



*Enevate Recognized for*

**2021**

**Customer Value Leadership**

*Global Electric Vehicle*

*Lithium-ion Battery Industry*

*Excellence in Best Practices*

## Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Enevate excels in many of the criteria in the electric vehicle lithium-ion battery market.

AWARD CRITERIA	
<i>Business Impact</i>	<i>Customer Impact</i>
Financial Performance	Price/Performance Value
Customer Acquisition	Customer Purchase Experience
Operational Efficiency	Customer Ownership Experience
Growth Potential	Customer Service Experience
Human Capital	Brand Equity

### *Creating Value from the Ground up*

In an effort to combat greenhouse gas emissions, various industries turned their focus toward electrification. As a result, lithium-ion (Li-ion) batteries experienced a surge in popularity due to their energy density, various chemistries, and scalability. As electric vehicles (EV) continue to transform the automotive and transportation industry, Frost & Sullivan expects EVs to account for most of the Li-ion battery demand in the new future, with 12 million to 15 million EV sales in 2025, roughly translating to 750 gigawatt hours (GWh) to 850 GWh of Li-ion capacity, a significant increase from the roughly 65 GWh in 2018.<sup>1</sup> Despite forecasted revenues of \$132.50 billion by 2025, problems with long and inconvenient charging times, and anxiety over driving distance and range, and safety stifle market adoption.<sup>2</sup> Frost & Sullivan research finds innovation regarding charging times and performance could help position battery manufacturers as one-stop solution providers for their customers' needs and ensure reliability of material supply.

<sup>1</sup> Frost Radar in the Global Lithium-Ion Battery Market (Frost & Sullivan Dec 2019)

<sup>2</sup> Ibid.

Founded in 2005, Enevate achieved firm footing in the battery vendor landscape as a pioneer in Li-ion technology. While the competition leverages silicon anodes similar to Enevate, the competition can only use silicon as an additive to the high-cost graphic electrode, greatly limiting the silicon anode activity. However, Enevate developed a silicon-carbon composite material with a unique structure that exhibits a 100% active material. Moreover, in January 2020, the company announced the fourth-generation of its “eXtreme fast charging” technology with silicon-dominated anode, facilitating a five-minute charge to 75% capacity at 800 watt hours (Wh) per liter and 340 Wh per kilogram in cell density.

Frost & Sullivan finds Enevate stands to transform EV battery charging significantly through its simplified and streamlined charging, making EVs truly attractive. Through this Li-ion technology, Enevate delivers an iron-clad value proposition through its long life and industry leading charging times. The revolutionary silicon-dominant composite anode material creates a disruptive and game-changing solution that provides a significant leap in performance while maximizing the use of existing cell production capabilities.

### **Key Benefits**

Enevate’s innovative roll form of anode alleviates concerns of battery manufacturers that require anodes that are compatible with high speed production lines. The company’s continuous roll-to-roll anode manufacturing process achieves over 80 meters (m) per minute electrode production, with more than 10 GWh per electrode production line, with greater than one m wide and five-kilometer long silicon anode rolls for efficient and high volume production. This high-volume production capability is a

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**- Samantha Fisher, Best Practices**

significant differentiator, as silicon technology is notorious for high-volume problems. Enevate leverages future cathode materials, making its technology revolutionary and dynamic for the Li-ion battery space. Its technology evolved from nano-carbon research conducted at the University of California, resulting in the company’s breakthrough HD-Energy solution. Compared to tradition Li-ion batteries, Enevate improve EV range by 30%, in addition to ultrafast charging, which translates well to the EV market.

Further compounding its reliability and quality, the company achieved global certifications from Underwriter Laboratories, Institute of Electrical and Electronics Engineers, and International Electrotechnical Commission. Additionally, Enevate eliminated the lithium plating on its anodes, circumventing challenges, such as accelerated performance degradation and hazardous outcomes associated with traditional Li-ion technology, making Enevate’s Li-ion battery technology one of the safest and top performing on the market. Frost & Sullivan continues to marvel at Enevate’s innovation and operational efficiency, having previously awarded the company with a Technology Innovation Leadership Award for the global Li-ion battery market.

### **Strategic and Efficient Growth**

Enevate operates efficiently through its internal processes. The company achieved faster progress on battery technology when compared to its competitors due to key infrastructure improvements. For example, several competing vendors use existing software to test batteries, which lacks efficiency. Enevate developed an internal electronic document management system, enabling all company scientists and researchers to access the same data instantly. This system was critical during the COVID-19 shutdown, as employees working from home received the same real-time data as those in the office. The company also tests cells quickly due to its fast charge. Whereas the competition often spends up to six months testing their batteries, Enevate's fast charge enables a significantly shorter one-to-two month timeframe.

Moreover, the company appointed Noel Whitley as general counsel in February 2019. Whitley works to protect Enevate's innovative technologies through a robust worldwide patent program, a key component of the company's technology licensing business. Thanks to the general counsel working with the company's scientists and engineers, Enevate surpassed 350 Li-ion patents issued and in-process in November 2020, representing a significant growth milestone for the company. Combining groundbreaking technology with strong patent protection puts Enevate in perfect position to license the EV industry as the market grows. In this regard, Enevate has a history of accurately predicting consumer trends. In 2009, the company targeted its technology for consumer mobile devices, with a key focus on smartphones. Recognizing the EV market's massive potential, Enevate shifted focus and approached the EV market with confidence and proven expertise.

### **Looking Forward**

Enevate continues to deliver high results and earn support from top companies, including LG Chem, The Alliance (Renault, Nissan, Mitsubishi), and Samsung SDI. Thus far, Enevate raised \$111 million, with its latest reported funding occurring in April 2019 through Bangkok-based energy company, Bangchak

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**- Samantha Fisher, Best Practices Research Analyst**

Corporate Public Company, which operates more than 1,000 fueling stations across Thailand. Additionally, in September 2019, Enevate congratulated its advisory board member, Dr. John B. Goodenough, for winning the Nobel Prize in Li-ion battery technology. He is widely considered the father of the Li-ion Battery, which further bolsters Enevate's visibility and credibility.

Moreover, Enevate focuses on distributing information on its Li-ion technology in the market. It currently has a keen focus on the EV market, and as such, it seeks opportunities to validate its technology, increasing its credibility further. The company hopes to dispel the wild claims that pervade EV battery technology and it sees distributing samples and increasing its visibility through customer validation as a necessary means to accomplish its goal. As a result, over

the last few years, Enevate gained attention from well-known publications, such as the *Wall Street Journal* and *Bloomberg*. Moreover, Enevate identified a significant opportunity to serve the power tool market in the next year or two before its technology will reach consumers in the EV market. Frost & Sullivan research on the future of energy forecasts Li-ion dominance maintained by advanced batteries for the next decade. The demand for Li-ion batteries in the United States mostly stems from the automotive and power utilities sector. Given Enevate's long-term focus on EV technology and its differentiated and innovative technology, Frost & Sullivan finds the company well-positioned for strong growth.

## Conclusion

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Despite a significant need for electric vehicles (EV), poor battery charging and safety concerns provide a barrier to adoption. Enevate, a strong performer in the lithium-ion (Li-ion) battery market, differentiated itself early as a Li-ion pioneer. It supersedes the competition through its silicon-carbon composite material that exhibits a 100% active material. The company is best-known for its "eXtreme fast charging" that offers a five-minute charge to 75% capacity. Enevate continues to attract attention through various means, such as incorporating its new legal counsel to help forward its licensing and patent portfolio, which resulted in unmitigated growth. While Enevate currently offers technology for power tools, its overall goal is to penetrate and transform the EV market. Through its service, technology, and dedication, Enevate is well-positioned to achieve future growth and disrupt the market on a fundamental and global scale.

For its pioneering technology, dedication to exceptional customer value, internal expertise, and strong overall performance, Enevate earns Frost & Sullivan's 2021 Global Customer Value Leadership Award in the EV Li-ion battery market.

## What You Need to Know about the Customer Value Leadership Recognition

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Frost & Sullivan's Customer Value Leadership Award recognizes the company that offers products or services customers find superior for the overall price, performance, and quality.

### Best Practices Award Analysis

For the Customer Value Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

#### *Business Impact*

**Financial Performance:** Strong overall financial performance is achieved in terms of revenues, revenue growth, operating margin, and other key financial metrics

**Customer Acquisition:** Customer-facing processes support efficient and consistent new customer acquisition while enhancing customer retention

**Operational Efficiency:** Company staff performs assigned tasks productively, quickly, and to a high-quality standard

**Growth Potential:** Growth is fostered by a strong customer focus that strengthens the brand and reinforces customer loyalty

**Human Capital:** Commitment to quality and to customers characterize the company culture, which in turn enhances employee morale and retention

#### *Customer Impact*

**Price/Performance Value:** Products or services provide the best value for the price compared to similar market offerings

**Customer Purchase Experience:** Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints

**Customer Ownership Experience:** Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service

**Customer Service Experience:** Customer service is accessible, fast, stress-free, and high quality

**Brand Equity:** Customers perceive the brand positively and exhibit high brand loyalty

## About Frost & Sullivan

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Frost & Sullivan's proprietary model to systematically create on-going growth opportunities and strategies for our clients is fuelled by the Innovation Generator™. [Learn more.](#)

### Key Impacts:

- **Growth Pipeline:** Continuous flow of Growth opportunities
- **Growth Strategies:** Proven Best Practices
- **Innovation Culture:** Optimized Customer Experience
- **ROI & Margin:** Implementation Excellence
- **Transformational Growth:** Industry Leadership



## The Innovation Generator™

Our six analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

### Analytical Perspectives:

- **Mega Trend (MT)**
- **Business Model (BM)**
- **Technology (TE)**
- **Industries (IN)**
- **Customer (CU)**
- **Geographies (GE)**

