment.

4 Sub-Topic Summary

Sub-Topic	Headline	Momentum	Key Insight
Solid-State Batteries	Asian Firms Accelerate 500Wh/kg SSB Mass Production by 2026	Accelerating	Chinese firms like CATL and GAC are targeting 500Wh/kg solid-state battery mass production by 2026, while Western players like QuantumScape and Factorial advance partnerships and on-road testing. Toyota holds over 1,000 patents, aiming for 2027-2028 production. Safety, energy density, and fast charging are key drivers, with significant R&D in electrolyte stability and manufacturing.

Perovskite Solar Cells	Tandem Cells Achieve 34.85% Efficiency, Commercialization Builds	Building	Record efficiencies, including LONGi's 34.85% for perovskite/crystalline silicon tandem cells and Trinasolar's 29.2% for modules, are accelerating commercialization, particularly in Asia. German research validates accelerated aging tests and identifies degradation mechanisms, crucial for long-term stability. Hanwha Qcells leads a South Korean project for 28%+ tandem modules by 2029.
Hydrogen Energy	Green Hydrogen Market Targets \$262B by 2031, Projects Commission	Accelerating	Global investments are accelerating, with the hydrogen generation market projected to reach \$262 billion by 2031. Major projects like Iberdrola-bp's 25MW plant in Spain and NEOM's gigascale project are commissioning. Germany achieved 31.3% direct solar-to-hydrogen efficiency. Policy support is strong, but EU REDIII fragmentation poses investment challenges.
Next-Gen Storage	Sodium-Ion Batteries Near LFP Parity, LDES Deployments Expand	Building	Sodium-ion batteries are nearing cost parity with LFP, with CATL deploying 20,000 EVs by 2026 and launching a 1 GWh grid-scale system. Long-Duration Energy Storage (LDES) sees significant investment, including a \$30 million US DOE program and 11 GWh of European BESS projects. Battery recycling and upcycling technologies are also advancing.

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

Source: Gemini Grounding (Toyota)

Summary: Toyota aims to commercialize solid-state batteries for electric vehicles (EVs) by 2027-2028, with the initial application anticipated under the Lexus brand. The first-generation design targets a 10-minute DC fast-charge (10-80%) and a range of up to 1,000 km o...

WHY ENGINEERS SHOULD CARE

EV powertrain and battery system architects should track Toyota's 2027-2028 solid-state battery launch for competitive benchmarking on range (1,000 km WLTP) and charging speed (10 minutes for 10-80%)....

Panasonic Advances Solid-State Battery for Industrial Use, Targets 1000 Wh/L

Source: Gemini Grounding (Panasonic)

Summary: Panasonic Holdings plans to begin sample shipments of coin-type all-solid-state batteries in fiscal year 2026, aiming for commercialization of lithium metal anode batteries in fiscal year 2027. These batteries are initially intended for applications requiring ...

WHY ENGINEERS SHOULD CARE

Design teams working on high-temperature or compact industrial power solutions should evaluate Panasonic's solid-state battery samples in FY2026 for their heat resistance and energy density (900-1000 ...

TDK Achieves 1,000 Wh/L Solid-State Battery Material for Wearables

Source: Gemini Grounding (TDK)

Summary: TDK successfully developed a material for a next-generation solid-state battery in June 2024, achieving an energy density of 1,000 Wh/L, which is approximately 100 times greater than their conventional solid-state batteries. This technology, utilizing an oxide...

WHY ENGINEERS SHOULD CARE

Product development teams for compact, high-density portable electronics should monitor TDK's progress on mass production and multi-layer lamination for their 1,000 Wh/L solid-state battery material. ...

This Week's Japan Technology Highlights

Japan's solid-state battery push is accelerating, with Toyota targeting 1,000 km EV range by 2027-2028 and TDK achieving 1,000 Wh/L for wearables.

Solid-State Battery Development: China's Ambitions for High-Density Energy Storage

■ China's Move

Chinese battery giants CATL and BYD are advancing solid-state battery technology. CATL's Chairman Robin Zeng stated around June 25, 2026, that their solid-state battery technology is at "level four of nine" readiness, with small-scale all-solid-state productio...

■ Technical Verification

[CONFIRMED]

China's national solid-state battery standard (GB/T 43568-2026) is in effect since July 1, 2026, providing a clear classification for solid-state technologies. / CATL's semi-solid "condensed battery..."

[BOTTLENECK]

Achieving high energy density (e.g., 500 Wh/kg) while simultaneously ensuring long cycle life, robust safety (no fire, no explosion), and high-rate charging (5C) for all-solid-state cells. / Scaling...

■ Implications for Western Engineers

- Evaluate: Benchmark Chinese solid-state battery claims based on independently verified pack-level energy density, cycle life, an...
- Monitor: Track the evolution of China's national solid-state battery standards (GB/T 43568-2026) for potential influence on glob...
- Assess: Investigate the scalability and cost projections of Chinese solid-state technologies, as these remain critical factors f...

Sodium-Ion Battery Commercialization: A Cost-Effective Alternative for Energy Storage and EVs

■ China's Move

CATL officially launched its TENER Sodium Energy Storage System, validated for real-world use, with global deliveries scheduled to begin in June 2027 (CATL). The company also unveiled the Changan Nevo A06, a mass-produced passenger vehicle equipped with a 45 k...

■ Technical Verification

[CONFIRMED]

CATL has launched the TENER Sodium Energy Storage System, with global deliveries planned for June 2027. / A mass-produced passenger vehicle, the Changan Nevo A06, equipped with a CATL 45 kWh sodium-...

[BOTTLENECK]

Increasing the energy density of sodium-ion cells to become more competitive with LFP for broader EV adoption, especially for longer ranges (e.g., 600 km). / Optimizing electrode materials and elect...

■ Implications for Western Engineers

- Benchmark: Evaluate Chinese sodium-ion battery performance, particularly for energy storage, against existing LFP and lead-acid ...
- Investigate: Analyze the low-temperature performance claims of CATL's sodium-ion cells, as this could represent a significant co...
- Assess: Determine the potential for sodium-ion batteries to disrupt existing LFP markets in cost-sensitive EV segments (e.g., en...

Key Trends This Week (5 Total)

TR-01 HIGH

Cross-Domain

Asian Leadership in Commercialization Accelerates

Asian Firms Drive 2026 Mass Production of Next-Gen Energy Tech

China and Japan are rapidly advancing mass production and deployment of solid-state batteries (CATL, GAC, Toyota) and perovskite solar cells (LONGi, Trinasolar, Hanwha Qcells), setting aggressive targets for 2026-2028. This establishes a significant first-mover advantage in key energy transition technologies, challenging Western market positions.

GAC SSB Energy Density

500 Wh/kg

LONGi PSC Efficiency

34.85%

CATL Na-ion EV Deployment

20,000 EVs by 2026

► CATL ► GAC ► Toyota ► LONGi ► Hanwha Qcells

Refs: S1-01 S1-02 S1-04 S1-16 S1-22 S1-24 S2-02 S2-03 S2-04 S2-06 S2-08 S2-09 S4-01 S4-18 S4-19 S4-20

TR-02 HIGH

Hydrogen Energy

Policy & Investment Drive Green Hydrogen Scale-Up

Global Green Hydrogen Market Targets \$262B by 2031, Projects Commission

Governments and private capital are pouring billions into green hydrogen infrastructure, with a projected \$262 billion market by 2031. Strategic acquisitions (Ballard-GeoPura \$400M) and large-scale projects (Iberdrola-bp 25MW, NEOM 600k tons ammonia) are rapidly expanding production and supply chains, despite regulatory fragmentation in some regions.

Hydrogen Market Projection

\$262 Billion by 2031

Ballard-GeoPura Acquisition

\$400 Million

Iberdrola-bp Plant Capacity

25 MW

► Ballard Power Systems ► Iberdrola ► bp ► ITM Power ► Air Products

Refs: S3-01 S3-02 S3-03 S3-05 S3-06 S3-08 S3-09 S3-10 S3-11 S3-12 S3-13 S3-14 S3-18 S3-20 S3-21 S3-23 S3-24 S3-25 S3-26 S3-27 S3-28 S3-30 S3-31 S3-33 S3-34 S3-35 S3-36 S3-38 S3-39 S3-40 S3-41 S3-43

TR-03 MED

Cross-Domain

Advanced Materials & Interface Engineering Unlock Performance

New Electrolyte Designs Boost Battery Energy Density to 604 Wh/kg

Breakthroughs in solid electrolyte design (oxygen doping, PIL/MOF composites, Ti-doping LLZO) and perovskite film quality (GSH additive, dual-molecule interfaces) are crucial for enhancing energy density, stability, and ionic conductivity. These material science innovations are fundamental to next-gen battery and solar cell performance, enabling higher capacities and longer lifespans.

Tsinghua Quasi-SSB Energy Density

604 Wh/kg

PIL/MOF Electrolyte Conductivity

1.4 mS cm⁻¹

Chinese Academy PSC Efficiency

26.17%

► Tsinghua University ► Chinese Academy of Sciences ► Imperial College London ► University of Adelaide ► Syensqo

Refs: S1-09 S1-10 S1-11 S1-12 S1-13 S1-15 S1-29 S1-30 S1-31 S1-32 S1-33 S1-34 S1-35 S1-36 S1-37 S1-38 S1-39 S2-02 S2-08

Long-Duration Storage & Circular Economy Solutions Expand

US DOE Funds \$30M LDES Program, Europe Unveils 11 GWh BESS Projects

The market for Long-Duration Energy Storage (LDES) is gaining momentum with significant investments (US DOE \$30M, Ofgem 16 projects, 11 GWh Europe BESS). Concurrently, battery recycling and upcycling technologies (Cornell 95% recovery, UC San Diego LFP to LMFP) are advancing, addressing sustainability and resource security for the growing energy storage sector.

US DOE LDES Program	Europe BESS Projects	Li-ion Capacity Recovery
\$30 Million	11 GWh	95%

► Energy Dome ► CMBlu Energy ► Moment Energy ► Cornell University ► UC San Diego

Refs: S4-04 S4-05 S4-06 S4-07 S4-08 S4-09 S4-10 S4-11 S4-12 S4-13 S4-14 S4-15 S4-16 S4-17 S4-21

AI & Data Center Demand Drives Distributed Power Innovation

Brookfield & Bloom Energy Expand AI Power Partnership to \$25 Billion

The exponential growth of AI infrastructure is creating massive demand for reliable, distributed power solutions. Partnerships like Brookfield and Bloom Energy's \$25 billion expansion for fuel cell systems highlight the critical need for on-site generation to bypass grid constraints and ensure energy resilience for data centers.

Brookfield/Bloom Energy Partnership	FuelCell Energy Data Center Systems
\$25 Billion	380 MW

► Bloom Energy ► FuelCell Energy ► Brookfield ► SK hynix ► Air Liquide

Refs: S3-15 S3-21 S3-35 S3-41

Macro Market Indicators

Indicator	Direction	Value	Note	Source
Global Hydrogen Generation Market	↑	\$262 Billion	Projected market size by 2031, driven by green hydrogen investments.	EIN Presswire
US DOE LDES Program Funding	↑	\$30 Million	New demonstration program to accelerate Long-Duration Energy Storage deployment.	Department of Energy
EU REDIII Policy Fragmentation	→	High	Inconsistent national transposition complicates investment in low-carbon hydrogen.	Argus Media
AI Infrastructure Power Partnership	↑	\$25 Billion	Brookfield and Bloom Energy expand funding for data center fuel cell systems.	Business Wire

Macro Environment Summary

Global energy transition efforts are accelerating, driven by significant investments and supportive government policies. The hydrogen generation market is projected to reach \$262 billion by 2031, with substantial funding like the US DOE's \$30 million LDES program. However, regulatory fragmentation, such as the inconsistent transposition of EU's REDIII directive, poses challenges for European low-carbon hydrogen investments. Concurrently, the surging demand from AI infrastructure is creating a new market for distributed power solutions, exemplified by the \$25 billion expansion of the Brookfield and Bloom Energy partnership.

Market Data: LIT (Battery & Storage) Weekly Trend

76.53 USD +1.22%

Action Recommendations by Player

Action Recommendations for Western OEM

OEM Honda, Stellantis, BMW, Mercedes-Benz, Tesla

Honda partners with QuantumScape for QSE-5 SSB, targeting 800Wh/L and sub-15 min charging; Stellantis tests Factorial Energy SSBs on-road, aiming for 80% CAPEX reduction.

Risk

- If Chinese OEMs achieve 500-600Wh/kg SSB mass production by 2026, Western OEMs without secured supply chains face 12-18 month product launch delays.
- Reliance on non-Western SSB suppliers could lead to geopolitical supply chain vulnerabilities and cost increases.

Opportunity

- Partner with Western SSB developers (QuantumScape, Solid Power, Factorial) to co-develop and secure IP for 2027-2028 EV models, targeting \$100B+ market.
- Integrate advanced perovskite solar cells into vehicle roofs or charging infrastructure to extend range and reduce grid reliance.

Actions This Week

- Initiate Q3 2026 strategic sourcing discussions with QuantumScape and Factorial for 2027-28 SSB supply agreements to secure early access.
- Evaluate integration of perovskite solar film into EV designs by Q4 2026 to enhance vehicle-integrated PV capabilities.

□ Scenario: If Chinese CATL achieves 2027 SSB mass production, Western OEMs without secured alternative supply chains will lose 12–18 months on product launch timelines — begin dual-sourcing qualification now.

□ Quick Win : Register for the DOE Solid-State Battery Summit (August, Washington DC) and book meetings with Factorial and Solid Power BD teams this week.

Action Recommendations for Western Contract Manufacturer

Foundry GlobalFoundries, Lonza, BTRY

Swiss BTRY secures €2.2M EIC grant to establish Europe's first large-scale thin-film SSB factory, targeting millions of batteries annually for microelectronics.

Risk

- Lack of large-scale Western SSB manufacturing capacity risks reliance on Asian suppliers, creating geopolitical and supply chain vulnerabilities for critical components.
- High capital expenditure and technical complexity for next-gen battery and solar cell production deter rapid Western scaling.

Opportunity

- Establish pilot and commercial SSB manufacturing lines in US/EU, leveraging government incentives (e.g., US DOE \$16M for SSB manufacturing) to capture \$5B+ market by 2030.
- Develop contract manufacturing services for perovskite solar cells, especially for flexible or specialized applications, targeting \$1B+ market by 2030.

Actions This Week

- Develop a Q4 2026 proposal for US DOE/EU EIC funding to co-invest in pilot SSB manufacturing lines, focusing on dry electrode or thin-film processes.
- Form strategic partnerships with Western perovskite solar developers by Q3 2026 to offer scale-up manufacturing services.

□ Scenario: If Western governments fail to provide sufficient manufacturing incentives by Q4 2026, domestic SSB production will lag by 3-5 years, ceding market share to Asian competitors — lobby for accelerated funding now.

□ **Quick Win** : Engage with US DOE and EU EIC program managers by end of this week to understand upcoming SSB manufacturing grant cycles and application requirements.

Action Recommendations for Western T&M; Provider

T&M; Teradyne, NI, Bureau Veritas, Eurofins

German researchers validate accelerated aging tests for perovskite solar cells, enhancing reliability for lifetime prediction and accelerating commercial deployment.

Risk

- Inconsistent global standards for next-gen battery and solar cell performance/safety (e.g., China's new SSB standard) could fragment market access and increase testing costs.
- Rapid technological evolution requires continuous investment in new testing equipment and methodologies, risking obsolescence.

Opportunity

- Develop and standardize advanced testing protocols for solid-state batteries (e.g., interface stability, dendrite growth) and perovskite solar cells (e.g., outdoor degradation, tandem efficiency) to serve a \$1B+ market by 2030.
- Offer certification services for green hydrogen production (e.g., India's GHCS) to ensure compliance and market credibility, targeting a \$500M+ market by 2030.

Actions This Week

- Collaborate with industry consortia (e.g., GRC, EU PVSEC) by Q4 2026 to establish harmonized testing standards for SSB and PSC durability and safety.
- Launch a specialized certification service for green hydrogen by Q1 2027, aligning with emerging national and international standards.

□ Scenario: If global standards for SSB and PSC stability are not harmonized by 2027, Western manufacturers will face increased compliance costs and market entry barriers — advocate for ISO/IEC standardization now.

□ **Quick Win** : Attend the Gordon Research Conference on Unconventional Semiconductors (2026) to network with perovskite stability researchers and identify new testing service needs.

Action Recommendations for Western Material Supplier

Material Syensqo, Axens, Johnson Matthey, BASF, Dow, DuPont

Syensqo & Axens form Argylium to industrialize sulfide solid-state electrolytes; Johnson Matthey licenses Fischer-Tropsch technology for \$2.8B eSAF plant in South Africa.

Risk

- Dependence on non-Western sources for critical raw materials (e.g., lithium, rare earth elements) and advanced electrolyte components creates supply chain vulnerabilities and price volatility.
- High R&D; costs and long development cycles for novel materials may delay market entry and commercialization compared to Asian competitors.

Opportunity

- Invest in R&D; for Western-sourced solid electrolytes (e.g., sulfide, polymer, garnet-type LLZO) and advanced anode/cathode materials to capture a \$4B+ market by 2030, reducing reliance on Asian suppliers.
- Supply specialty chemicals and catalysts for green hydrogen production (e.g., electrolyzers) and eSAF manufacturing, targeting a \$2B+ market by 2030.

Actions This Week

- Prioritize Q3 2026 R&D; budget allocation for scalable synthesis of high-performance solid electrolytes and silicon-based anode additives, targeting 2028 commercialization.
- Secure long-term supply contracts for critical raw materials from Western-aligned sources by Q4 2026 to mitigate geopolitical risks.

□ Scenario: If Western material suppliers do not scale domestic production of advanced battery and solar materials by 2028, they will lose market share to Asian competitors and face increased import costs — accelerate pilot plant investments now.

□ Quick Win : Evaluate IP landscape for sulfide and polymer solid electrolytes this week to identify acquisition targets or licensing opportunities for rapid market entry.

Action Recommendations for Western Distributor

Distributor Arrow, Avnet, Brenntag

No direct mention of Western trading companies in the context of next-gen energy tech, but they play a crucial role in distributing components and finished products.

Risk

- Rapid technological shifts and direct OEM-supplier relationships in emerging energy markets could bypass traditional distribution channels, reducing market relevance.
- Lack of specialized logistics and technical expertise for handling novel energy components (e.g., solid-state battery cells, hydrogen fuel cells) limits market entry.

Opportunity

- Develop specialized logistics and value-added services for next-gen energy components (e.g., solid-state battery cells, perovskite modules, green hydrogen) to serve a \$500M+ market by 2030.
- Partner with emerging Western startups in SSB, PSC, and hydrogen sectors to provide distribution channels and market access, securing early-mover advantage.

Actions This Week

- Establish a dedicated Q4 2026 task force to identify and onboard emerging Western SSB/PSC/H2 component manufacturers for distribution partnerships.
- Invest in training and infrastructure by Q2 2027 to handle specialized storage and transport requirements for new energy technologies.

□ Scenario: If Western distributors do not adapt their supply chain services for next-gen energy components by 2027, they will be excluded from high-growth segments — invest in specialized logistics capabilities now.

□ Quick Win : Research emerging Western solid-state battery and perovskite solar startups this week to identify potential early-stage distribution partners.

Action Recommendations for Western Equipment Maker

Equipment Plug Power, ITM Power, Applied Materials, Thermo Fisher, Bosch Rexroth

Plug Power's 5MW PEM electrolyzer goes live in Denmark; ITM Power gains UK government strategic stake and signs LOI with Deutsche Bahn for green energy solutions.

Risk

- Intense competition from Asian equipment manufacturers, particularly in battery production, could limit market share for Western players without differentiated technology or strong IP.
- High R&D; costs and long lead times for developing advanced manufacturing equipment may hinder rapid response to evolving technology needs.

Opportunity

-
- Supply advanced manufacturing equipment for solid-state batteries (e.g., dry electrode, pulsed laser deposition) and perovskite solar cells (e.g., roll-to-roll, vacuum coating) to capture a \$3B+ market by 2030.
 - Provide electrolyzer and fuel cell systems for green hydrogen production and AI data center power, targeting a \$5B+ market by 2030.

■ **Actions This Week**

- Allocate Q3 2026 R&D; funds to develop next-gen manufacturing tools for SSB and PSC, focusing on cost reduction and scalability for 2028 market entry.
- Strengthen partnerships with major green hydrogen project developers by Q4 2026 to secure long-term electrolyzer supply contracts.

□ Scenario: If Western equipment makers do not develop cost-competitive, high-throughput manufacturing solutions for SSBs and PSCs by 2027, they will lose out on major factory build-out contracts — accelerate R&D; and pilot programs now.

□ **Quick Win** : Schedule meetings with BTRY and Pulsedeon by end of this month to discuss their thin-film and PLD manufacturing equipment needs for 2027 scale-up.

Impact Matrix (Players × Trends)

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

Player	TR-01 HIGH Asian	TR-02 HIGH Policy	TR-03 MED Advanc	TR-04 MED Long-D	TR-05 LOW AI & D
Western OEM	++	+	++	-	+
Western Contract Manufacturer	+	+	+	--	+
Western T&M; Provider	+	+	+	0	++
Western Material Supplier	+	++	+	-	+
Western Distributor	0	+	+	0	0
Western Equipment Maker	+	++	+	-	++

Timeline This Week (8 Events)

Date	Tag	Headline	Source
2026-06-25	milestone	German study validates accelerated aging tests for Perovskite Solar Cells, enhancing lifetime prediction reliability.	Germany S2-01
2026-06-26	policy	US Department of Energy awards \$16M to advance Solid-State Battery manufacturing, including Solid Power partnership.	USA S1-42
2026-06-27	deal	Ballard Power Systems finalizes GeoPura acquisition, strengthening its stationary hydrogen power market position.	USA, UK S3-03
2026-06-29	milestone	LONGi sets new world record with 34.85% efficiency for Perovskite/Crystalline Silicon 2-Terminal Tandem Solar Cell.	China S2-04
2026-07-01	product	Google and Energy Dome launch first commercial 23 MW / 200 MWh CO2 battery storage plant in Ireland.	Ireland S4-05
2026-07-02	product	CATL targets deployment of second-gen Na-Ion Batteries in 20,000 EVs by end of 2026.	China S4-01
2026-07-02	milestone	German researchers achieve record 31.3% efficiency for direct solar-to-hydrogen conversion.	Germany S3-04
2026-07-03	milestone	US Air Energy advances pilot production of 2000Wh/kg All-Solid-State Lithium-Air Batteries for electric aircraft.	USA S1-19

Company Spotlight

Ballard Power Systems [BLDP] ↑ Stock surged 22.3% in Q1 2026

Acquisition of GeoPura and renewed focus on hydrogen sector drove significant stock movement and positive market sentiment.

- Integrate GeoPura operations by Q4 2026 to realize synergies and expand Energy-as-a-Service offerings.
- Leverage increased market attention to secure new contracts for fuel cell and electrolyzer deployments within 6 months.

ITM Power [ITM] ↑ Price target raised to £1.31

Increased UK government strategic stake and director share purchase signal strong confidence in the green hydrogen firm's growth prospects.

- Capitalize on government support to accelerate manufacturing capacity expansion for electrolyzer systems by Q1 2027.
- Expedite FEED study with Deutsche Bahn by Q4 2026 to convert LOI into definitive green hydrogen deployment contracts.

Energy Dome ↑ Secured 2 major CO2 battery contracts

Signed commercial agreements with Google (23MW/200MWh) and Salt River Project (19MW/10hr) for CO2 battery storage systems.

- Ensure successful commissioning of the Ireland and Arizona projects by 2028 to establish commercial viability and build market trust.
- Scale manufacturing and deployment capabilities by Q1 2027 to meet growing demand for long-duration energy storage solutions.

Technology Roadmap

2026

- ◆ Chinese firms (GAC, SVOLT, Donut Lab) target 400-500Wh/kg SSB mass production.
- ◆ CATL deploys 20,000 Na-ion EVs and 1 GWh grid storage system.
- ◆ NEOM Green Hydrogen project initiates operations, targeting Europe.

2027

- ◆ Samsung SDI targets anode-free SSB mass production for EVs, robots, and mobile devices.
- ◆ Toyota aims for SSB production for hybrid vehicles, expanding to EVs later.
- ◆ Semi-solid batteries projected to reach mass production scale and cost parity with liquid batteries.
- ◆ US DOE targets \$2/kg hydrogen production cost and \$250/kW electrolyzer system cost.

2028

- ◆ Google/Energy Dome 23MW/200MWh CO2 battery plant commissioned in Ireland.
- ◆ IPX Power's 1.15GW solar + 4.6GWh BESS project in California aims for commercial operation.
- ◆ Air Liquide's US facilities for SK hynix's AI chip manufacturing become operational.

2029

- ◆ Hanwha Qcells targets 28%+ perovskite/Si tandem module commercialization.
- ◆ Orica's Hunter Valley Green Hydrogen Hub begins production, reducing natural gas consumption.

-
- ◆ Eku Energy's 1.6GWh German BESS project slated for commissioning.

2030

- ◆ CATL predicts full solid-state battery commercialization post-2030.
- ◆ Moment Energy's Megafactory 1 scales to 1 GWh/year for second-life EV batteries.
- ◆ Global hydrogen generation market projected to reach \$262 billion.

References (119 Total)

ID	Title	Source	Date	Region	Sub-Topic
S1-01	CATL Chairman Predicts Post-2030 Solid-State Battery Commercialization, Citing Current 'Level 4' Maturity	Electrek	2026-06-25	US	Solid-State Batteries
S1-02	Chinese Firms Drive Solid-State Battery Revolution: CATL Aims for 500Wh/kg, GAC Targets 2026 Mass Production at 500Wh/kg	EnkiAI	2026-07-02	China	Solid-State Batteries
S1-03	Honda and QuantumScape Forge Alliance for Next-Gen QSE-5 All-Solid-State Lithium-Metal Batteries, Boasting Over 800Wh/L and Sub-15 Minute Fast Charging	EETPower	2026-07-02	US	Solid-State Batteries
S1-04	Toyota Holds Over 1,000 Sulfide Solid-State Battery Patents, Samsung SDI Targets 2027 Anode-Free Mass Production	solidess.com	2026-07-02	Japan, South Korea	Solid-State Batteries
S1-05	Dragonfly Energy Secures Dry Electrode Manufacturing Patents for All-Solid-State Batteries Across US, Japan, and Europe	XenoSpectrum	2026-06-28	US	Solid-State Batteries
S1-06	Solidion Technology Acquires SpaceX Stock as Strategic Treasury Asset, Highlighting Solid-State Battery Suitability for Space Applications	Barchart.com	2026-06-29	US	Solid-State Batteries
S1-07	Key Attributes for Solid-State Battery Adoption: High Energy Density, Enhanced Safety, Rapid Charging, and Extended Lifespan	Ahead of the Herd	2026-06-27	Canada	Solid-State Batteries
S1-08	Eight Key Differences Between Semi-Solid and All-Solid-State Batteries: A Comprehensive Comparison of Safety, Energy Density, Manufacturing Complexity, Cost, and Charging Performance	EV Insight Daily	2026-06-30	Unknown	Solid-State Batteries
S1-09	All-Solid-State Lithium-Sulfur Battery Achieves 505 Wh/kg at Cell Level, Tsinghua Quasi-Solid-State Battery Records Over Double Conventional Energy Density at 604 Wh/kg	Space Daily Editorial Team	2026-06-28	Unknown	Solid-State Batteries
S1-10	Oxygen Introduction in Sulfide Solid Electrolytes: Stabilizing Interfaces While Maintaining Lithium Ion Conduction for Next-Gen Batteries	EurekAlert!	2026-06-25	US	Solid-State Batteries
S1-11	Synergistic Integration Achieves High Ionic Conductivity and Mechanical Strength: PIL/MOF Composite Solid Electrolyte Boosts Performance of Li-Metal Batteries	PubMed (Small Methods)	2026-06-29	Unknown	Solid-State Batteries

ID	Title	Source	Date	Region	Sub-Topic
S1-12	Degradable Yet Fireproof: Trace Multifunctional Additive Enables Highly Safe Polymer Composite Electrolyte, Resolving Environmental Challenges for Li-Metal Batteries	The Royal Society of Chemistry (Chemical Communications)	2026-07-01	UK	Solid-State Batteries
S1-13	MOF-Modified Solid Electrolyte Optimizes Interfacial Ion Transport Pathways: Achieving $3.04 \times 10^{-4} \text{ S cm}^{-1}$ Ionic Conductivity at 60°C	ACS Publications (The Journal of Physical Chemistry C)	2026-06-30	US	Solid-State Batteries
S1-14	UCLA Engineers Pioneer 3D-Printed Zinc-Iron Battery with Sevenfold Energy Density Boost	.	2026-07-03	Japan	Solid-State Batteries
S1-15	Strategies for Mitigating Volume Strain in Silicon-Based Anodes: Carbon and High-Modulus Additives Enhance Battery Stability	The Royal Society of Chemistry (The Journal of Physical Chemistry C)	2026-07-03	UK	Solid-State Batteries
S1-16	Toyota Achieves 1000-Mile EV Range, 5-Minute Charging with Solid-State Battery, Targeting Production by 2027	Unnamed source	2026-06-29	Japan	Solid-State Batteries
S1-17	Pulsedion Secures €700K to Industrialize Next-Gen Solid-State Battery Manufacturing, Launches Global Sample Program	Pulsedion	2026-06-25	Finland	Solid-State Batteries
S1-18	Swiss BTRY Secures €2.2M EIC Grant to Industrialize Thin-Film Solid-State Batteries, Establish Large-Scale European Plant	BTRY	2026-07-02	Switzerland	Solid-State Batteries
S1-19	US Air Energy Advances Pilot Production of 2000Wh/kg All-Solid-State Lithium-Air Batteries for Electric Aircraft	en.Wedoany.com	2026-07-03	US	Solid-State Batteries
S1-20	UK's Ilika Secures £4.56M to Accelerate Solid-State Battery Commercialization, Strengthening Medical, EV, and Defense Markets	TipRanks.com	2026-07-03	UK	Solid-State Batteries
S1-21	LiNa Energy Raises £29.2M to Advance Solid-State Sodium Battery Development for Renewable Energy Storage and EV Markets	Funding Spotter	2026-07-02	UK	Solid-State Batteries
S1-22	SMM H1 2026 Review: China's New National Standard Defines Solid-State Batteries, Predicts Semi-Solid Mass Production & Cost Parity by 2027	SMM	2026-07-02	China	Solid-State Batteries
S1-23	Electropages July 2026 Review: Syensqo & Axens Form Argylium for Sulfide SSE Industrialization; Ilika Ships 10Ah Samples; Donut Lab's 400Wh/kg SSB to Power Verge Motorcycles	Electropages	2026-07-01	UK	Solid-State Batteries

ID	Title	Source	Date	Region	Sub-Topic
S1-24	Samsung SDI Solid-State Batteries Receive Positive Global Client Feedback on Safety and Energy Density, Targeting Late 2027 Mass Production	Korea JoongAng Daily	2026-07-01	South Korea	Solid-State Batteries
S1-25	Nio Supplier TIES Unveils New 'Liquid-Solid Cells' Adhering to China's New Standard, Claims Existing Factories Adaptable with <10% Modification	ArenaEV	2026-06-26	China	Solid-State Batteries
S1-26	Finnish Donut Lab Unveils 400 Wh/kg Solid-State EV Battery with 5-Minute Charge, Slated for 2026 Verge Motorcycle Debut	The Robotics Media	2026-06-27	Finland	Solid-State Batteries
S1-27	Factorial Energy Begins On-Road EV Solid-State Battery Testing with Stellantis, Targets 80% Manufacturing CAPEX Reduction	Tracxn	2026-06-30	US	Solid-State Batteries
S1-28	Samsung Chairman Lee Jae-yong Pledges Investment in Ulsan for Next-Generation Solid-State Battery and BESS Regional Plants	Seoul Economic Daily	2026-06-29	South Korea	Solid-State Batteries
S1-29	Research Unravels Anode Compatibility Challenges in Sulfide Solid-State Electrolytes, Achieves 401.1 Wh/kg High-Energy Density Pouch Cell	ResearchGate	2026-07-02	Unkno wn	Solid-State Batteries
S1-30	Ti-Doping Improves Densification and Ionic Conductivity of LLZO Solid Electrolytes, Stabilizing Cubic Phase	arXiv	2026-07-01	Unkno wn	Solid-State Batteries
S1-31	Disordered Lithium Sublattice in Garnet-Type LLZO Achieves 10^{-3} S/cm Room-Temperature Ionic Conductivity	European Journal of Chemistry	2026-06-30	Unkno wn	Solid-State Batteries
S1-32	Korean Team Triples Sulfide All-Solid-State Battery Lifespan, Achieves 2500 Hours Stable Operation with Elastic Ion-Conducting Polymer	BigGo Finance	2026-06-28	South Korea	Solid-State Batteries
S1-33	CATL's Sulfide All-Solid-State Battery Achieves Liquid Electrolyte-Level Ionic Conductivity at Room Temperature, Stable from -40°C to 100°C with 6C Charging	YouTube	2026-06-27	China	Solid-State Batteries
S1-34	Imperial College London & University of Adelaide Achieve 85%+ Fast Charging in 6 Minutes for Li-Ion Batteries via Interfacial Catalysis	Electronics360 - GlobalSpec	2026-07-02	UK	Solid-State Batteries
S1-35	LiBF ₄ Doping Stabilizes Sulfohalide Electrolyte Interfaces, Enabling Over 800 Hours of Stable Lithium Metal Battery Operation	Molecules	2026-07-01	Unkno wn	Solid-State Batteries
S1-36	Sulfide All-Solid-State Batteries Achieve 1.54 mS/cm Ionic Conductivity, 120 mAh/g Initial Capacity, and 97% Retention over 50 Cycles via Three-Stage Pressure Optimization	IEST Instrument	2026-06-29	Unkno wn	Solid-State Batteries

ID	Title	Source	Date	Region	Sub-Topic
S1-37	rGO Enhances Surface Stability of LATP Composite Solid Electrolytes, Achieving 125 mAh/g in Li-LFP Full Cells	ACS Publications	2026-06-26	Unknown	Solid-State Batteries
S1-38	Caltech Develops Cobalt-Free, Mechanically Robust LFP-Carbon 3D Electrodes, Eyes Future Solid-State Battery Integration	Electronics Online	2026-06-25	US	Solid-State Batteries
S1-39	Lactone Electrolytes for 4.5 V Sodium-Ion Batteries Show High-Voltage Advantages, Yet Face Ionic Conductivity and SEI Stability Challenges	ACS Energy Letters	2026-06-29	Unknown	Solid-State Batteries
S1-40	Ganfeng Lithium Achieves 400Wh/kg, 1100+ Cycles with Li-Metal Route, Offers 320-480Wh/kg Si-Anode Products with 1000+ Cycles	Unnamed source	2026-07-02	China	Solid-State Batteries
S1-41	QuantumScape's QSE-5 Solid-State Cell Achieves 301Wh/kg, 844Wh/L, Targets Extended Robotics Operation and Fast Charging	TopSecretStocks	2026-07-02	US	Solid-State Batteries
S1-42	US Department of Energy Awards \$16M to Advance Solid-State Battery Manufacturing, Including Solid Power Partnership	Department of Energy	2026-06-26	US	Solid-State Batteries
S1-43	Uniaxial Press Critical for LLZO Solid Electrolyte Green Pellet Production, Lays Foundation for High-Performance Solid-State Batteries	Kintek Press	2026-06-28	Unknown	Solid-State Batteries
S2-01	German Study Validates Accelerated Aging Tests for Accurate Perovskite Solar Cell Lifetime Prediction Outdoors	Mirage News	2026-06-25	Germany	Perovskite Solar Cells
S2-02	Chinese Academy of Sciences Boosts Inverted Perovskite Solar Cell Efficiency to 26.17% with Glutathione Additive, Enhancing Stability	EurekAlert!	2026-06-25	China	Perovskite Solar Cells
S2-03	Hanwha Qcells to Lead South Korean Government Project for Commercial-Scale Perovskite/Silicon Tandem Module Development	Perovskite-Info	2026-06-30	South Korea	Perovskite Solar Cells
S2-04	LONGi Sets New World Record with 34.85% Efficiency for Perovskite/Crystalline Silicon 2-Terminal Tandem Solar Cell	LONGi	2026-06-29	China	Perovskite Solar Cells
S2-05	German Researchers Achieve World Record 25.5% Efficiency for Perovskite-CIGS Tandem Solar Cell	pv magazine Global	2026-07-01	Germany	Perovskite Solar Cells
S2-06	Trinasolar Achieves World Record 907W Power Output and 29.2% Full-Area Efficiency for Perovskite/Crystalline Silicon Tandem Module	PR Newswire	2026-07-02	China	Perovskite Solar Cells

ID	Title	Source	Date	Region	Sub-Topic
S2-07	German Research Unveils Perovskite Solar Cell Outdoor Degradation Mechanisms, Proposing Lifetime Framework with ~15.6-Month T80 Life	AZoCleantech	2026-07-03	Germany	Perovskite Solar Cells
S2-08	Chinese Scientists at Soochow University Achieve 27.3% Efficiency and Long-Term Stability in Inverted Perovskite Solar Cells via Dual-Molecule Interface	PV Magazine	2026-07-03	China	Perovskite Solar Cells
S2-09	CATL and CECEP Expand Strategic Partnership to Accelerate Perovskite Solar Commercialization; Chinese Government Supports GCL Optoelectronics and Other Projects	Perovskite-Info	2026-06-29	China	Perovskite Solar Cells
S2-10	Gordon Research Conference to Host 2026 Unconventional Semiconductors Meeting, Focusing on Perovskite Solar Cell Stability	GRC (Gordon Research Conferences)	2026-06-28	US	Perovskite Solar Cells
S2-11	ISFH to Present Latest Perovskite Research, Including Surface Recombination Velocity Measurement, at EU PVSEC in September 2026	ISFH (Institute for Solar Energy Research Hamelin)	2026-06-29	Germany	Perovskite Solar Cells
S2-12	Verde Technologies Appoints Jean-Noël Poirier as CEO to Accelerate Commercialization of Thin-Film Perovskite Solar Cells and Entry into Space Market	TaiyangNews	2026-06-30	US	Perovskite Solar Cells
S3-01	Green Hydrogen Steelmaking Achieves Up to 95% CO2 Reduction, Paving Way for Trillion-Dollar Industry Transformation	CleanTechnica	2026-06-25	US	Hydrogen Energy
S3-02	Ballard Power Systems Expands Hydrogen Infrastructure Role with GeoPura Acquisition Plan, Testing Market Confidence	Kalkine Media	2026-07-01	Canada	Hydrogen Energy
S3-03	Ballard Power Systems Finalizes GeoPura Acquisition, Deepens Penetration into Stationary Hydrogen Power Market	Insider Monkey	2026-06-27	US	Hydrogen Energy
S3-04	German Researchers Achieve Record 31.3% Efficiency for Direct Solar-to-Hydrogen Conversion, Accelerating Commercial Viability	Economies.com	2026-07-02	Germany	Hydrogen Energy
S3-05	Iberdrola-bp Venture Commissions Spain's Largest Green Hydrogen Plant, Targeting 2,800 Tons Annually	pv magazine Global	2026-07-01	Spain	Hydrogen Energy
S3-06	UK Government's Increased Strategic Stake in ITM Power Reinforces Confidence in Low-Carbon Manufacturing and Hydrogen Sector	Kalkine Media	2026-06-30	UK	Hydrogen Energy
S3-07	Ballard Power Systems Stock Surges as Traders Renew Focus on Hydrogen Sector	Zacks.com	2026-07-03	US	Hydrogen Energy

ID	Title	Source	Date	Region	Sub-Topic
S3-08	Spain's €211 Million IPCEI Reallocation Accelerates BP-Iberdrola Green Hydrogen Project in Castellón	ESG News Editorial Team	2026-06-26	Spain	Hydrogen Energy
S3-09	Hydrogen Generation Market Projected to Reach \$262 Billion by 2031, Driven by Accelerating Green Hydrogen Investments	EIN Presswire	2026-07-01	US	Hydrogen Energy
S3-10	Fragmented REDIII Transposition Complicates Investment in European Low-Carbon Hydrogen Market	Argus Media	2026-07-03	UK	Hydrogen Energy
S3-11	NEOM's Gigascale Green Hydrogen Project in Saudi Arabia Gears Up for Mid-2026 Launch, Targeting Europe and Global Markets	CleanTechnica	2026-06-30	Saudi Arabia	Hydrogen Energy
S3-12	Stegra Unveils Blueprint for Green Steel Future: 700 MW Electrolyzer to Power 2.5 Million Tons of H2-DRI Annually	SteelRadar	2026-06-30	Sweden	Hydrogen Energy
S3-13	ITM Power Director Warren East Buys 172,000 Additional Shares, Signaling Strong Management Confidence in Green Hydrogen Firm	Morningstar / Alliance News	2026-07-01	UK	Hydrogen Energy
S3-14	Spain's Green Hydrogen Future Begins: Iberdrola-BP Joint Venture Commissions Nation's Largest 25 MW Plant	pV magazine Global	2026-07-01	Spain	Hydrogen Energy
S3-15	FuelCell Energy Secures Binding Agreement with Fit Energy USA for up to 380 MW Data Center Fuel Cell Systems	Baxtel	2026-06-26	US	Hydrogen Energy
S3-16	India Launches Green Hydrogen Certification Scheme and Portal to Enhance Traceability and Credibility	Tarun IAS	2026-06-26	India	Hydrogen Energy
S3-17	German Researchers Achieve 31.3% Efficiency in Direct Sunlight-to-Hydrogen Conversion, Bolstering Clean Energy	Economies.com	2026-07-02	Germany	Hydrogen Energy
S3-18	Air Products Halts US Clean Hydrogen Projects, Pivots Focus to Saudi NEOM Green Hydrogen Agreement	PR Newswire	2026-06-30	US	Hydrogen Energy
S3-19	INA Powers Croatia's Green Hydrogen Future with 11 MW Solar Plant at Rijeka Refinery	CEEnergynews	2026-07-03	クロアチア	Hydrogen Energy
S3-20	Phelan Green Hydrogen Licenses Johnson Matthey Technology for \$2.8B South African eSAF Production Hub	GreenAir News	2026-06-30	South Africa	Hydrogen Energy
S3-21	Brookfield and Bloom Energy Expand AI Infrastructure Power Partnership to \$25 Billion	Business Wire	2026-06-30	US	Hydrogen Energy
S3-22	India Inaugurates World-First Hydrogen Production Facility Utilizing Nuclear Process Heat	Hydrogen Informs	2026-06-27	India	Hydrogen Energy

ID	Title	Source	Date	Region	Sub-Topic
S3-23	Plug Power's 5 MW PEM Electrolyzer Goes Live at Denmark's Måde PtX Facility, Advancing Europe's Green Hydrogen Economy	Simply Wall St	2026-06-25	Denmark	Hydrogen Energy
S3-24	ITM Power Signs LOI with Deutsche Bahn Unit for Green Energy Solutions in Transport Sector	Research the market - Halifax	2026-06-26	Germany	Hydrogen Energy
S3-25	US Department of Energy Updates Heartland Hydrogen Hub Progress, Advancing Low-Carbon Fertilizer Production	Department of Energy	2026-06-26	US	Hydrogen Energy
S3-26	Orica Reaches Final Investment Decision for Hunter Valley Hydrogen Hub in Australia, Targeting 4,700 Tons Renewable Hydrogen Annually	H2 Tech	2026-07-01	Australia	Hydrogen Energy
S3-27	Ballard Power Systems Acquires UK-Based GeoPura in \$400 Million Deal, Strengthening Stationary Hydrogen Power Market Position	Startup Researcher	2026-06-30	Canada	Hydrogen Energy
S3-28	Daimler Truck, MB Energy, Kawasaki Heavy Industries Partner to Establish Liquefied Hydrogen Supply Chain to Europe	Daimler Truck	2026-06-29	Japan	Hydrogen Energy
S3-29	Element One Hydrogen Advocates for Inclusion of Natural ('White') Hydrogen in Canada's Policy Framework	Streetwise Reports	2026-06-30	Canada	Hydrogen Energy
S3-30	ITM Power's Price Target Raised Due to Progress in UK Projects and Strategic Partnerships	Simply Wall St	2026-07-01	UK	Hydrogen Energy
S3-31	US Department of Energy Updates Hydrogen and Fuel Cell Technologies Multi-Year Program Plan, Outlining Cost Targets	Department of Energy	2026-06-30	US	Hydrogen Energy
S3-32	Kawasaki Heavy Industries Commences Demonstration of World-First Centrifugal Hydrogen Compressor for Liquefaction Plants	COMPRESSORtech2	2026-06-29	Japan	Hydrogen Energy
S3-33	China Incorporates Hydrogen Energy into Primary Energy Data Classification for First Time, Accelerating Industrial Policy Shift	Shanghai Metals Market (SMM)	2026-07-02	China	Hydrogen Energy
S3-34	Kawasaki Heavy Industries Reportedly Plans Over ¥190 Billion Capital Raise for Advanced Manufacturing and Hydrogen Transition, Clarifies No Final Decision Yet	TipRanks	2026-07-02	Japan	Hydrogen Energy
S3-35	Air Liquide Invests Over \$170 Million in US to Support SK hynix's AI Chip Manufacturing	Manufacturing Digital	2026-07-02	US	Hydrogen Energy
S3-36	Quebec's Long-Term Energy Strategy Promotes Geologic (Natural) Hydrogen, Supporting Development Projects by 2050	Mining.com	2026-07-02	Canada	Hydrogen Energy

ID	Title	Source	Date	Region	Sub-Topic
S3-37	Bosch Rexroth and Kawasaki Heavy Industries Partner for Hydrogen Fuel Cells in Off-Highway Machinery	[Source not available in snippet]	2026-07-02	Japan	Hydrogen Energy
S3-38	Orica Approves Final Investment for 50MW Hunter Valley Green Hydrogen Hub, Targeting 7.5% Natural Gas Reduction in Ammonia Production	Mining Weekly	2026-07-01	Australia	Hydrogen Energy
S3-39	Verde Hydrogen Secures 25MW Electrolyzer Contract for China Coal Energy Group's Off-Grid Green Hydrogen Project in China	ChemAnalyst	2026-07-03	China	Hydrogen Energy
S3-40	India Launches Green Hydrogen Certification Portal (GHCI) to Bolster Credibility and Transparency in Clean Energy Mission	Organiser	2026-06-30	India	Hydrogen Energy
S3-41	Brookfield and Bloom Energy Expand AI Power Partnership to \$25 Billion, Boosting On-Site SOFC Generation for Data Centers	Bloom Energy Press Releases	2026-07-01	US	Hydrogen Energy
S3-42	Plug Power Reports Strong Q1 2026 Earnings, Exceeding Revenue Expectations with \$163.51M and Improved EPS of -\$0.08	MarketBeat	2026-07-03	US	Hydrogen Energy
S3-43	FuelCell Energy Secures \$49 Million EXIM Loan to Boost US Clean Energy Exports	GlobeNewswire (via FuelCell Energy's press releases)	2026-06-29	US	Hydrogen Energy
S4-01	CATL to Deploy Second-Gen Na-Ion Batteries in 20,000 EVs by 2026, Unveils TENER Stationary Storage System	autoevolution, Forbes, Electrek, Matelion, CleanTechnica, The EV Zone (YouTube)	2026-06-25	China	Next-Gen Storage
S4-02	BESS Firms Forecast Sodium-Ion Batteries to Achieve Cost Parity with LFP in 2-3 Years	Energy-Storage.News	2026-06-25	US	Next-Gen Storage
S4-03	Biwatt Unveils Modular Sodium Iron Pyrophosphate Residential Storage System: PowerNest R5 Series	pv magazine Global	2026-07-01	China	Next-Gen Storage
S4-04	U.S. Department of Energy Unveils New Policies and \$30 Million Demonstration Program to Accelerate Long-Duration Energy Storage (LDES) Commercial Deployment	Department of Energy	2026-06-30	US	Next-Gen Storage
S4-05	Google and Energy Dome Launch First Commercial 23 MW / 200 MWh CO2 Battery Storage Plant in Ireland	ESG Today, pv magazine Global, gasworld	2026-07-01	Ireland	Next-Gen Storage
S4-06	Ofgem Selects 16 Innovative Projects to Bolster UK Long-Duration Energy Storage	Ofgem	2026-06-26	UK	Next-Gen Storage
S4-07	Energy Dome and Salt River Project to Construct 19MW CO2 Battery Storage System in Arizona	everything PE	2026-06-26	US	Next-Gen Storage

ID	Title	Source	Date	Region	Sub-Topic
S4-08	Avangrid to Construct 82MWh BESS Project in Oregon, Scheduled for 2027 Commissioning	Energy-Storage.News	2026-06-30	US	Next-Gen Storage
S4-09	Europe's Gigawatt Gambit: Three IPPs Unveil 11 GWh of Landmark BESS Projects	Energy-Storage.News	2026-07-01	Germany, —, —	Next-Gen Storage
S4-10	Utah's Largest Solar-Storage Facility, Green River Energy Center, Now Online with 400MW Solar and 1,600MWh Battery	Salt Lake Tribune, pv magazine Global	2026-07-02	US	Next-Gen Storage
S4-11	IPX Power Secures \$4.95 Billion Financing for 1.15GW Solar and 4.6GWh BESS Project in California	REGlobal	2026-07-01	US	Next-Gen Storage
S4-12	Vopak Acquires Majority Control of Dutch BESS Developer GES, Advancing 200MW/800MWh Project	Energy Storage News	2026-07-02	Netherlands	Next-Gen Storage
S4-13	Ekus Energy Enters German Market with 1.6GWh BESS Acquisition, Providing Black Start Capability for Grid Restoration	Batteries International	2026-07-02	Germany	Next-Gen Storage
S4-14	Tucson Electric Power Commissions Wilmot Energy Center with 100MW Solar and 30MW BESS	Tucson Electric Power	2026-06-28	US	Next-Gen Storage
S4-15	Cornell University Develops Electrochemical Bath to Directly Regenerate Li-Ion Battery Electrodes, Achieving 95% Capacity Recovery and 56% Cost Reduction	New Atlas, electrive.com	2026-06-25	US	Next-Gen Storage
S4-16	UC San Diego Develops Novel Green Method to Upcycle Spent LFP Cathodes into Higher-Performance LMFP Material	UC San Diego Today	2026-07-01	US	Next-Gen Storage
S4-17	Clean the Sky Unveils Integrated Solar Storage Systems Portfolio with DMEGC Solar, Featuring High-Efficiency Modules	Clean the Sky	2026-07-01	Unknown	Next-Gen Storage
S4-18	CATL Mass Produces Sodium-Ion Batteries While Focusing R&D; on 'Breathable' Lithium-Air Batteries for Extended EV Range	CleanTechnica	2026-07-03	China	Next-Gen Storage
S4-19	CATL to Power 10,000-20,000 EVs with Sodium-ion Batteries by 2026, Targeting Cost Reduction and Enhanced Cold-Weather Performance	Bloomberg Television via CnEVPost	2026-06-29	China	Next-Gen Storage
S4-20	CATL Unveils TENER Sodium Energy Storage System, First Commercial Grid-Scale Solution, Targeting 1 GWh Deployment by End of 2026	WFIN (Local News)	2026-07-02	China	Next-Gen Storage
S4-21	Moment Energy Unveils "Megafactory 1" in Vancouver, World's Largest Second-Life EV Battery Plant, Scaling to 1 GWh Annually by 2030	Electrek	2026-07-02	Canada	Next-Gen Storage

Editor's Note

Navigating the Energy Transition: Western Strategy in a Rapidly Evolving Landscape

This week's analysis underscores a critical juncture in the global energy transition. While scientific breakthroughs in solid-state batteries, perovskite solar cells, and hydrogen energy continue at a rapid pace, the commercialization and large-scale deployment are increasingly dominated by Asian players. Chinese firms are setting aggressive targets for mass production and market penetration, particularly in batteries and solar, leveraging strong government support and integrated supply chains. Western innovation, while robust in R&D, faces the challenge of translating laboratory success into competitive industrial scale.

For Western manufacturers, investors, and executives, the imperative is clear: move beyond incremental improvements and strategically invest in industrialization. This involves securing critical material supply chains, accelerating domestic manufacturing capacity, and fostering public-private partnerships to de-risk large-scale projects. The interconnectedness of these technologies means that advancements in one area, such as high-efficiency perovskite solar, can directly impact the viability of green hydrogen production or grid-scale storage, creating synergistic opportunities.

The rise of long-duration energy storage and circular economy solutions, alongside the burgeoning demand for distributed power from AI data centers, presents new avenues for Western leadership. By focusing on niche high-value applications, leveraging advanced testing and certification, and advocating for harmonized regulatory frameworks, Western players can carve out defensible positions and ensure a resilient, sustainable energy future.

- ◆ How can Western manufacturers accelerate the transition from pilot-scale to commercial-scale production for solid-state batteries and perovskite solar cells by 2028?
- ◆ What specific policy mechanisms are needed in the US/EU/UK to de-risk and incentivize domestic green hydrogen and LDES infrastructure investments to compete with Asian deployment?
- ◆ How can Western R&D institutions and industry collaborate more effectively to secure IP and establish manufacturing leadership in critical advanced materials for energy storage?

Troy Technical Weekly Editorial Team Editorial Assistant

Next Issue Vol. 50 Monday, July 13, 2026 06:00 JST Feature: Advanced Materials for Sustainable Energy

troy-technical.com original curation. Article copyrights belong to original authors. | Gemini API + Claude | Monday, July 6, 2026 06:00 JST