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Battery Energy Storage System (BESS) TIC Market by Testing, Inspection, Certification, Technical Due Diligence, Lithium-ion, Sodium-ion, BESS Manufacturers, Utilities, EPC Contractors, Project Developers, and Region – Global Forecast to 2032

https://marketpublishers.com/r/B365FF3E118FEN.html
Date: July 2026
Pages: 418
Price: US$ 4,950.00 (Single User License)
ID: B365FF3E118FEN

Abstracts

The global Battery Energy Storage System (BESS) Testing, Inspection, and Certification (TIC) market is estimated at USD 0.66 billion in 2026 and is projected to reach USD 1.30 billion by 2032, registering a CAGR of 11.8% during 2026–2032. Growth is supported by expanding utility-scale and renewable-plus-storage projects, stricter requirements for battery safety, thermal-runaway prevention, fire-risk assessment, grid-code compliance, and commissioning validation. Demand is also rising for independent certification, factory and site acceptance testing, technical due diligence, and lifecycle assurance. However, standardized BESS platforms, internal OEM testing capabilities, and fragmented country-level safety and grid requirements remain key market restraints.

“Sodium-ion batteries are projected to be the fastest-growing battery type in the BESS TIC market, supported by emerging commercial deployment and evolving validation needs.”

Sodium-ion batteries are expected to register the highest growth in the BESS TIC market as manufacturers and project developers explore alternatives to lithium-ion systems for stationary storage applications. Although the segment remains at an early stage of commercial adoption, increasing product development and pilot-to-commercial deployment are generating demand for battery safety, electrical performance, environmental, thermal, and lifecycle validation services. Sodium-ion systems also require independent testing and certification as cell chemistries, battery-management

systems, rack configurations, and operating parameters evolve. This creates a high-growth opportunity for TIC providers with specialist capabilities in battery testing, certification, and system integration.

“Utilities account for the largest share of the BESS TIC market, driven by their role in grid-scale storage deployment and long-term asset operation.”

Utilities are the largest end-user group, as they procure, own, operate, or contract for large grid-connected BESS projects for renewable integration, grid balancing, peak management, and reliability support. Their projects require assurance across supplier qualification, factory acceptance, site acceptance, commissioning, fire safety assessment, grid code validation, and periodic operational verification. Utilities also face high scrutiny from grid operators, regulators, lenders, insurers, and local approval authorities, increasing the need for independent documentation and third-party technical assurance throughout the asset lifecycle.

“India is projected to be the fastest-growing BESS TIC market within Asia Pacific, supported by expanding renewable integration and utility-scale storage activity.”

India is expected to record the highest growth in the Asia Pacific BESS TIC market as renewable energy expansion, grid-flexibility requirements, and energy storage procurement accelerate demand for battery storage projects. The developing market requires greater support for system safety testing, fire risk assessment, grid integration studies, commissioning validation, and certification of new BESS configurations. As utilities, developers, EPC contractors, and system integrators scale storage deployment, demand for independent testing, inspection, certification, and technical due diligence services is expected to increase rapidly.

Breakdown of primaries

A variety of executives from key organizations operating in the testing, inspection, and certification (TIC) market were interviewed in-depth, including CEOs, marketing directors, and innovation and technology directors.

By Company Type: Tier 1 –30%, Tier 2 – 50%, and Tier 3 – 20%

By Designation: C-level Executives – 25%, Directors – 30%, and Others – 40%

By Region: North America – 35%, Europe – 30%, Asia Pacific – 25%, and RoW

– 10%

The Battery Energy Storage System (BESS) Testing, Inspection, and Certification (TIC) market includes globally established providers such as UL Solutions (US), Intertek Group plc (UK), T?V Rheinland (Germany), T?V S?D (Germany), DNV (Norway), CSA Group (Canada), Bureau Veritas (France), SGS SA (Switzerland), DEKRA (Germany), VDE Testing and Certification Institute (Germany), CESI S.p.A./KEMA Labs (Italy), Element Materials Technology (UK), Applus+ Laboratories (Spain), Eurofins Scientific (Luxembourg), and Kiwa (Netherlands). The study provides an in-depth competitive assessment of these companies, covering BESS safety testing, thermal-runaway and fire-risk assessment, product and system certification, grid-compliance validation, factory and site inspection, FAT/SAT, commissioning support, technical due diligence, and lifecycle assurance capabilities.

Study Coverage

The report segments the BESS TIC market by service type, sourcing type, battery type, delivery mode, end user, and region. It covers Testing, Inspection, Certification, and Other Services across the BESS lifecycle, from battery and system qualification through factory acceptance, site commissioning, grid connection, and operational verification. The report provides detailed analysis across North America, Europe, Asia Pacific, South America, and the Middle East & Africa, along with country-level assessment for key BESS markets. It also examines market drivers, restraints, opportunities, and challenges; BESS safety and fire regulations; grid-code and certification requirements; sourcing practices; value-chain dynamics; competitive strategies; and recent developments across the global BESS TIC ecosystem.

Key Benefits of Buying the Report

Analysis of key drivers (utility-scale and renewable-plus-storage deployment increasing demand for battery safety testing, thermal-runaway assessment, fire-risk evaluation, grid-code compliance, and FAT/SAT; increasing scrutiny from regulators, utilities, lenders, insurers, and approval authorities driving independent technical assurance; rising BESS system complexity across cells, modules, racks, PCS, BMS, EMS, fire-suppression systems, and grid interfaces), restraints (standardized containerized BESS platforms and pre-certified components reducing repeat testing requirements; in-house quality-control and commissioning capabilities among large OEMs, EPCs, and utilities;

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country-specific fire codes, grid standards, and certification pathways increasing delivery complexity), opportunities (system and grid-compliance certification, large-scale fire testing, battery traceability, cybersecurity assessment for connected BMS and EMS platforms, technical due diligence, lifecycle safety, and performance assurance creating high-value service pools; integrated testing–inspection–certification–commissioning packages enabling cross-sell and multi-year contracts; remote inspection, digital documentation, and predictive asset-assurance tools improving turnaround and scalability; expansion into emerging BESS markets through specialist laboratories, partnerships, and local compliance capabilities), and challenges (fragmented safety and grid requirements increasing re-testing, documentation, and cost-to-serve; maintaining consistent technical quality and data integrity across multi-site BESS projects and remote assurance workflows) influencing the growth of the BESS TIC market.

Solution/Service Development/Innovation: Detailed insights on emerging BESS TIC services, including thermal-runaway testing, large-scale fire assessment, battery and system certification, grid-performance validation, battery passport and traceability support, cybersecurity assurance, remote inspection, and lifecycle performance verification.

Market Development: Comprehensive information on high-growth BESS TIC markets across North America, Europe, Asia Pacific, South America, and the Middle East & Africa, covering project deployment, regulatory developments, third-party assurance demand, and country-level opportunities.

Market Diversification: Extensive information on battery chemistries, delivery models, end users, outsourcing opportunities, emerging service lines, and strategic partnerships across the BESS TIC ecosystem.

Competitive Assessment: In-depth assessment of service capabilities, market strategies, partnerships, laboratory infrastructure, and BESS-specific offerings of leading providers such as UL Solutions, Intertek, T?V Rheinland, T?V S?D, DNV, CSA Group, Bureau Veritas, SGS, DEKRA, and VDE.

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