



RESEARCH REPORT

Executive Summary:

Navigant Research Leaderboard Report: Li-Ion Grid Storage

Assessment of Strategy and Execution for
15 Li-Ion Battery Manufacturers

NOTE: This document is a free excerpt of a larger report. If you are interested in purchasing the full report, please contact Navigant Research at research-sales@navigant.com.

Published 2Q 2015

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Section 1

EXECUTIVE SUMMARY

1.1 Market Introduction

Lithium ion (Li-ion) batteries have accounted for an increasing percentage of stationary energy storage deployments in recent years. Due to a combination of low cost, energy density, efficiency, and safety, the technology has emerged as the go-to choice for most stationary energy storage system developers. Li-ion batteries have also led the markets for energy storage in electric vehicles (EVs) and consumer electronics. The rapid growth in these markets has allowed suppliers to develop economies of scale through large-scale manufacturing and lower prices. The global landscape of Li-ion manufacturers is becoming increasingly competitive, with companies vying for market share and investing heavily in both manufacturing and R&D.

However, the market for stationary battery energy storage is only just taking root, with a number of companies around the world ready to establish themselves as market leaders. The most successful companies targeting the stationary battery energy storage market to date are larger corporations with established businesses providing Li-ion batteries for both consumer electronics and EVs. While a number of market barriers that could limit growth in the near term remain, there is tremendous potential, as the market is forecast to grow rapidly in the coming years.

Navigant Research expects the Li-ion stationary storage market to grow from \$775.4 million in 2015 to over \$15.8 billion by 2024. This market growth will be spread primarily among the regions of North America, Europe, and Asia Pacific, driven at first by regulatory changes and incentives before prices come down enough to compete with retail electricity rates and natural gas peaker plants. As the Li-ion manufacturing industry develops, it promises to deliver low-cost, high-performance systems. The key challenge for these systems will be longevity and safety.

1.2 Criteria Overview

This *Navigant Research Leaderboard Report* examines the current vendor landscape for Li-ion batteries within the context of stationary storage applications. It analyzes the strengths and weaknesses of the key players in this global industry and then displays those rankings visually in the Navigant Research Leaderboard Grid. This *Leaderboard Report* utilized the following guidelines to determine which market participants should be included:

- » Any company that is currently in bankruptcy proceedings has been excluded.
- » Any company that provides cells for only one country's markets has been excluded. A minimum of two country markets was used as a threshold to be considered a global player.

- » Any company that does not sell into the stationary storage market was excluded. There are more than 100 Li-ion cell manufacturers in the world, but most concentrate their efforts on the consumer electronics space. Only those companies that have an active sales channel and specialized product for the stationary energy storage market were included.

The criteria by which manufacturers are assessed in this *Leaderboard Report* include:

- » Vision
- » Go-to-Market Strategy
- » Partners
- » Production Strategy
- » Technology
- » Geographic Reach
- » Sales, Marketing, and Distribution
- » Product Performance
- » Product Quality and Reliability
- » Product Portfolio
- » Pricing
- » Staying Power

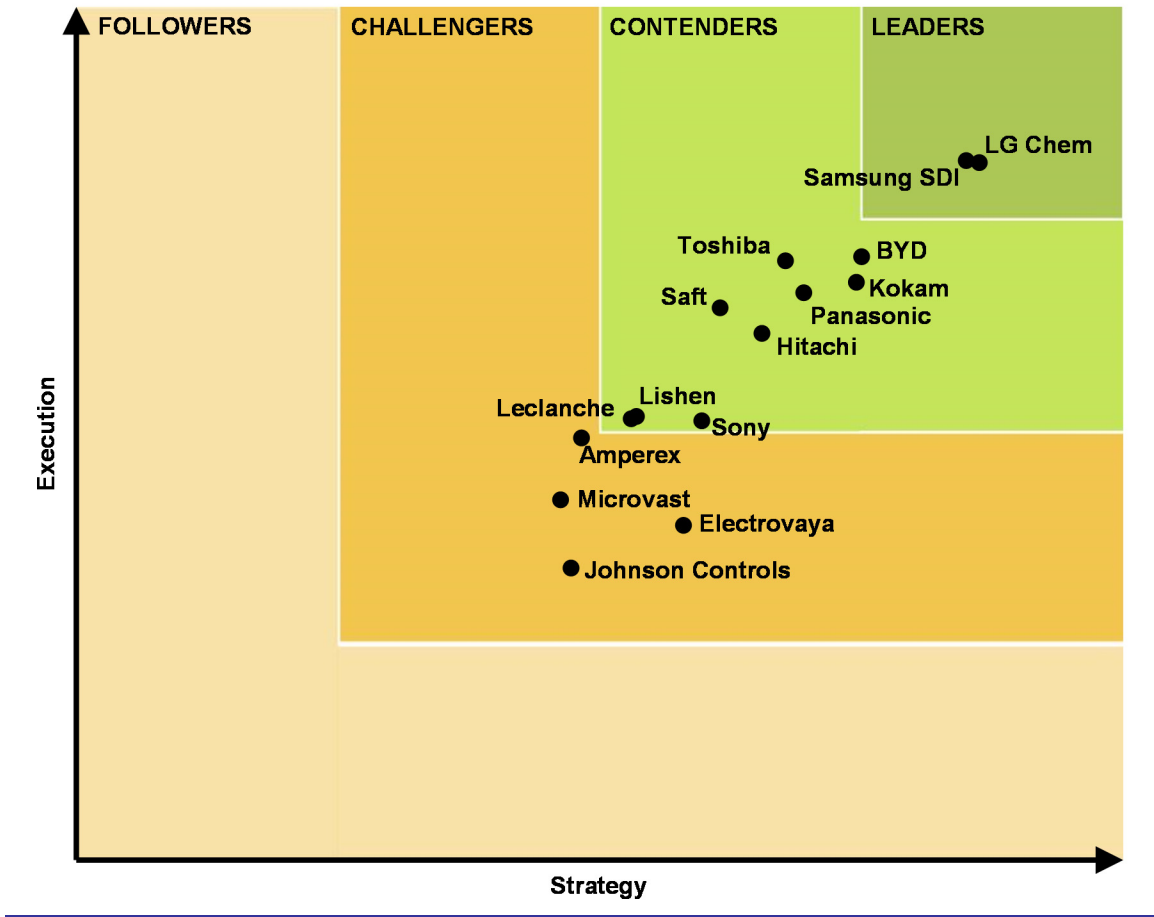
Detailed descriptions of each criterion are provided in the “Criteria Definitions” section of this report.

1.3 The Navigant Research Leaderboard Grid

The 15 companies rated on the above criteria were evaluated based on numerical scores to determine which competitors are Leaders, Contenders, Challengers, or Followers in the market. As the global Li-ion market has heated up in recent years, leading companies have invested heavily to develop their capabilities and strategy. As a result, no companies fall into the Followers category; all competitors profiled in this report are well-positioned for success in the market, but to varying degrees.

To qualify for the Leaders category, a company must perform exceedingly well in both Strategy and Execution. There are only two companies that currently meet these requirements. The second category consists of the Contenders, which are companies that have exhibited the required staying power in the market despite relatively slow growth while boasting significant financial reserves for future investment. The majority of companies profiled in this *Leaderboard Report* fall into this category. The four companies that fall into the third category, Challengers, represent varying strategies for capturing market share, and all have some hurdles to overcome before establishing themselves as market leaders. Overall, in a highly competitive space such as Li-ion for stationary storage, the Challengers and Contenders in this *Leaderboard Report* represent credible competition for the Leaders.

Chart 1.1 The Navigant Research Leaderboard Grid



(Source: Navigant Research)

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SCOPE OF STUDY AND METHODOLOGY

9.1 Scope of Study

Navigant Research has prepared this report to provide participants in the Li-ion market with an analysis of the current landscape of Li-ion battery manufacturers for stationary storage applications. The report is intended for end users of those cells, including electric utilities and merchant energy storage companies, as well as for the battery manufacturers themselves to better understand how they fit in to the overall landscape. This *Navigant Research Leaderboard Report* focuses only on cell manufacturers that sell battery cells for the stationary storage space, whether they provide the systems integration for those applications or sell only the cells. The report is not exhaustive, as there are dozens of smaller players in the market that were not included because of their lack of geographic reach or ambition for growing larger.

The major objective of this *Leaderboard Report* is to provide a timely overview of the companies involved in this market, as well as their Strategy and Execution in developing, manufacturing, and marketing Li-ion batteries for stationary storage applications. Note that the company rankings capture the vendor's standing at the time of the report and are not a retrospective of past accomplishments or an indication of future success. The ratings are likely to change rapidly as this market matures and business models continue to evolve.

9.2 Sources and Methodology

Navigant Research's industry analysts utilize a variety of research sources in preparing Research Reports. The key component of Navigant Research's analysis is primary research gained from phone and in-person interviews with industry leaders, including executives, engineers, and marketing professionals. Analysts are diligent in ensuring that they speak with representatives from every part of the value chain, including but not limited to technology companies, utilities and other service providers, industry associations, government agencies, and the investment community.

Additional analysis includes secondary research conducted by Navigant Research's analysts and its staff of research assistants. Where applicable, all secondary research sources are appropriately cited within this report.

These primary and secondary research sources, combined with the analyst's industry expertise, are synthesized into the qualitative and quantitative analysis presented in Navigant Research's reports. Great care is taken in making sure that all analysis is well-supported by facts, but where the facts are unknown and assumptions must be made, analysts document their assumptions and are prepared to explain their methodology, both within the body of a report and in direct conversations with clients.

Navigant Research is a market research group with the goal of presenting an objective, unbiased view of market opportunities within its coverage areas. Navigant Research is not beholden to any special interests and is thus able to offer clear, actionable advice to help clients succeed in the industry, unfettered by technology hype, political agendas, or emotional factors that are inherent in cleantech markets.

9.2.1 Vendor Selection

Vendors were eliminated if they are currently in bankruptcy proceedings with little chance of emerging as a going concern. Additionally, any manufacturer that sold into only one country was eliminated, as Navigant Research wanted to capture only players that were involved in international trade and have a diversity of product offerings for multiple end users. That left 15 major market participants, all of which are represented in this report.

9.2.2 Ratings Scale

Companies are rated relative to each other using the following point system. The ratings are a snapshot in time, showing the current state of the company. These scores are likely to be fluid as new competitors enter the market and customer requirements evolve.

» Very Strong	91 – 100
» Strong	76 – 90
» Strong Moderate	56 – 75
» Moderate	36 – 55
» Weak Moderate	21 – 35
» Weak	11 – 20
» Very Weak	1 – 10

9.2.2.1 Score Calculations

The scores for Strategy and Execution are weighted averages based on the subcategories. The overall score is calculated based on the root mean square of the Strategy and Execution scores.

9.2.3 Criteria Definitions

9.2.3.1 Strategy

- » **Vision:** Measures the company’s stated goals in designing market solutions against the actual needs of customers based on the entire environment in which they will operate. Clear and compelling visions that are effectively communicated to the industry result in higher scores.
- » **Go-to-Market Strategy:** Evaluates the company's strategy for reaching the target market, including the sales and marketing channels to be used, as well as the processes established for informing the target market about brand differentiation and unique product value. While ambition and boldness are usually valued in the marketing realm, the Li-ion

industry rewards caution and financial conservatism far more. Thus, scores in this criterion are judged not just according to investment and marketing but also in prudent timing of go-to-market initiatives.

- » **Partners:** Measures the company’s established partnerships with key organizations that will provide an advantage in financial backing, sales, business, and product development. Affiliations with successful systems integrators, utilities, and power electronics vendors, as well as a track record of financial strength through fundraising or profitable product sales, positively affect scores in this *Leaderboard Report*.
- » **Production Strategy:** Evaluates the long-term competitiveness of the manufacturing plan as an effective solution that satisfies market requirements and meets market capacity needs. A component of this is an evaluation of the ability of the manufacturing base to supply product quality to meet market expectations and demand. Additionally, a too ambitious manufacturing strategy—one which reduces available capital without adding significantly to revenue—is penalized in the scoring of this criterion.
- » **Technology:** Evaluates whether the company has developed and/or patented technology that provides a significant business advantage over competitors that is likely to have an enduring impact on its success. Higher scores are given if the company’s technology is already a proven market success or delivers unique product attributes.
- » **Geographic Reach:** The Li-ion marketplace is global, requiring a marketing and sales logistics presence on every continent. However, some battery manufacturers have harmed their own interests by over-investing in global sales efforts rather than concentrating on one or two core markets. This criterion is scored according to the right-sized approach for each company.

9.2.3.2 *Execution*

- » **Sales, Marketing, and Distribution:** Evaluates the company’s marketing and sales performance and current distribution channel. Higher scores are given to companies with a large global dealer network with access and support for current products.
- » **Product Performance:** The competitive performance of the battery cells and systems (where applicable). Higher scores are given to companies that provide high productivity yield in manufacturing, as well as excellent quality control to reduce the number of dead-on-arrival cells delivered to customers.
- » **Product Quality and Reliability:** Evaluates the quality and reliability of the battery systems delivered to customers, the company’s strategy to develop quality products for the market, and its track record of quality with the current product line. This includes after-sales service and maintenance offerings by vendors, as well as warranties and performance guarantees.

- » **Product Portfolio:** Li-ion batteries have at least four large potential markets: EVs, stationary storage, consumer electronics, and portable. While this *Leaderboard Report* is concerned only with the stationary storage market, Navigant Research believes that having a diverse market approach—with products available for sale in most, if not all, of the four major markets—adds to the overall financial health of the vendor.
- » **Pricing:** Determines the suitability of product pricing. Because pricing for most applications of Li-ion in stationary storage can vary according to chemistry and application, this criterion is scored entirely on a price-competitiveness basis for the application that the cell chemistry is most suited for. Some vendors claim that they have higher quality cells, which allows them to charge a higher price. However, this criterion is judged entirely by the end price point. Navigant Research believes that the market for Li-ion batteries in stationary applications has reached the point where quality and durability are prerequisites, not value-added benefits.
- » **Staying Power:** As is apparent from the number of bankruptcies in this sector, the Li-ion market for stationary storage has not developed in such a manner that allows for poorly capitalized companies to flourish. Instead, deep pockets of the company or its corporate parent are extremely important to the long-term health of the firm. In addition to available capital, this criterion is judged also by the prioritization that the battery division has been given within the corporate hierarchy. If the battery business is not core to the future of the company, then a very competitive future marketplace will lead to rationalization and shedding or dissolution of non-core assets at some point in the future.

Published 2Q 2015

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