



**Guidehouse**  
INSIGHTS

**Research Report**

## **Guidehouse Insights Leaderboard: Commercial and Industrial Energy Storage Systems Integrators**

Assessment of Strategy and Execution for 15 Commercial and Industrial Energy Storage Systems Integrators

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# Section 1

## Executive Summary

### 1.1 Market Introduction

The distributed energy storage (DES) market has grown increasingly competitive since 2016. With \$5.4 billion projected for US storage investments by 2024—a 12-fold increase in annual growth in less than 5 years—the market represents a significant opportunity. The number of cities, states, and businesses committed to carbon reduction goals is swelling and the demand for onsite generation of renewable energy is mounting. In this environment, DES is poised to take a leading role in the new energy paradigm shift, delivering cost savings, grid support, and other bottom-line benefits. As the market matures, the role of DES system (DESS) integrators has become the key position in the value chain for ensuring projects are successfully built and profitable.

As competition intensifies, the field of pure-play DESS integrators is in flux. During the past 2 years, companies in the DESS integration space have started shifting focus away from the origination and development of projects to acting as pure-play integrators that provide integrated hardware and software solutions. This transition has occurred as systems integration companies have become better at optimizing the value of energy storage across multiple revenue streams for different customers using advanced software and controls. The greater assurance of project success has enabled the introduction of pure-play project developers that have confidence in the guarantees that integrators can offer for project revenue stream and reliability. As a result, systems integrators can focus on core competencies around software development, system design, and ongoing system operation and optimization. Furthermore, systems integration companies are no longer seen as competing with other project developers. Instead, the project developers are becoming customers.

Many established DESS integrators have joined forces to create larger, more diversified firms. Others have found new homes as divisions of larger multinational energy companies, providing the DESS integration knowledge to complement the company's other product and service offerings (best evidenced by the string of mergers and acquisitions since 2016).

Companies are becoming more specialized and using diverse backgrounds to bring compelling solutions to the market. As such, the leading companies are able to integrate DESSs by providing the technical functions, system design, and follow-on services that can transform hardware and software into an intelligent storage-based solution that delivers maximum ROI. In addition, given DESSs' ability to serve as generation or load and to produce or absorb both real and reactive power, integrators are providing end-to-end energy management solutions to optimize energy supply and demand. These solutions include demand response (DR), DES, microgrids controls, EV charging equipment, and building analytics and software controls to manage load.

The criteria by which companies are compared in this Guidehouse Insights Leaderboard include:

- Vision
- Go-to-Market Strategy
- Partnerships
- Technology
- Geographic Reach
- Sales, Marketing, and Distribution
- Product Performance
- Product Portfolio
- Pricing
- Staying Power

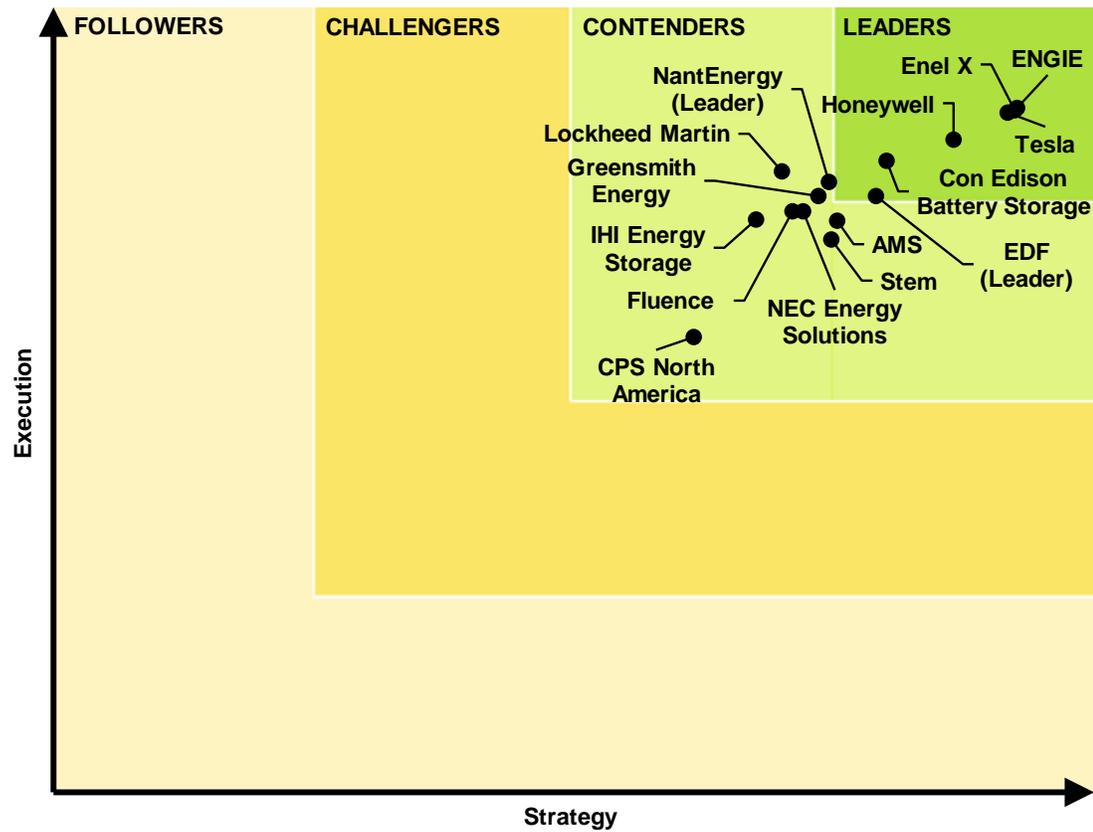
## 1.2 The Guidehouse Insights Leaderboard Grid

The C&I energy storage segment requires systems integrators to incorporate a broad set of capabilities, either through in-house capabilities or strategic partnerships, to drive down costs and facilitate the development, financing, and deployment of projects to drive revenue. In addition, these firms need access to capital through strategic investors, a patient corporate parent, or early revenue streams to mitigate the cost and time-intensive customer acquisition requirements inherent to the segment. Systems integrators with the right energy storage software platform can also integrate site-specific load and tariff characteristics, distributed generation (DG) technologies (i.e., solar PV), energy storage technology, building energy management systems (BEMSs), building automation systems (BASs), and EV charging infrastructure.

As Chart 1-1 shows, the majority of companies competing in this space fall in the Contenders category. Although a select few Leaders have emerged, many companies are well positioned to become Leaders in the coming years. Leaders have distinguished themselves by:

- Focusing on playing multiple roles through turnkey services or strategic partnerships across the project delivery value chain to drive down costs and enable financing innovation to deploy projects
- Establishing an access-to-customers advantage relative to peer companies
- Using a comprehensive energy storage software platform that analyzes project costs and forecasts project revenue streams to support the growth of financing innovation that will drive the deployment of more C&I ESSs

**Chart 1-1. The Guidehouse Insights Leaderboard Grid**



(Source: Guidehouse Insights)

## Section 2

### Market Overview

#### 2.1 Introduction

Guidehouse Insights provides the following definition for energy storage systems (ESSs) integration:

*Software and controls-based integration of core energy storage technology into complete, intelligent systems that deliver the performance required by the customer while ensuring the overall profitability of the system.*

This section introduces the commercial and industrial (C&I) energy storage market segment and defines the market segment drivers, barriers, and trends that affect the deployment of distributed energy storage systems (DESSs) located behind the C&I customer's utility meter. These systems are deployed either as a standalone DESS or as aggregated DESSs (deployed as a virtual power plant [VPP]).

#### 2.2 Market Definition

The C&I distributed energy storage (DES) market has seen significant growth during the past 5 years due to several key factors. DESSs, installed behind-the-meter (BTM) for C&I buildings, are inherently flexible, can be deployed rapidly, have the potential to provide multiple grid and customer benefits, and can generate multiple value streams. Battery prices have also decreased faster than previously expected. Breakthroughs in adjacent digital technologies, including AI, blockchain, and predictive analytics, are facilitating the emergence of C&I storage as a key enabling technology for aggregated distributed energy resources (DER) solutions. These solutions are propelling storage projects toward economic viability and improved bankability.

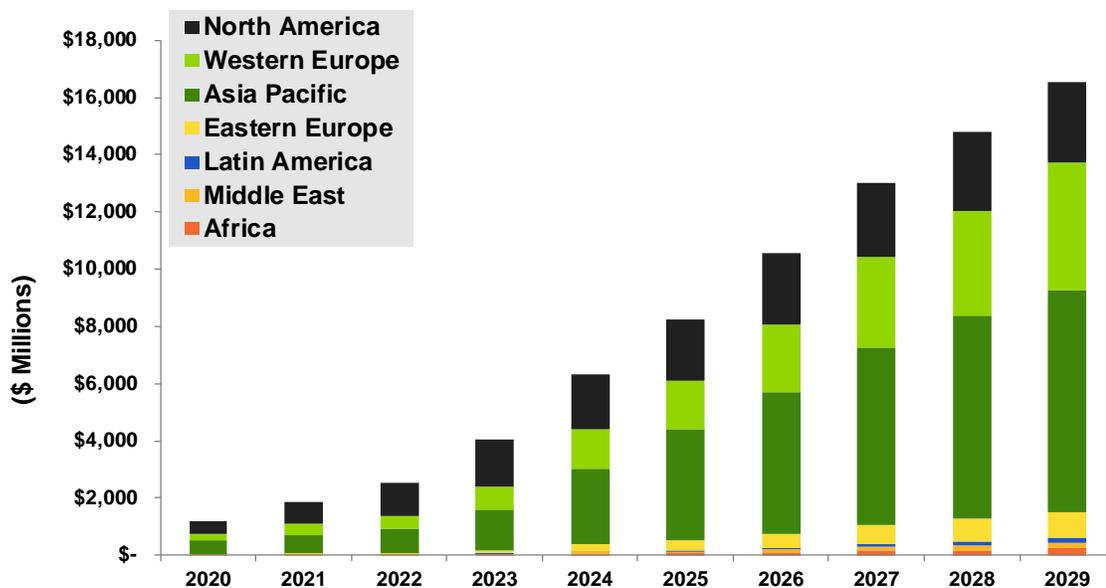
This section highlights how C&I DESSs and associated software can serve C&I customer energy management needs:

- **Deliver energy cost reductions:** C&I customers are under pressure to manage energy spend fluctuations and to guarantee the reduction of total energy use and expenditures with minimal capital expenditures (i.e., financing flexibility). DESSs have proven their ability to reduce electricity demand charge savings at the tariff level and building load-specific level.
- **Improve supply quality:** C&I customers are placing increased focus on resilience and redundancy of supply by deploying DER on their premises to self-generate and make energy spend more predictable. Energy storage is a key enabling technology for the delivery of low carbon DER, providing peak energy demand reduction at the distribution system level and supporting resilience at the customer level.

- Improve sustainability:** For the past several years, C&I customers have moved to set targets for greenhouse gas (GHG) reduction, energy efficiency, and renewable energy to reduce their energy spend and green their portfolio. Energy storage can partner with onsite distributed generation (DG) to enable the delivery of lower carbon onsite energy supply.
- Drive scalable technology solutions:** C&I customers seek scalable, enterprisewide solutions to monitor, benchmark, and optimize energy costs. New and disruptive technology market entrants are giving customers new energy usage insights and options related to their business. Previously, energy was viewed as an unavoidable operating cost that was difficult to effectively manage in terms of use or fiscal effect. New energy technologies, such as energy storage, are changing this dynamic.
- Simplify operations:** C&I energy portfolio managers seek strategy support across their property portfolios to help simplify operations and refocus on core business. These portfolio managers are seeking cost-effective, customized, and greener energy solutions that can meet these needs while reducing energy use and spend (without CAPEX or affecting day-to-day operations). The DESS is becoming a component of the solution set that can meet these needs.

Outlined in previous market forecasts published in the *Distributed Energy Storage Overview* report, the total market size for distributed-scale ESSs is expected to exceed 15.5 GW and \$16.5 billion annually by 2029.

**Chart 2-1. Annual Installed Distributed Battery Energy Storage Vendor Revenue by Region, World Markets: 2020-2029**



(Source: Guidehouse Insights)

## 2.3 Market Drivers

Numerous key motivators are driving the growth of C&I ESSs:

- **Lower distributed-scale ESS prices:** Costs for distributed-scale ESSs have fallen substantially in the past several years, led by the decline in Lithium ion (Li-ion) battery pack costs.
- **Rising electricity costs:** Rising electricity rates and higher demand charges by electric utilities for electricity use during peak periods create demand for energy storage. The higher and more volatile the electricity prices and demand charges for C&I customers, the better the business case for commercial energy storage.
- **Power market policy changes:** Software and hardware platforms can analyze, control, and optimize a single ESS and an aggregated portfolio of distributed-scale ESSs. The aggregation of distributed-scale ESSs of sufficient capacity in this manner allows grid operators to view and plan for taking advantage of grid benefits as part of VPPs. Power market rules in the US (PJM Interconnection as well as California, New York, and Kentucky), Australia, and Europe (Germany) are now recognizing the value of VPPs.
- **Resilience:** C&I customers are becoming more aware of the potential resilience benefits of C&I ESS technology. This awareness is increasing interest in the enhanced electricity reliability and power quality improvements that can be provided by C&I ESSs to mitigate the challenges posed by both natural and manmade disasters.
- **Financing innovation:** The emergence of comprehensive energy storage software platforms that can quantify the costs and revenue associated with the deployment of distributed-scale ESSs will enable energy storage markets to mature. Growth enables new business models with improved revenue prediction capabilities. Such predictable revenue streams are feeding the growth in financing innovation that are expected to drive the deployment of additional DES technology.

## 2.4 Market Barriers

Guidehouse Insights see a few key barriers limiting the growth of distributed-scale ESSs:

- **High ESS costs:** Without financing options, high capital costs are often cited as the leading barrier to energy storage development.
- **Poorly understood technology:** A lack of understanding of distributed-scale ESS technologies by host customers, and the value that storage can provide, continues to pose obstacles for wider energy storage technology deployments.

- **Power market policy changes:** Despite the rise of VPP projects, many utilities and grid operators are slow to adopt new technologies and regulations. This slow progress on policy changes is due in part to the newness and complexity of storage, however, stakeholders also often have competing interests.

**2.5 Market Trends**

There are two key trends in the C&I ESS market segment related to value chain participation. The first is that systems integrators have improved their ability to define C&I DESS battery use cases and potential project revenue streams. These developments, as well as the need to drive costs down, result in the growth of standardized C&I DESS modules. The second is that the evolution of standardized modules in this segment reduces the need for one-off, project-by-project systems integration for single DESSs and VPPs. This development results in fewer companies playing a strictly standalone systems integration role.

Figure 2.1 highlights the upstream value chain components. These upstream C&I ESS components are incorporated into new modular systems that reduce costs as well as the need for standalone systems integration.

**Figure 2-1. DES Value Chain, Upstream Portion**



(Source: Guidehouse Insights)

On the second point, Figure 2-2 shows the downstream value chain activities for distributed-scale ESSs. Guidehouse Insights expects downstream value chain players such as systems integrators and project developers to quickly start playing multiple roles. Successful companies are anticipated to use the ability to access customers, customer data, the network operations capabilities of the energy storage software platforms, and the ability to predict revenue streams to support financing innovation.

**Figure 2-2. DES Value Chain, Downstream Portion**



(Source: Guidehouse Insights)

Given the trends outlined, Guidehouse Insights sees the following key characteristics as critical for successful business strategies for systems integrators in the DES segment:

- Strategic investors that can help streamline the customer acquisition process by improving access to sales channel partners and C&I customers
- Strong software platform capabilities in the analysis of upfront project costs and future revenue streams for single DESSs and VPPs, with a focus on the analysis of site-specific load and tariff characteristics:
  - The integration of DG technologies (i.e., solar PV)
  - Energy storage technology
  - Building energy management systems (BEMSs)/building automation systems (BASs)
  - Power market data
- Software platform capabilities that use the same algorithms used for project analysis to operate and optimize a single DESS or a VPP as highlighted earlier to forecast future project revenue

- Access to innovative financing partnerships and the ability to facilitate financing for emerging DESS financing asset classes (such as equipment leases, shared savings agreements, solar PV plus energy storage power purchase agreements [PPAs], and utility demand response [DR] service agreements) to drive deployments
- Access to standardized, modular DESSs that reduce project development, manufacturing, hardware/software, systems integration, and engineering, construction, and procurement (EPC) costs
- A multipronged, go-to-market strategy that includes direct-to-customer sales, channels sales strategies, and partnerships with project developers, electricity retailers, EPCs, energy service companies (ESCOs), and utilities to improve access to customers and customer data
- The ability to provide a creditworthy performance guarantee to investors or host customers

## 2.6 Evaluation Overview

This *Leaderboard* is the first by Guidehouse Insights that exclusively highlights DESS integrators that are primarily focused on the C&I energy storage segment. Based on market forecasts published in the Navigant Research *Distributed Energy Storage Overview* report, the total market size for C&I DESSs is expected to exceed 15.5 GW and \$16.5 billion annually by 2029. In this *Leaderboard*, Guidehouse Insights ranks 15 companies that exhibit the following characteristics:

- Focus a significant portion of their go-to-market strategy on the C&I energy storage segment
- Develop and implement a comprehensive energy storage software platform exhibiting many of the criteria outlined in Section 2
- Incorporate several of the beyond standalone systems integration capabilities outlined in Section 2.5 as part of their strategy and execution efforts

The criteria by which C&I energy storage system (ESS) integrators are compared in this *Leaderboard* include the following:

- Strategy
  - Vision
  - Go-to-Market Strategy
  - Partnerships
  - Technology
  - Geographic Reach

- Execution
  - Sales, Marketing, and Distribution
  - Product Performance
  - Product Portfolio
  - Pricing
  - Staying Power

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

## Section 3

### The Guidehouse Insights Leaderboard

#### 3.1 The Guidehouse Insights Leaderboard Categories

Guidehouse Insights scored the vendors in this *Leaderboard* according to four categories: Leaders, Contenders, Challengers, and Followers. These categories are defined in the following sections.

##### 3.1.1 Leaders

Leaders are vendors that achieved a combined score of 75 or above. These companies have differentiated themselves from the competition through exceptional product development, strong supplier relationships, and a sustainable business model. Leaders are currently in the strongest position for long-term success in the DES market.

##### 3.1.2 Contenders

Contenders are vendors that achieved a combined score between 50 and 75. While these companies have a solid foundation for growth and long-term success, they have not attained a superior position in the market. They are well positioned to become Leaders but have not yet fully demonstrated the multiple role approach needed to gain a competitive advantage in the distributed-scale C&I energy storage market segment.

##### 3.1.3 Challengers

Challengers are vendors that scored higher than 25 in Strategy and Execution but are not yet Contenders for market leadership. There are no companies ranked as Challengers in the distributed-scale C&I energy storage market segment.

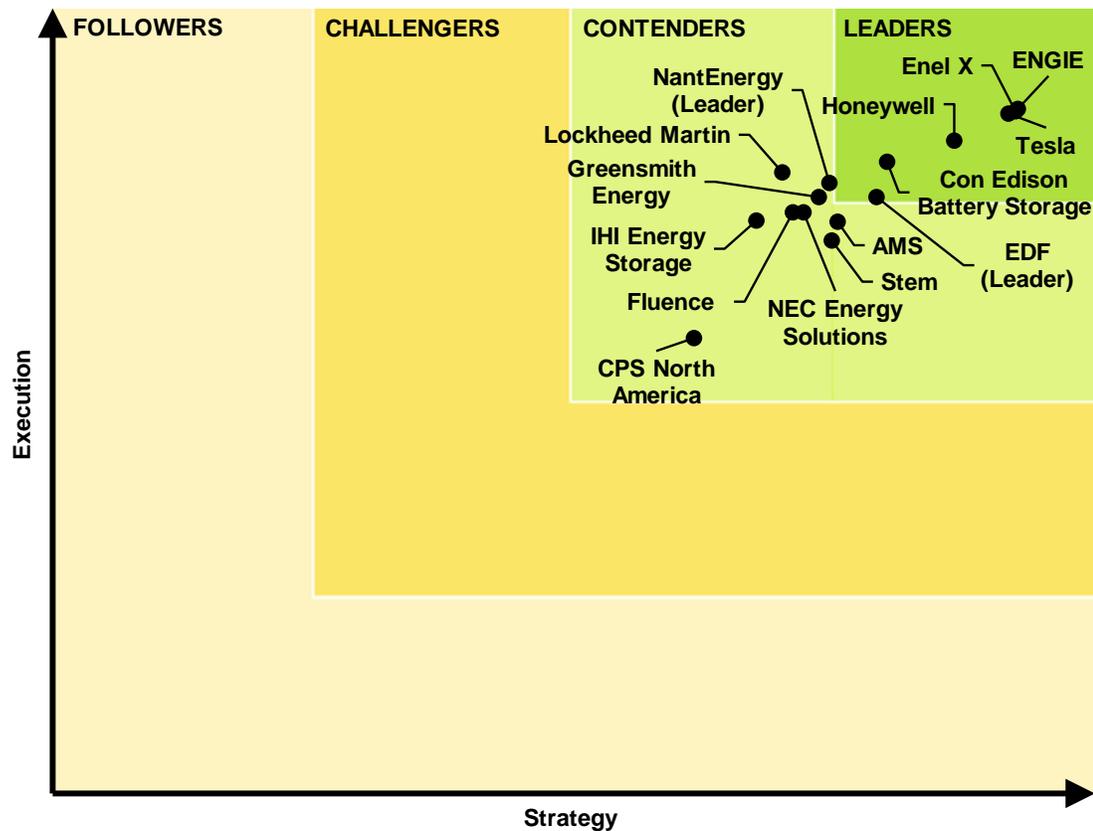
##### 3.1.4 Followers

Followers are vendors that have failed to distinguish themselves and scored below 25 in Strategy and Execution. There are no companies ranked as Followers in the distributed-scale C&I energy storage market segment.

**3.2 The Guidehouse Insights Leaderboard Grid**

The seven vendors that are Leaders in this space have focused on playing multiple roles through turnkey services or strategic partnerships across the project delivery value chain to drive down costs and enable financing innovation to deploy projects. Each company has established an access-to-customers advantage to reduce the costs of customer acquisition. Further, each Leader uses a comprehensive energy storage software platform that analyzes project costs and forecasts project revenue streams to support the growth of financing innovation that will drive the deployment of more DESSs across both single DESS and aggregated VPP scenarios.

**Chart 3-1. The Guidehouse Insights Leaderboard Grid**



(Source: Guidehouse Insights)

The Contenders field is crowded, with many of the companies having made key progress on the software platform, financing, and access-to-customers challenges. These companies have focused on playing multiple roles through turnkey services or strategic partnerships across the project delivery value chain to drive down costs and enable financing innovation to deploy projects. The companies have also established an access-to-customers advantage relative to competitors and use a comprehensive energy storage software platform that analyzes project costs and forecasts project revenue streams to support the growth of financing innovation.

**Table 3-1. The Guidehouse Insights Leaderboard Overall Scores**

Rank	Company	Total
1	ENGIE	90.0
2	Enel X	89.7
3	Tesla	89.2
4	Honeywell	84.8
5	Con Edison Battery Storage	80.3
6	EDF	77.5
7	NantEnergy	76.1
8	Greensmith Energy	74.8
9	Lockheed Martin	74.7
10	AMS	74.1
11	NEC Energy Solutions	73.0
12	Stem	72.6
13	Fluence	72.5
14	IHI Energy Storage	70.3
15	CPS North America	59.8

(Source: Guidehouse Insights)

## Section 4

### Company Rankings

#### 4.1 Leaders

Companies in the Leaders category scored a 75 or higher in both Strategy and Execution. The leading companies have integrated DESSs by providing the technical functions, system design, and follow-on services that transform hardware and software into an intelligent storage-based solution that delivers maximum return on investment. In addition, given the ability of DESSs to serve as generation or load and to produce or absorb both real and reactive power, integrators are providing end-to-end energy management solutions to optimize energy supply and demand. These solutions include DR, DES, microgrids controls, EV charging equipment, and building analytics and software controls to manage load.

##### 4.1.1 ENGIE

*Overall Score: 90.0*

*Strategy: 92.6*

*Execution: 87.3*

Founded in 2009 as Green Charge Networks, ENGIE Storage designs, finances, builds, and aggregates DES solutions to serve energy producers, distributors, and a variety of customers in business and government. ENGIE Storage and ENGIE Distributed Solar are part of ENGIE. The company offers a range of capabilities including clean electricity generation, cogeneration, and energy storage; retail energy supply that includes renewable, DR, and on-bill financing options, and comprehensive energy services. Globally, ENGIE is the largest independent power producer and a leading energy efficiency service provider, employing 160,000 people and with a revenue of more than €67 billion (\$74 billion) in 2019.

ENGIE Storage offers GridSynergy software and a fleet of energy storage units installed on both sides of the meter, at commercial sites or utility-owned substations. The GridSynergy system can be divided into two parts—GridSynergy software and GridSynergy hardware. The software helps engineers analyze energy demand and configure the hardware to meet performance commitments. The cloud-based software draws on historical data from hundreds of GridSynergy systems, learning and adapting to the energy usage patterns in the installed environment to deliver energy optimization services. The GridSynergy hardware is tailored to the needs of the clients to match their project specifications. In addition, ENGIE Storage can aggregate distributed GridSynergy systems into a single managed resource to provide a variety of grid services.

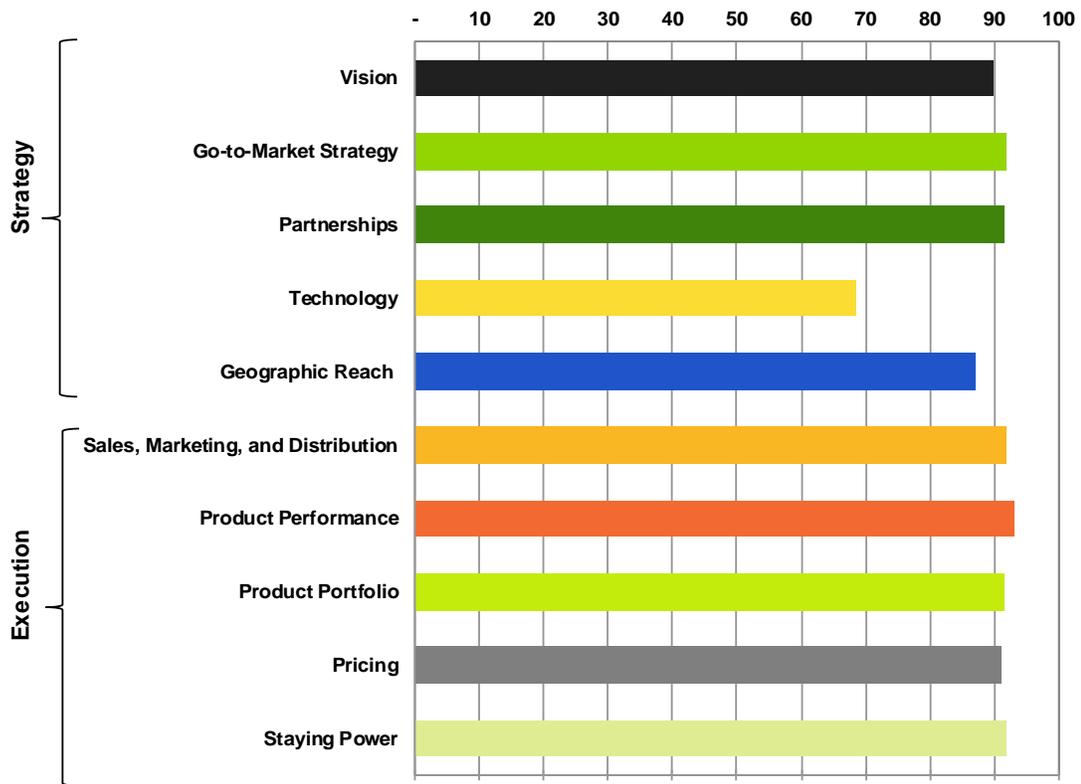
ENGIE has been expanding its service offering thanks to a series of acquisitions: commercial storage with Green Charge Networks; PPA facilitator OpTerra Energy Services; EV charging network EVBox; solar developer SoCore Energy; and energy services company Ecova. In 2019, ENGIE North America Inc. announced the acquisition of Genbright LLC., a company leading the integration of DER into wholesale electricity markets. ENGIE's purchase of Genbright enables the full integration of wholesale market bidding, scheduling, and dispatch optimization capabilities into ENGIE Storage's GridSynergy platform.

ENGIE Storage is the leading DESS integrator in the C&I space due to its strong global presence, comprehensive software suite, and wide-ranging beyond energy efficiency offerings. In addition, ENGIE Storage maintains an open ecosystem of technology and project development partnerships to provide a broader set of customers with tailored energy solutions. ENGIE Storage also scored high on Vision, Go-to-Market Strategy and Sales, Marketing and Distribution because the company offers multiple contracting options, including direct purchase with service agreements, fixed payment, and blended PPA with solar. The company's services include analysis and design, project financing and bankability, procurement and installation, 24-hour operation and maintenance, and billing and settlement.

Primarily through acquisition, ENGIE Storage has layered a comprehensive set of beyond energy efficiency solutions providers on its energy supply offering, strengthening its in-house turnkey solution capabilities. The recent acquisition and integration of Genbright has enabled the company to realize the stacked-value stream potential of energy storage. By working with channel partners that are already actively participating in the solar market, ENGIE Storage has achieved efficiencies that enable better pricing and improved savings for end-customers. With 77.5 MWh deployed and a 157 MWh pipeline in North America, ENGIE Storage is the leading DESS integrator in the C&I space.

[www.engiestorage.com](http://www.engiestorage.com)

**Chart 4-1. ENGIE Storage Strategy and Execution Scores**



(Source: Guidehouse Insights)

## 4.1.2 Enel X

*Overall Score: 89.7*

*Strategy: 92.4*

*Execution: 86.9*

Enel X is an Enel global business line that provides energy management and digital solutions for cities, homes, industries, and electric mobility. Based in Rome, Italy, Enel X assists its customers in meeting goals for reduced energy costs and decarbonization, with a focus on flexibility services to support the integration of DER, including BTM energy storage. Enel X's parent company, Enel, is a multinational power company and a leading player in the global power, gas, and renewables markets. The company posted a revenue of €78.5 billion (\$85.3 billion) in 2019 and has nearly 63,000 employees.

Enel X in North America has around 3,400 business customers, spanning more than 10,400 sites and representing approximately 4.7 GW of DR capacity and more than 20 operational BTM storage projects. Enel X provides turnkey solutions and flexible financing options (including direct purchase, fixed rate, benefit share, PPA, and hybrid PPA) to cover the hardware and installation costs of both standalone and solar-plus-storage systems. Enel X also oversees the integration of the technology into customer facilities. The company's intelligent DER Optimization Software is designed to analyze real-time energy and utility bill data, improve performance, and manage distributed energy assets (including BTM storage projects).

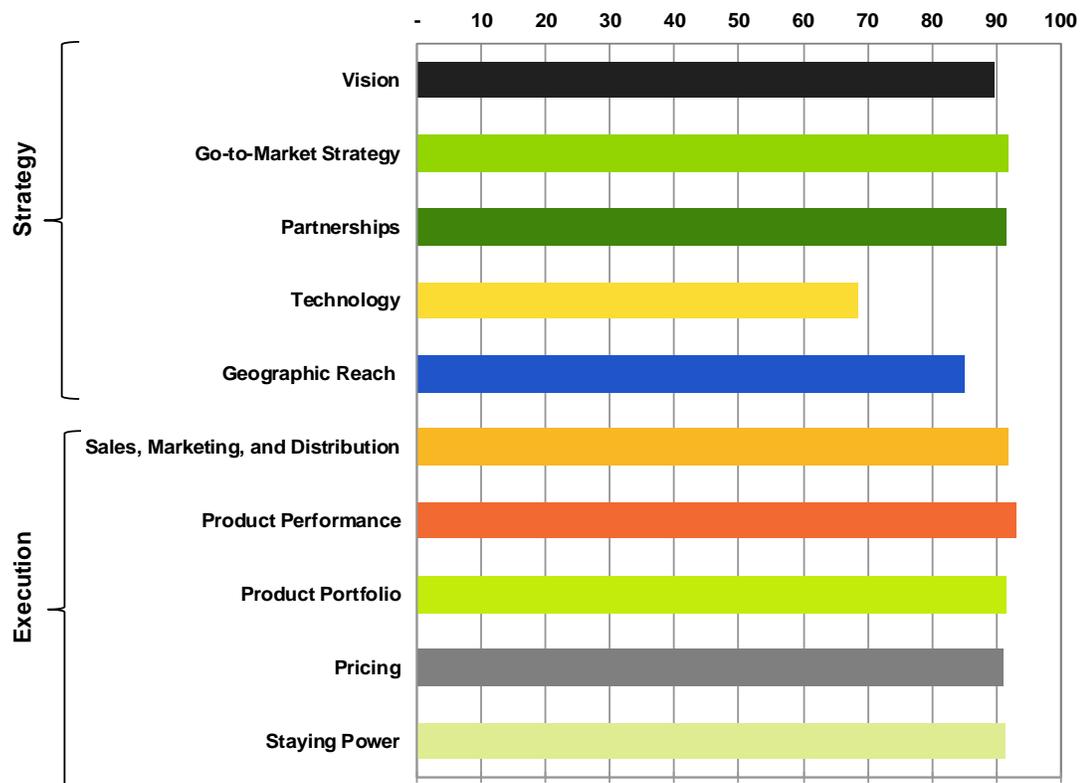
In 2019, Enel X and Related Companies announced the launch of a 4.8 MW/16.4 MWh battery system in New York City. The installation, located at Gateway Center in Brooklyn, supports the grid of local utility Con Edison during periods of peak demand. Through a lease agreement with Related, Enel X and Related installed and connected the storage system to Con Edison's grid. The system's design enables a direct relationship between Enel X's energy storage resource and Con Edison while simplifying the lease transaction from a real estate perspective by removing the complexities of energy management and tenant participation from the structure.

Enel X's legacy EnerNOC, Demand Energy, and eMotorWerks technologies are focused on aggregating C&I consumption, DES, and EVs to provide both flexibility services to the electric grid and to optimize C&I loads. Enel X is able to deliver energy services across North America and Enel's existing Europe and Latin American countries across three customer segments underpinned by e-mobility solutions: households (e-home), C&I energy users (e-industries), and municipalities (e-cities).

Primarily by acquisition, Enel X has added leading edge capabilities across portfolio advisory and load management and optimization by adding flexibility technologies like energy storage, DR, and building energy management to its offerings. These acquisitions add a formidable set of solutions to its energy supply capabilities and boosted the company's scores in terms of Product Portfolio, Vision, and Go-to-Market Strategy. In addition, Enel X couples these capabilities with tailored approaches to meet the needs of existing customers in North America (related to flexibility and independent advisory support) and Europe (as a turnkey supply and solutions provider). As the DES industry continues to grow, Enel X is expected to remain a leading player, especially given the company's access to customer data.

[www.enelx.com](http://www.enelx.com)

**Chart 4-2. Enel X Strategy and Execution Scores**



(Source: Guidehouse Insights)

#### 4.1.3 Tesla

*Overall Score: 89.2*

*Strategy: 91.7*

*Execution: 86.6*

Originally founded in 2003 and based in Palo Alto, California, Tesla's primary business is the manufacture and sale of EVs and Li-ion batteries. The company posted revenue of \$24.6 billion in 2019. During the past 5 years, Tesla has rapidly grown its grid-tied energy storage business in the residential, large C&I, and utility-scale market segments. Though Tesla has been involved in the energy storage market as a battery system vendor through channel sales, it has developed its own software and integration capabilities to meet the growing needs of project developers and end users. The company is active throughout the entire DER ecosystem—with a focus on offering solar-plus-storage solutions along with software for customers across the ESS industry.

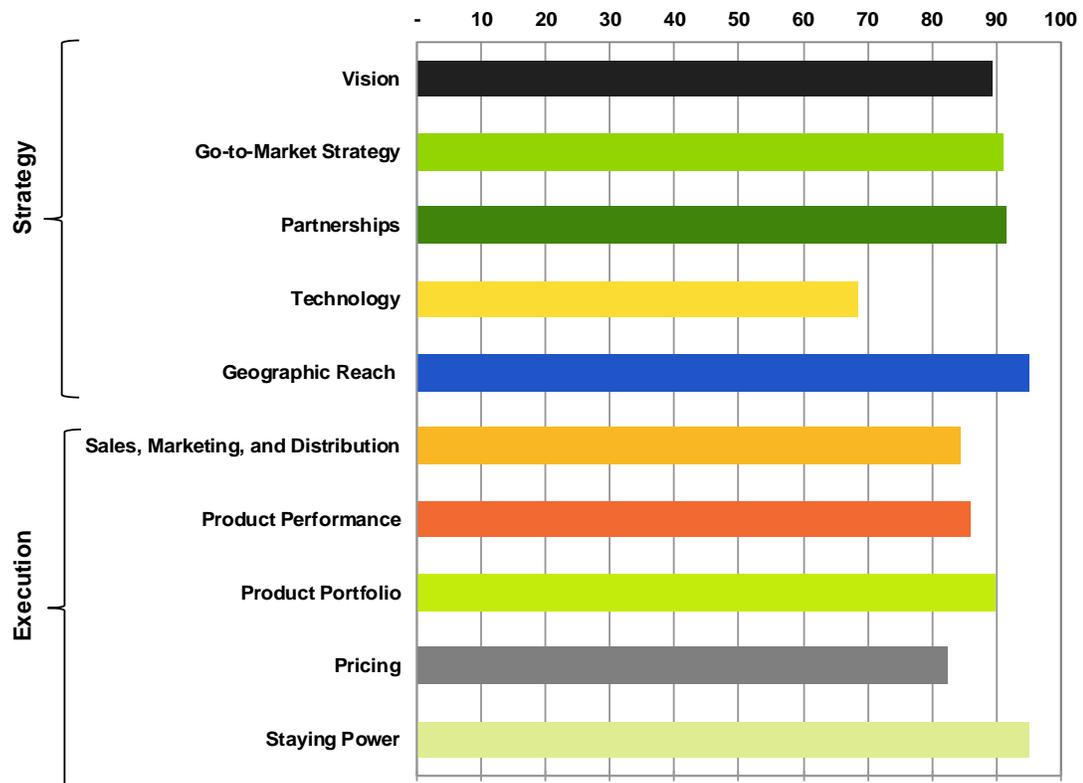
Tesla has developed an advanced ecosystem of software to support its energy hardware products. Tesla's suite of optimization software solutions, Autopilot, is composed of machine learning, forecasting, optimization, and real-time control algorithms used for utility bill reduction, DR participation, microgrid control, and wholesale energy market bidding. Autopilot products include Autobidder, Powerhub, Opticaster, and Microgrid Controller.

In 2019, Tesla deployed a 7 MWh installation in Osaka, Japan intended to provide emergency backup power for a Kintetsu train line. With enough power to get a train safely to the next station in the event of a grid outage, the system consist of 42 industrial-strength Powerpack batteries and also helps reduce energy demand on the Osaka grid during peak hours. In addition, Tesla deployed 415 MWh worth of Powerwalls and Powerpacks in the second quarter of 2019, a record for the company. In 2018 and into early 2019, the company had to scale back the number of Powerwall and Powerpack products it deployed because it needed the batteries to support the dramatic increase in Model 3 production. Now, however, its latest deployment figures suggest the company is rebounding.

The company has a strong global presence, a robust sales and marketing organization, and staff that have extensive experience in the C&I vertical. Tesla has enjoyed revenue growth in recent years—despite the company’s supply chain difficulties in 2018-2019. In addition, Tesla scores high for Vision and Product Performance. The company also scores high in terms of Partnerships and Geographic Reach, with a string of high-profile utility and commercial partners including Pacific Gas and Electric (PG&E) and Kintetsu Railway.

[www.tesla.com/powerpack](http://www.tesla.com/powerpack)

**Chart 4-3. Tesla Strategy and Execution Scores**



(Source: Guidehouse Insights)

## 4.1.4 Honeywell

*Overall Score: 84.8*

*Strategy: 86.5*

*Execution: 83.2*

Honeywell is a technology manufacturer and software provider that addresses challenges in the global energy, safety, security, and production spaces. Headquartered in Morris Plains, New Jersey, the company employs more than 131,000 people and its 2019 sales exceeded \$40 billion.

Honeywell Energy Services Group provides solutions that address customer energy efficiency, security, and resilience needs. In most cases, the deployment of these solutions is through turnkey and guaranteed self-funding energy and infrastructure renewal projects. Honeywell has a strong presence in the building technologies market with a broad product and services portfolio, positioning itself as a comprehensive solutions provider. Honeywell has used its position as a leading building efficiency and controls technology provider across portfolio advisory, non-renewables and renewables onsite supply, load management and optimizations solutions, and energy efficiency solutions.

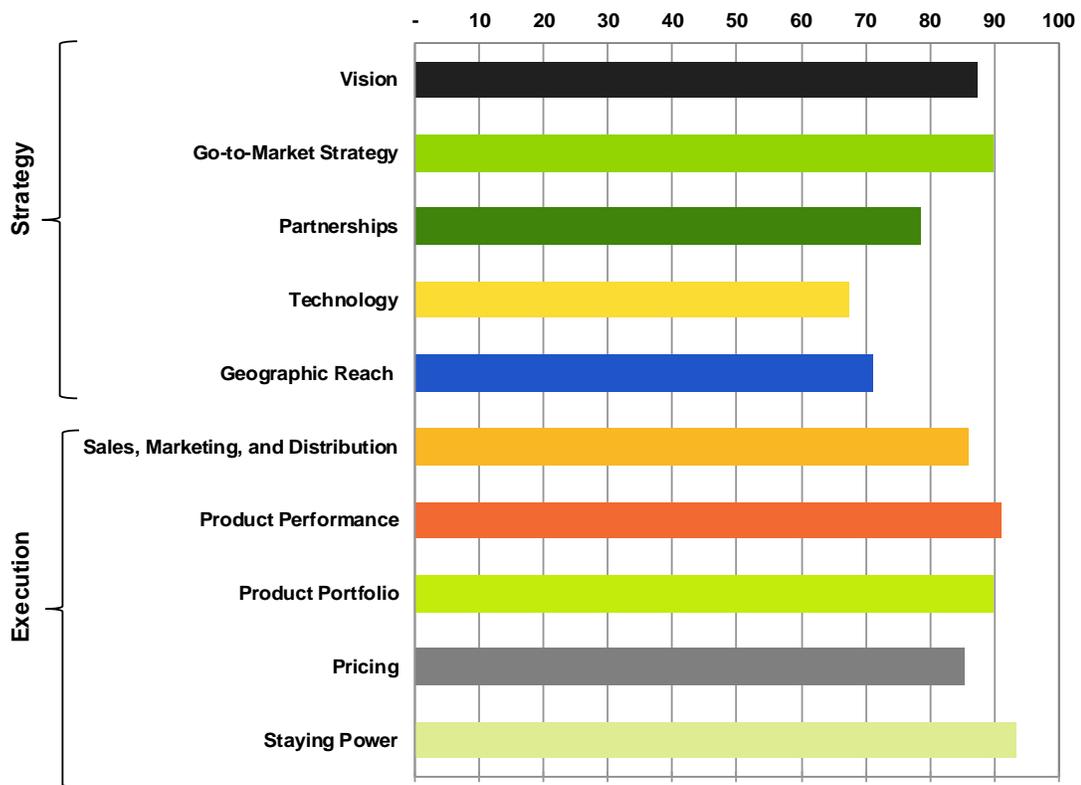
In 2019, Honeywell announced a partnership with NRStor C&I LP to launch the Experion Energy program, which is anticipated to create the largest BTM energy storage deployment to date in North America. The program is expected to result in the deployment of a total of 300 MW of Li-ion battery storage as a service to commercial customers in Ontario, New York, and Massachusetts. NRStor C&I and Honeywell expect approximately 100 MWs of storage to be operational by mid-2020, with the remaining to follow in the next several years. In the partnership, NRStor C&I owns the assets and is responsible for installing the storage systems while Honeywell provides NRStor C&I with a software platform to maximize cost savings and revenue through smart dispatch. This program is a natural extension of Honeywell's end-to-end automation and energy control services that provide building controls for energy management around the world and software and controls to utilities to run their operations more efficiently and cost-effectively.

The ESSs are supported by two remote operations centers that use AI-based peak prediction and value stack optimization algorithms. These centers automatically start the battery systems to maximize savings for C&I customers. Honeywell's advanced control technologies enable precise battery dispatch along with network security and cybersecurity protection. As part of the partnership, the two companies are offering performance guarantees customized to the specific objectives of corporate customers. Contractual guarantees are designed around jointly defined key performance indicators.

Honeywell is the top contender in the C&I DESS space because of its end-to-end value chain, a primary reason the company scored high for their Product Portfolio. The company’s smart grid consultancy, experience with military and other microgrids, SCADA systems, substation design, firm frequency response and automated DR, and with utility touch points at the residential, C&I and substation level, allows it to deliver unique solutions to its customers.

[hwl.co/renewableenergy](http://hwl.co/renewableenergy)

**Chart 4-4. Honeywell Strategy and Execution Scores**



(Source: Guidehouse Insights)

#### 4.1.5 Con Edison Battery Storage

*Overall Score: 80.3*

*Strategy: 80.0*

*Execution: 80.5*

Con Edison Battery Storage is a joint venture between Con Edison Solutions and Johnson Controls, formed in October 2018. Under terms of the joint venture, Con Edison Solutions is the majority owner and operating partner while Johnson Controls participates as a minority owner and contributes intellectual property it has developed for battery management systems and controls. As a wholly owned subsidiary of Con Edison Clean Energy Businesses and member of the Consolidated Edison, Inc owned businesses, Con Edison Battery Storage has significant installations across North America, including one of the largest BTM projects in the world.

The company offers either inside or containerized, modular, scalable energy storage for a building, campus, enterprise or utility, configuring each solution to fit the customer's specific needs. Its solutions handle a variety of applications including solar-plus-storage, peak shaving, load shifting, DR, microgrid, backup, frequency regulation, renewable energy support, and power factor correction. The company serves a range of commercial and institutional verticals, including government, military, healthcare, higher education, utilities, and general industry.

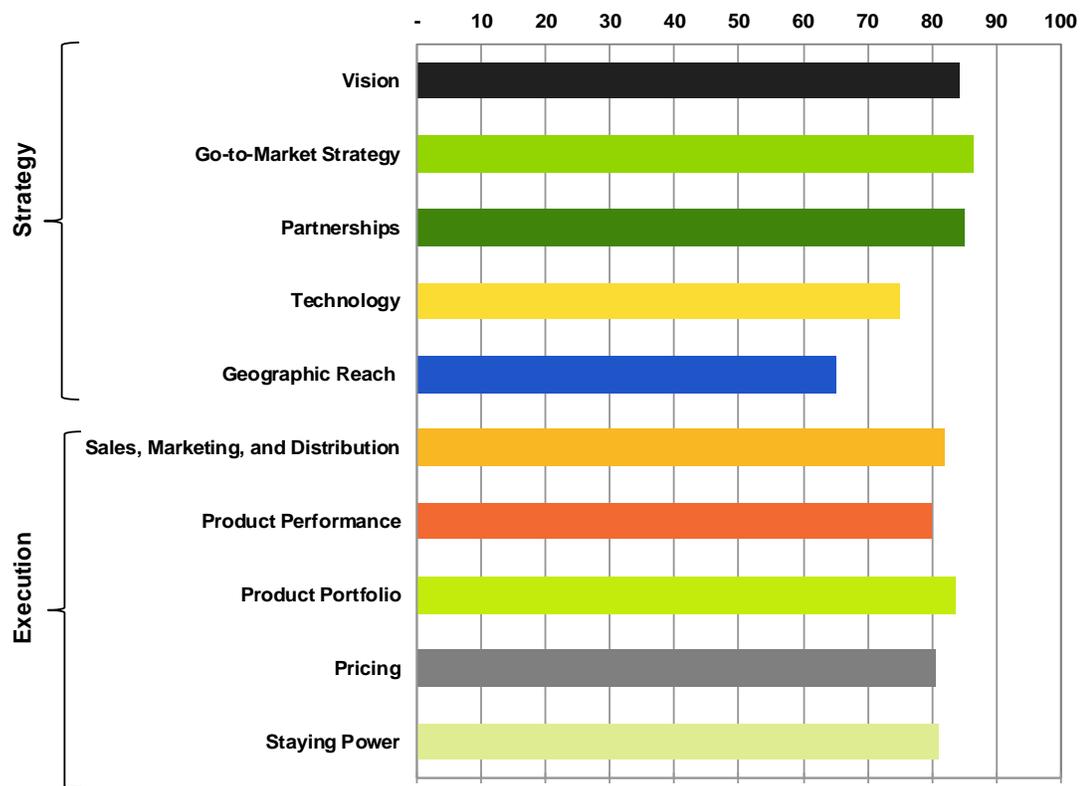
Con Edison Battery Storage's software platform supports pre-sales analytics for system modeling and design of energy storage applications with dispatch, optimization, and VPP aggregation capabilities for storage, solar PV, and combined heat and power. The company's platform analytics can analyze site-specific load, tariff details, and a year of weather forecasting trends to evaluate the optimal DG, battery, and building controls dispatch for energy savings. Con Edison Battery Storage approach also includes the ability to forecast power market electricity and ancillary services pricing data for a single large site or a VPP.

In 2019, Johnson Controls expanded the scope of its existing agreement with Con Edison Battery Storage to extend financing to customers that want solar-plus-storage. The company partnered with Capital Dynamics as a means of offering a simpler way for customers to access capital for solar-plus-storage projects. Capital dynamics is an independent global asset management firm focusing on private assets including private equity, private credit, clean energy infrastructure, and clean energy infrastructure credit. Through this agreement, Johnson Controls aggregates customers' projects signed up to PPAs worth \$1 million or more, into a larger portfolio of projects.

Con Edison Battery Storage uses its Johnson Controls Building Technology and Services channel, cross-selling energy storage in attractive markets. The company has 40 projects installed or in construction with an activity in eight countries and 14 US states. Additionally, it has developed tools to identify existing customers that would most benefit from energy storage. Further, the company can provide financing services for shared savings, demand charge savings contracts, or as part of integrated ESCO offerings, each of which can be equipped with savings performance guarantees.

[www.conedsolutions.com/energy-storage-capabilities](http://www.conedsolutions.com/energy-storage-capabilities)

**Chart 4-5. Con Edison Battery Storage Strategy and Execution Scores**



(Source: Guidehouse Insights)

## 4.1.6

## EDF

*Overall Score: 77.5*

*Strategy: 79.0*

*Execution: 76.0*

EDF is a world leader in renewable energy. The company develops, builds, and operates clean energy power plants in 22 countries both for its own account and for third parties. As of June 2019, the company's gross installed capacity amounted to 12,468 MW worldwide, with net installed capacity standing at 7,971 MW and gross capacity under construction at 4,054 MW. Mindful of developments taking place in additional promising segments, the company is also involved in distributed production, energy storage, and marine energy.

EDF Renewables Distributed Solutions provides a fully integrated bundle for onsite energy projects with solar, storage, EV charging, and energy storage management. The company specializes in providing the design, financing, installation, and operation of holistic energy solutions to help businesses lower operational energy costs, control and forecast long-term energy budgets, increase energy reliability, and support sustainability and renewable energy goals. EDF Renewables Distributed Solutions offers third-party financing to eliminate upfront costs and reduce performance risk for energy managers. The company uses internally sourced financing, resulting in multiple contracting models and additional flexibility in contracting. EDF Renewables Distributed Solutions offers the following contracting mechanisms: purchasing, lease, and shared savings.

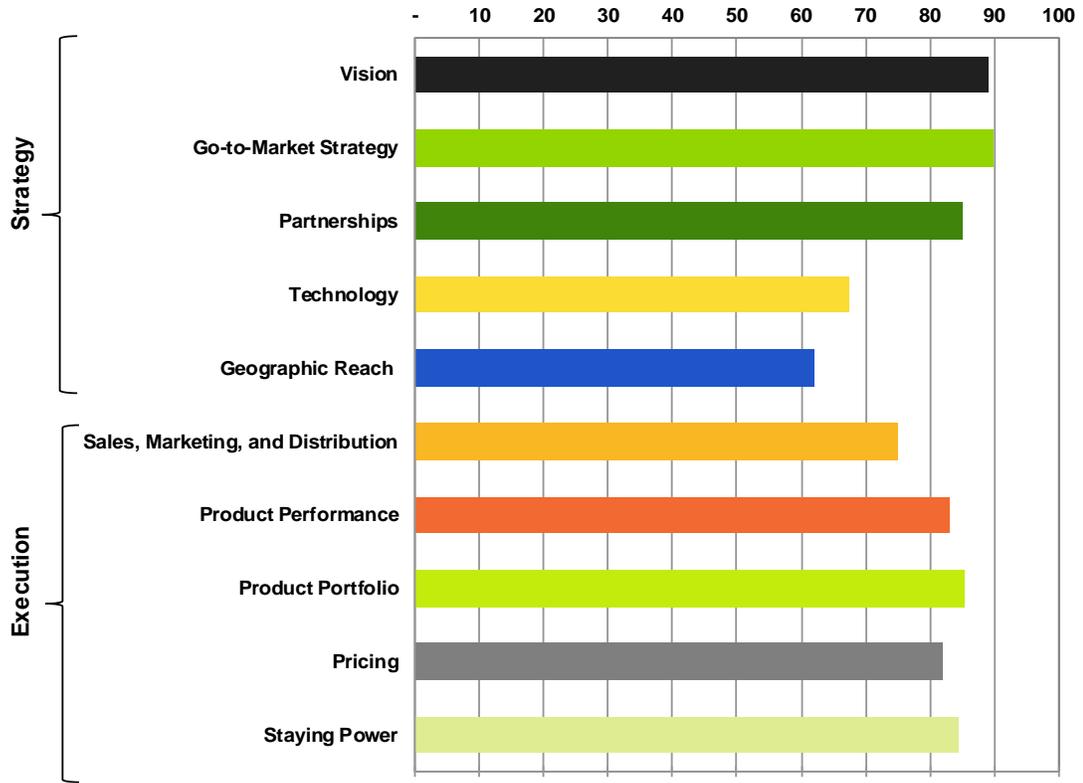
EDF's advanced holistic solutions use EDF Store and Forecast's PEGASE Energy Management System as the command and control layer that communicates with storage, load, and generation assets in order to forecast, optimize, and control operational energy. EDF's experience in solar and energy storage in tandem with its PEGASE EMS software enables the company to deliver fixed long-term onsite energy service contracts. For example, in 2017, EDF won a 10-MW/40-MWh contract with PG&E, enabling the company to build out its expertise in smaller-scale storage projects. In coordination with EDF Energy Services and Groom Energy, EDF can further provide commodity supply and energy efficiency equipment and services.

In 2018, EDF launched its energy flexibility, optimization and trading platform PowerShift. Developed by EDF's Energy's innovation accelerator Blue Lab, the platform is designed as a single source to optimize value from energy flexibility. In September 2019, Gresham House New Energy chose EDF to optimize 20 MW of battery storage and 4 MW of generation assets owned by the Gresham House Energy Storage Fund. The platform is expected to provide three categories of revenue. The first is ancillary services, where EDF Energy is anticipated to manage the asset on all the services and programs available through the National Grid. The second is load shifting, where EDF Energy is expected to dispatch assets according to non-energy costs and EDF TRIAD forecasts. The third category is wholesale optimization, for which EDF Energy is expected to apply its knowledge of the energy market and dispatch each asset against the day ahead, within day and cash out prices, as well using the balancing mechanism.

In 2019, EDF acquired the British energy storage and EV infrastructure developer Pivot Power, following the company's declaration last year that it would invest \$10 billion in energy storage by 2035. The deal gives EDF access to a 2 GW pipeline of projects and to Pivot's route to market, which includes oversizing batteries to be primarily used for grid services but also to supplement EV charging. In this way, the company can improve utilization of the interconnection and spread demand charges across a broader based of energy supplied either back to the grid or to an EV. In 2019 EDF made another acquisition with its purchase of the German aggregator and flexibility provider E2M, indicating a recognition by the company that energy storage assets turn to merchant markets (at least in the UK) for a portion of its revenue. While relatively new to the C&I DESS space, EDF is a high-ranking contender primarily because of the company's Staying Power, Go-to-Market Strategy, Geographic Reach, and customer data advantage.

[www.edf-re.com](http://www.edf-re.com)

**Chart 4-6. EDF Strategy and Execution Scores**



(Source: Guidehouse Insights)

#### 4.1.7 NantEnergy

*Overall Score: 76.1*

*Strategy: 74.5*

*Execution: 77.8*

Founded in 2008, NantEnergy (formerly Fluidic Energy) designs, manufactures, and markets energy storage solutions globally, providing backup power to critical wireless infrastructure, rural electrification microgrids, and distributed C&I energy management solutions. During the past 6 years, the company has installed 3,000 zinc-air battery systems in nine different countries, where it performed a cumulative 1.2 million cycles (amounting to 55 MWh of installed capacity). In 2018, NantEnergy acquired the energy systems and services business of Japanese technology provider Sharp and has since successfully executed projects for C&I customers in California and New Mexico.

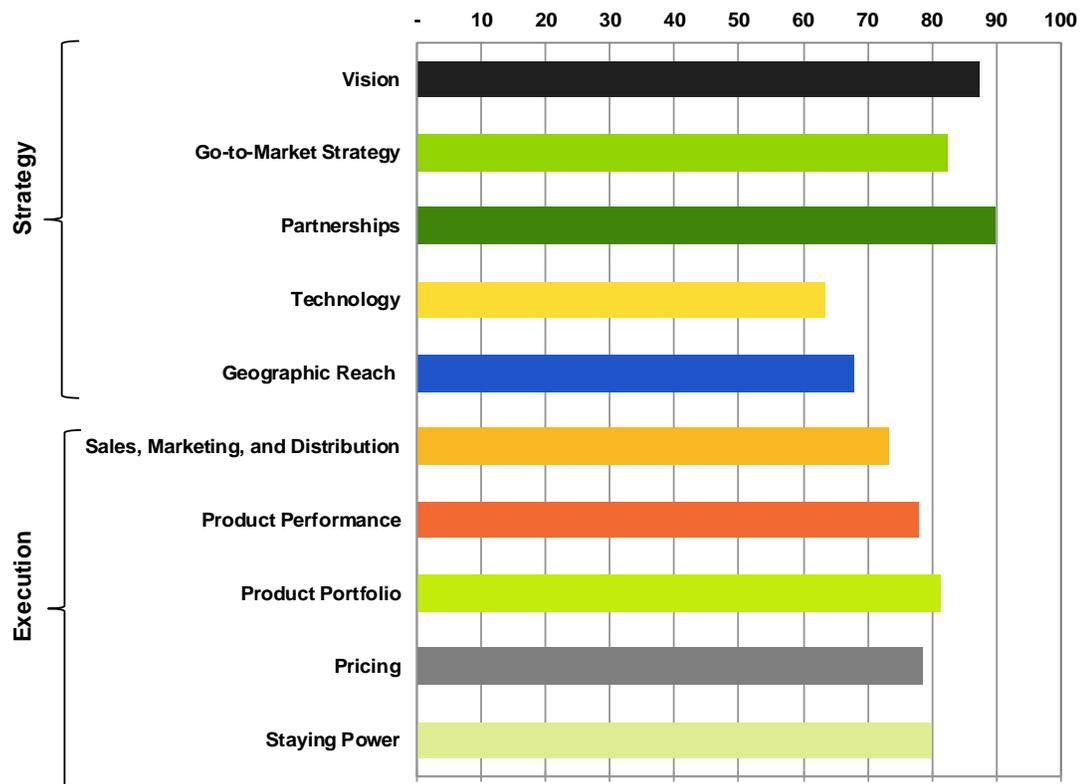
NantEnergy's SmartStorage energy solution is a managed energy storage technology package that allows C&I customers to lower peak demand usage and their utility bills. NantEnergy also prioritizes coupling distributed solar PV with energy storage to maximize electricity cost reduction with demand charge management. The company's comprehensive software platform can analyze site-specific load options, tariff details, solar PV inputs, potential battery use case scenarios, and building controls dispatch options to model and forecast energy savings. Its platform can operate and optimize the same inputs but does not offer the ability to aggregate ESSs across multiple sites (as of 2Q 2020).

NantEnergy's core focus is on how the system elements are integrated both onsite and with cloud-based management to provide maximum value for its customers. Its offerings include its in-house zinc-air battery, most appropriate for larger energy storage applications such as commercial buildings, campuses, remote locations, utility-scale projects, and community solar projects. The company offers two Li-ion systems. One is a 30 kW/40 kWh system and a 30 kW/80 kWh system that can be connected in series and scaled up to include 16 individual units, allowing the company to size a system specifically for its customer's needs. The other is a hybrid Li-ion/zinc-air ESSs deliver energy for short-, mid-, and long-term applications. This hybrid system can address the power and energy needs of a wide range of customers; it also offers several synergies for those customers seeking resiliency, lower technology and energy costs, and seeking to capture grid service revenue streams. In addition, NantEnergy's SmartStorage is offered with an optional 10-year asset management service agreement, which provides routine and unscheduled maintenance coupled with a 10-year demand reduction performance guarantee.

The technology and software capabilities of the SmartStorage product with NantEnergy’s technology and products in telecom and microgrid markets and have enabled the company to become a leader in large-scale BTM applications and in the broader stationary energy storage market.

[nantenergy.com](http://nantenergy.com)

**Chart 4-7. NantEnergy Strategy and Execution Scores**



(Source: Guidehouse Insights)

**4.2 Contenders**

The Contenders category in this market is crowded and includes eight of the 15 total companies profiled in this report. This category includes companies with diverse backgrounds in the industry that have shaped their offerings and approach to the market. Companies in this category are generally well positioned to find success as the market matures and potentially emerge as Leaders during the coming years.

#### 4.2.1 Greensmith Energy

*Overall Score: 74.8*

*Strategy: 73.5*

*Execution: 76.0*

Greensmith Energy, a Wärtsilä company, designs and deploys advanced ESSs, including hybrid solutions. Greensmith's software platform optimizes the performance of energy storage, lowering costs and maximizing ROI throughout the system's life. Greensmith's software platform is being used on more than 200 MW of energy storage projects for more than 50 major customers globally.

Greensmith Energy's parent company, Wärtsilä, is a leading global energy systems integrator offering a broad range of energy solutions. As of 2019, Wärtsilä has 65 GW of installed power plant capacity in 177 countries around the world.

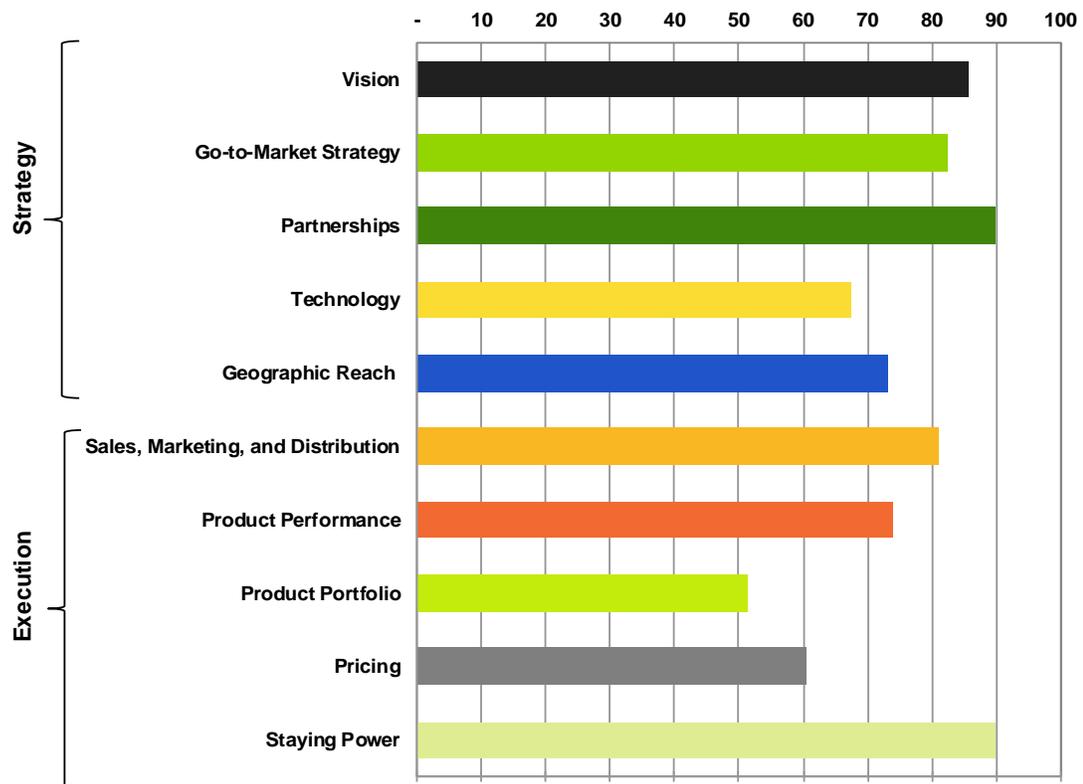
In 2016, Greensmith Energy launched its BTM energy storage solution, Omni4. The Greensmith Omni4 solution is a DES platform bundled with the advanced software controls to maximize a complete range of BTM and microgrid applications. Omni4 comes packaged with a NEMA 3R enclosure and is available in four configurable sizes—100 kW, 250 kW, 500 kW, and 1 MW—providing maximum flexibility for system sizing. All Omni4 systems come ready for deployment and include fully integrated, outdoor-rated enclosures, batteries, AC/DC protection, power conversion, thermal management, fire suppression and advanced software controls.

In 2019, Greensmith released Greensmith Energy Management Systems (GEMS) 6, the latest generation of its software platform. The software platform has been used to integrate a wide array of generation assets, including solar, wind, hydro, storage, and thermal. GEMS 6 is component-neutral to provide maximum flexibility and has integrated 16 different batteries to date, each according to the application needs of each project. GEMS 6 can be used independent from energy storage. With GEMS 6, renewable energy sources and engine systems can be equally modeled and simulated in a virtual environment using real-time data, allowing the software to be lab-tested (rather than onsite), and offers significant cost efficiencies in testing time, outages, and time-to-market. GEMS 6 also integrates weather and load forecast data to optimize an entire grid system.

Despite the company's experience and success, its focus in recent years has shifted toward utility-scale storage. As a result, Greensmith's scores for Vision and Go-to-Market Strategy have declined since this report was last published, resulting in the company's current ranking.

[www.greensmithenergy.com](http://www.greensmithenergy.com)

**Chart 4-8. Greensmith Energy Strategy and Execution Scores**



(Source: Guidehouse Insights)

#### 4.2.2 Lockheed Martin

*Overall Score: 74.7*

*Strategy: 70.0*

*Execution: 79.1*

Lockheed Martin is a publicly traded security and aerospace company headquartered in Bethesda, Maryland with 98,000 employees and 2019 revenue of approximately \$59.8 billion. Its Energy line of business delivers comprehensive solutions across the energy industry, including DR solutions, energy efficiency, energy storage, nuclear systems, tidal energy technologies, and bioenergy generation. Its Energy Solutions business implements efficiency, DR, and management solutions for seven of the largest 10 utilities in the US.

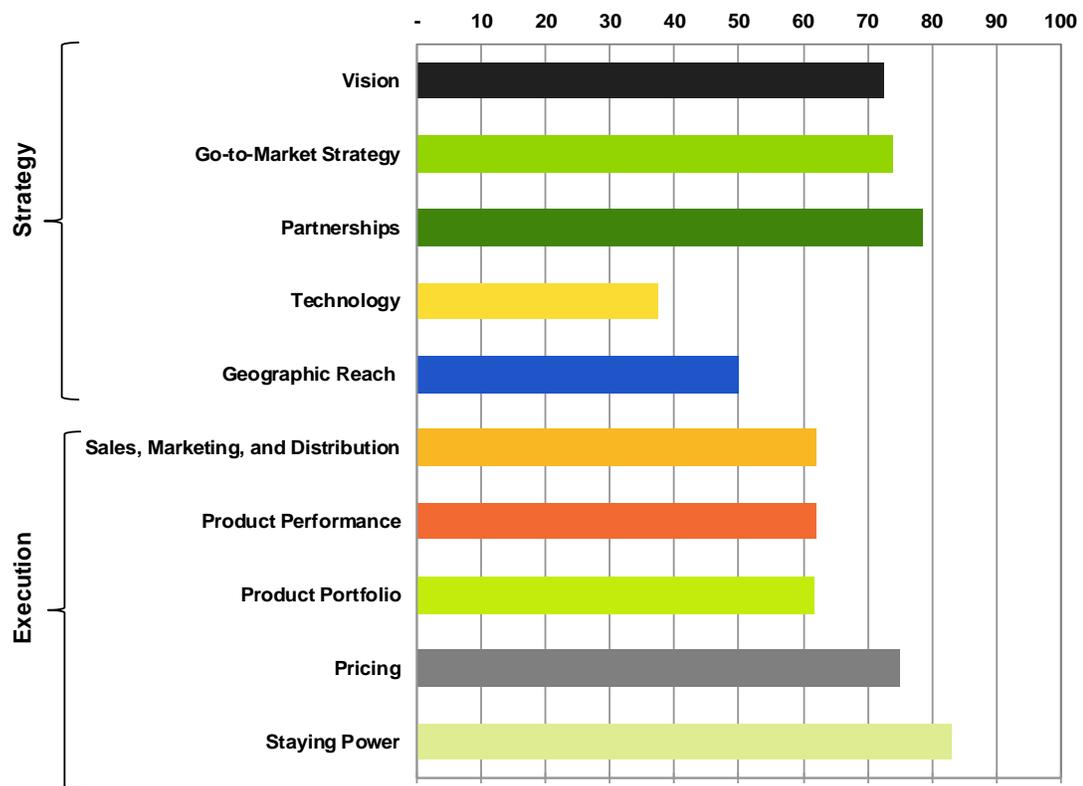
Lockheed Martin Energy sells modular ESSs to project developers, independent power producers, ESCOs, and utilities with turnkey design, manufacturing, and installation services. The company designs, manufactures, delivers, and supports turnkey energy storage solutions for utility and C&I customers. The company's GridStar Lithium Energy Storage Unit solution is a modular Li-ion system for short and medium duration energy storage and is scalable from 100 kW up to multiple megawatts. Lockheed Martin has successfully deployed more than 100 units of GridStar Lithium in 100 units in North America. As the market moves from shorter to longer duration energy storage, the company's GridStar Flow has the potential to satisfy the demands of large-scale C&I customers in the future.

Distributed-scale ESSs can be controlled by Lockheed Martin Energy's proprietary GridStar Site Controller and are also designed to be compatible with third-party control software. Lockheed Martin Energy offers pre-sales analytics and comprehensive system design and software for operation, daily dispatch, and optimization. The company has not publicly announced any financing partnerships or formal customer partnerships. Lockheed Martin Energy also offers a Smart Energy Enterprise Suite (SEESuite), an energy management system that commands, measures, and controls energy supply, demand, and usage. SEESuite includes a load management system (SEElload), a real-time monitoring system (SEEvview), and a remote data management system (VirtruGrid). All these systems help reduce costs and optimally deliver energy resources for a wide range of enterprises.

Lockheed Martin Energy has recently shifted emphasis away from offering complete microgrid solutions. It focuses on its energy storage and DER integration expertise rather than its controls. Lockheed Martin Energy's early and targeted approach to C&I energy storage deployments boosts its scores in terms of Product Portfolio, Vision, and Go-to-Market Strategy. Nevertheless, the company is geographically limited, with most deployments occurring in the US. In addition, Lockheed Martin has historically focused much of its work in the industrial space, limiting its access to other market segments.

[www.lockheedmartin.com/en-us/capabilities/energy.html](http://www.lockheedmartin.com/en-us/capabilities/energy.html)

**Chart 4-9. Lockheed Martin Strategy and Execution Scores**



(Source: Guidehouse Insights)

## 4.2.3 AMS

*Overall Score: 74.1*

*Strategy: 75.3*

*Execution: 72.9*

AMS is a software as a service company with an AI software platform that uses deep learning algorithms to enable optimized trading of energy assets in wholesale energy markets. AMS' business is powered by its transactive energy management platform, which AMS and its partners use to offer management services to customers, utilities, and asset owners and operators. The company first came to market when it won four DR energy storage agreements totaling 50 MW with Southern California Edison (SCE) in 2014 in an all resource competitive solicitation for resources to fill in supply gaps due to the retirement of the San Onofre nuclear power plant. As of April 2019, AMS has expanded its fleet within SCE territory to encompass 27 MW and 142 MWh of energy storage capacity at 40 sites. This expanding fleet has delivered in excess of 2 GWh of battery power in response to SCE dispatches.

AMS designed the SCE projects with its Armada software platform. The Armada platform identifies the most cost-effective technology design for three-dimensional financial performance—guaranteed customer savings, dispatchable capacity for contracted grid services, and investment-grade project-level returns. The projects are owned by Macquarie Capital and AMS manages the assets using the Armada platform to optimize and dispatch the battery systems to meet all three financial obligations for Macquarie. The Armada platform provides full ESS life cycle solutions, from pre-sales analytics for system modeling and design to daily dispatch, optimization, and aggregation.

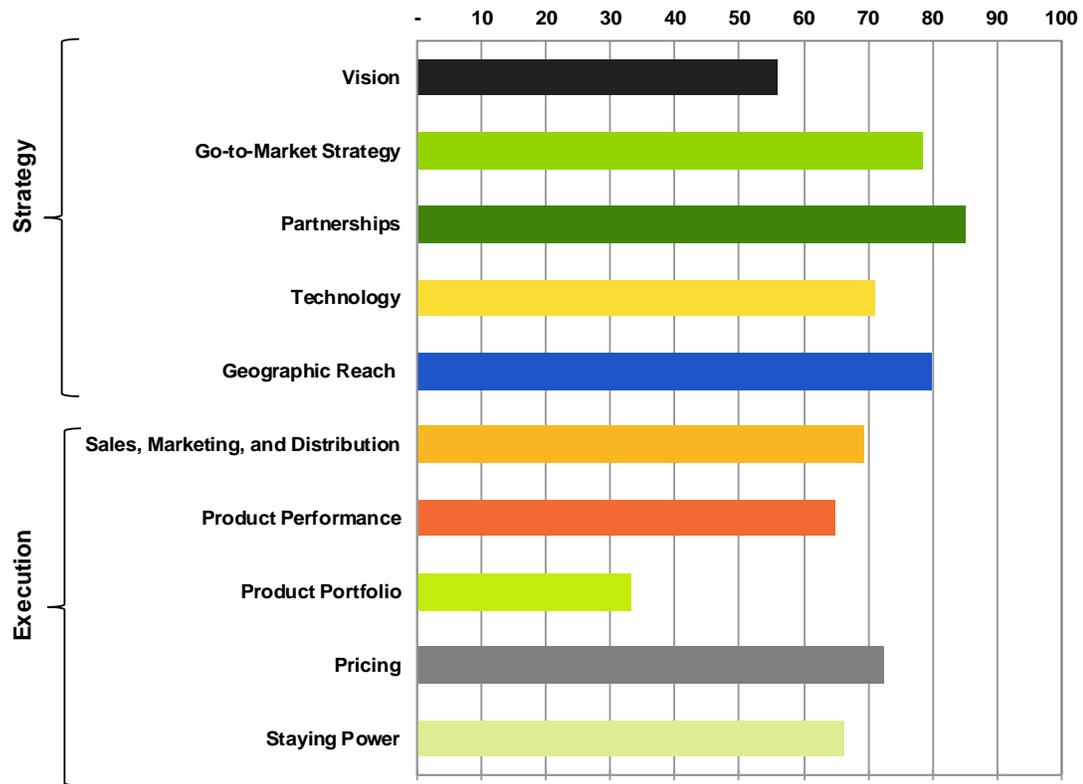
Since 2017, the San Francisco-based startup has shifted its focus from developing large-scale, BTM energy storage projects in California and a handful of other states, to becoming the provider of the software that allows others to optimize their own energy storage assets. For this reason, the company has scored lower on Vision and Product Portfolio as compared to their previous scores on the previous iteration of this report.

With a new focus on market-facing operations, AMS launched SigmaOne, an optimization software that uses algorithms to enable strategic optimized trading of energy assets, including battery storage, in competitive power markets. The platform uses AI and machine learning to forecast prices, supply, and demand; uses mathematical optimization to identify a revenue-maximizing bid strategy; and co-optimizes the bidding of hybrid resources to achieve portfolio objectives. Following SigmaOne launch, AMS has set its sights on enabling energy storage projects in markets outside California, including an early focus on Australia.

AMS has more than 90 MW of capacity currently under development. Its clients include: Shell Energy North America, the Inland Empire Utilities Agency, California State University System, the Irvine Company, Irvine Ranch Water District, and the Morgan Stanley Real Estate Investment Trust.

[www.advancedmicrogridsolutions.com](http://www.advancedmicrogridsolutions.com)

**Chart 4-10. AMS Strategy and Execution Scores**



(Source: Guidehouse Insights)

#### 4.2.4 NEC Energy Solutions

*Overall Score: 73.0*

*Strategy: 72.0*

*Execution: 74.0*

NEC Energy Solutions, a subsidiary of NEC Corporation headquartered in Westborough, Massachusetts, designs, manufactures, and integrates smart energy storage solutions for the electric grid and other applications with critical power needs. The company provides integration services and solutions ranging from battery systems for telecom, data center, and other industrial applications to utility-scale energy storage and control systems that support the operation of the grid. The company has installed more than 750 MW of ESSs globally.

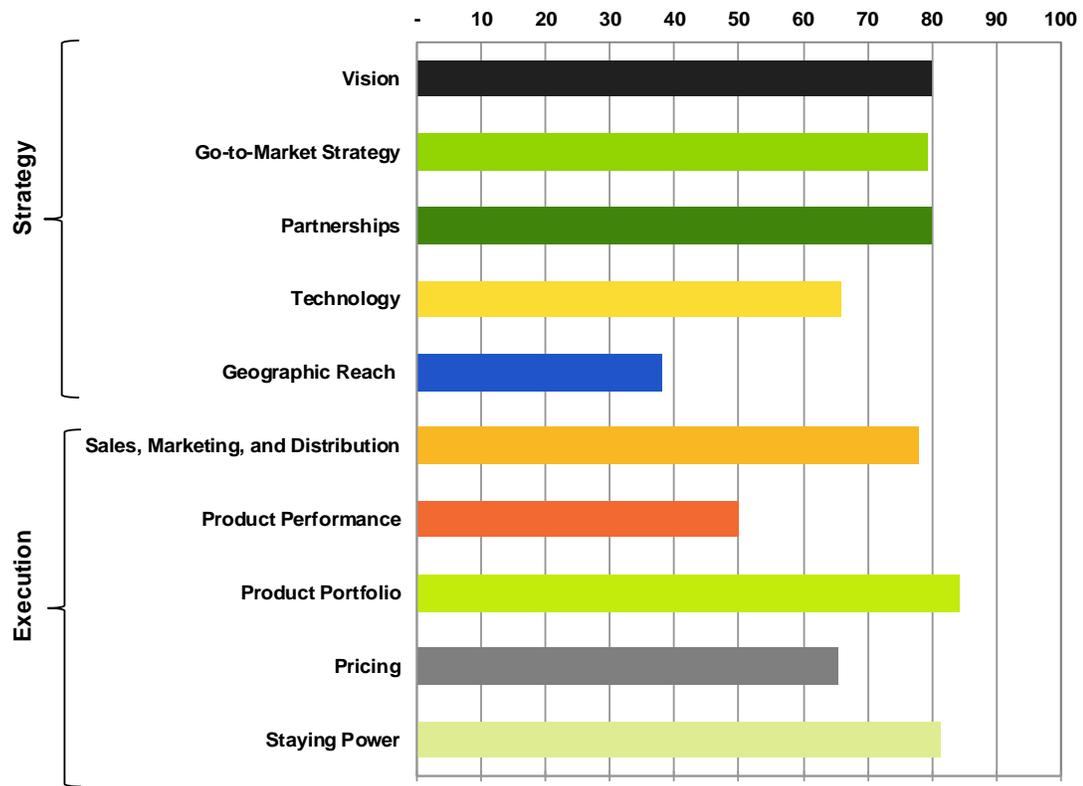
The company's Distributed Storage Solution (DSS) platform is a pre-configured, fully integrated AC energy storage platform optimized to support energy services creation at the grid edge. The platform is scalable from 85 kWh to 510 kWh of energy storage capacity and offers from 30 kW up to 650 kW of power capability. The company's AEROS software package offers operating modes that include switching from demand charge management to revenue earning by providing system services. NEC Energy Solutions plans for the software to facilitate the formation of aggregated portfolios of installations to permit a larger-scale provision of utility services.

In 2018, Neoenergia, active in distribution, generation and other parts of the supply chain in Brazil, contracted NEC Energy Solutions to deliver a Li-ion battery ESS to the Fernando De Noronha archipelago, on the company's scalable DSS platform. The project is to be managed by Brazil's Institute of Technology for Development through a Neoenergia subsidiary, Celpe, and the system is anticipated to store and integrate energy generated by two solar power plants. The project is the first form of energy storage installed in the region that enables daytime charging from solar.

In the UK, NEC Energy Storage has selected Dale Power Solutions, an electrical engineering company with more than 85 years in the uninterruptible power supply sector, as its authorized reseller, installer, operator, maintenance partner. This partnership is primarily for the DSSs the company is offering into the UK's C&I market, although it is likely to expand to include grid-scale, front-of-meter projects. Although nearly 90% of NEC Energy Storage's revenue is coming from the front-of-meter, grid-scale projects, the company is working to grow its role in the C&I segment for it to become a greater percentage of its revenue streams.

[www.neces.com](http://www.neces.com)

**Chart 4-11. NEC Energy Solutions Strategy and Execution Scores**



(Source: Guidehouse Insights)

## 4.2.5

## Stem

*Overall Score: 72.6*

*Strategy: 74.7*

*Execution: 70.5*

Stem, headquartered in Millbrae, California, was founded in 2009 and has operations in California, Arizona, Texas, Hawaii, Massachusetts, and New York. When Stem launched in 2012 as a rebranding of power electronics company Powergetics, the company designed hardware, developed and installed projects, controlled the assets with software and predictive analytics, and financed the product. In 2019, Stem pivoted to a partner-driven sales strategy with the introduction of the Stem Partner Network. This offering is a three-tiered solar partner program through which the company provides technical and software assistance to commercial solar installers that are seeking to add batteries to their deals. The newly launched partner network has brought in an estimated 159 MWh of contracts with more than 50 companies in 2019.

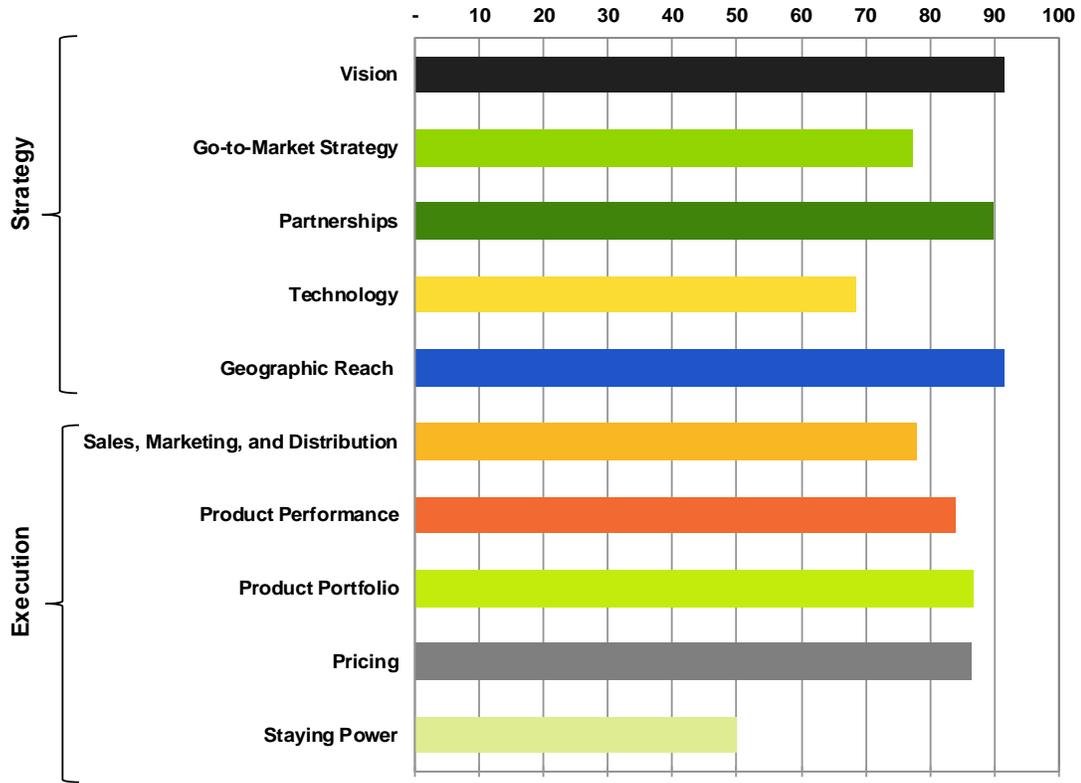
Stem's Athena, an AI platform, enables the company to optimize the timing of energy use for businesses and institutions, as well as across the utilities that serve it. The company does so by shifting energy use away from the most expensive times for network members while dispatching VPPs to strengthen the grid. The foundational components of Athena, including the Athena Edge Platform, Athena Cloud Platform, and Athena Analytics, deliver forecasting, monitoring, optimization, and automated controls capabilities. These components enable the platform to manage multiple applications, such as bill savings, solar-plus-storage optimization, market participation, and backup power. Athena's secure interface and web portal provide important data and transparency to partners, utilities, and grid operators. In 2019, financial modeling software provider Energy Toolbase integrated Stem's energy storage software to help communicate the economic benefits of storage at customer sites.

Stem has installed or contracted for more than 1,000 sites across six US states, Ontario, and Japan—totaling 400 MWh of energy, with 10 million runtime hours. Its signature project is the 85 MW VPPs it was contracted to develop and operate for SCE through its local capacity requirements procurement. Stem has partnered with eight Regional Transmission Organization/Independent System Operator/distributed systems operators and utilities as a market participant or by means of bilateral agreements, including SCE, San Diego Gas and Electric, PG&E, Hawaiian Electric, and Con Edison. Stem customers also include Fortune 500 companies such as Adobe, Albertsons, JC Penney, and Extended Stay Hotels. Stem has also secured more than \$110 million in equity funding and \$350 million in project funding from strategic investors. These investors include Activate Capital, Angeleno Group, BNP Paribas, Constellation Technology Ventures, Iberdrola (Inversiones Financieras Perseo), GE Ventures, Magnesium Capital, Mithril Capital Management, Mitsui & Co. LTD., Ontario Teachers' Pension Plan, RWE Supply & Trading, Temasek, and Total Energy Ventures.

Stem's ranking as a DESS integrator in the C&I space has dropped due to several key developments. In early 2020, the company confirmed it is looking for buyers, a change in tone from the previous year. This change negatively impacted the company's score for Vision. The company previously sold standalone batteries to save businesses money on their utility bills, but the company is increasingly reaching customers through channel partners in the solar industry. As commercial solar installers demonstrate an increased interest in adding energy storage to projects, Stem's new approach has the potential to give the company a more capital-efficient route to market while saving solar installers the hassle of developing storage expertise in house. Given the scale of Stem's portfolio and leading DES software platform, the company is expected to remain a leading player in the C&I DES integration space.

[www.stem.com](http://www.stem.com)

**Chart 4-12. Stem Strategy and Execution Scores**



(Source: Guidehouse Insights)

## 4.2.6 Fluence

*Overall Score: .72.5*

*Strategy: 71.0*

*Execution: 74.0*

Fluence is an energy storage technology and services company based in Arlington, Virginia that officially formed in 2018 with joint ownership by Siemens and AES Corp. The company was built to combine the offerings and expertise from Siemens' energy storage division and the market-leading group AES Energy Storage. Fluence has deployed or been awarded 701 MW of grid-connected storage projects in 16 countries, primarily in front-of-the-meter utility-scale systems. Its expertise expands across network and generation to energy end use. Fluence's five main service offerings include advisory and analytics, financing, deployment, asset life cycle services, and education and training. Fluence does not manufacture ESS components; the company procures hardware through ongoing relationships with preferred suppliers. It provides software/controls platforms and integrates hardware into complete units for customers. Fluence also offers a comprehensive financing program to customers through a partnership with the Siemens Financial Services group.

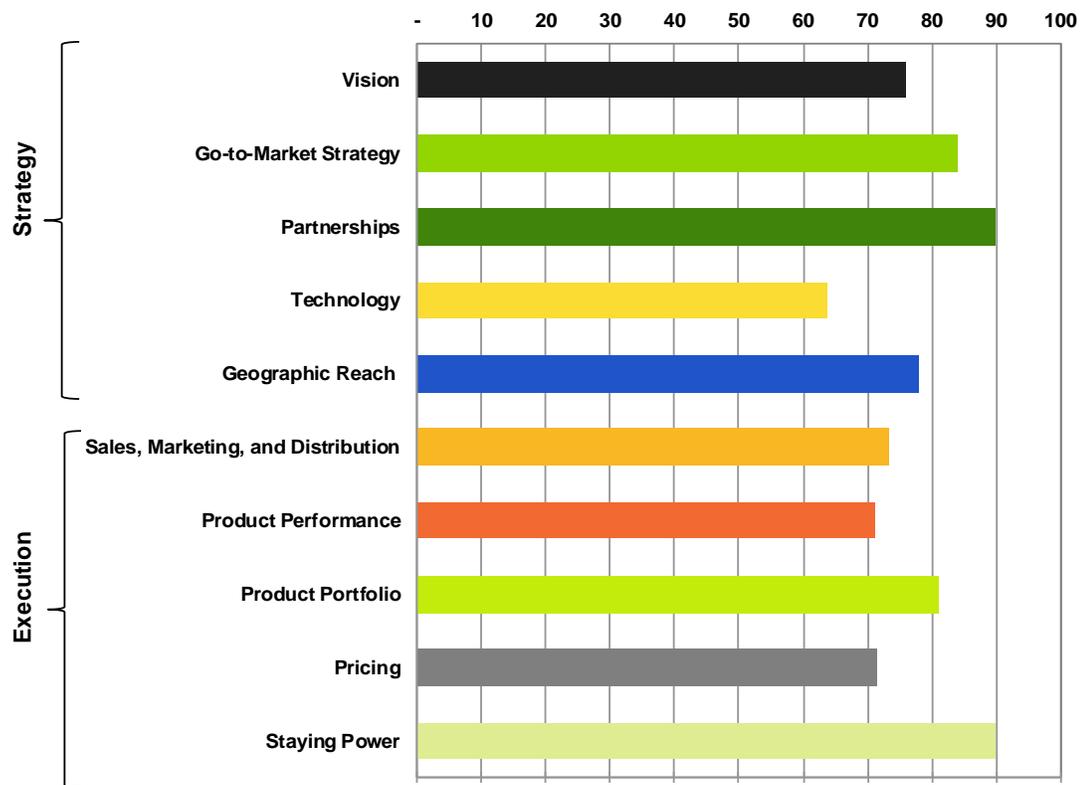
Fluence offers three main solutions, Advancion, SIESTORAGE, and SunFlex. The SIESTORAGE solution is underpinned by Fluence's proprietary power conversion technology that includes closed-loop controls and pulse modulation that enable rapid response times for critical power applications on the distribution grid and for large C&I customers. In early 2018, Fluence also launched SunFlex, a platform tailored to maximize the benefits of storage plus solar integration through improved solar capture, increased efficiency, and lower cost delivery. SunFlex uses a design that DC-couples the storage with the solar resource.

In 2018, Canadian company PUC Distribution announced a partnership with Fluence to bring energy management solutions to customers in the city of Sault Ste. Marie, Ontario. This partnership is anticipated to lead to a reduction in power bills for PUC customers and help reduce GHG emissions, to meet Canada's strict new federal carbon reduction mandates. To that end, Fluence supplies energy storage technology and EPC services for multiple projects, primarily for business customers, with the goal of reducing peak-load generation.

Fluence continues to have a large and increasingly diverse roster of projects spanning numerous customer types, applications, and geographic regions. Fluence is well positioned to capitalize on growth in the market with its connections to utilities and renewable energy developers through AES and conventional power providers and industrial customers through Siemens. The company offers a range of products built on standardized platforms to meet the needs of various customers yet maintain the flexibility to be customized for specific projects. While Fluence was ranked highly in the 4Q 2018 *Guidehouse Insights Leaderboard: Utility-Scale Energy Storage Systems Integrators* report, the company’s recent entrance into the C&I market and lack of experience deploying C&I ESSs has resulted in its current ranking in this *Leaderboard*.

[www.fluenceenergy.com](http://www.fluenceenergy.com)

**Chart 4-13. Fluence Strategy and Execution Scores**



(Source: Guidehouse Insights)

#### 4.2.7 IHI Energy Storage

*Overall Score: 70.3*

*Strategy: 67.5*

*Execution: 73.0*

IHI is a multinational Japanese company that produces heavy equipment, including engines and components for ships, aircrafts, automobiles, electrical infrastructure, and industrial machinery. The Tokyo-based corporation, founded in 1853, has roughly 29,000 employees and posted revenue of \$13.6 billion in 2019.

IHI Energy Storage was established in 2014. The group was positioned to develop software and provide energy storage products and services utilizing the software. In an effort to develop advanced optimization capabilities, IHI Energy Storage purchased the ESWare software suite from 24M—an advanced, non-linear, economic algorithm-based software. Since 2014, IHI Energy Storage has developed into a complete solar-plus-storage solutions provider with proprietary software and complementary services. IHI's solutions include adaptive, real-time operation software, technology agnostic system designs, and autonomous operation capabilities.

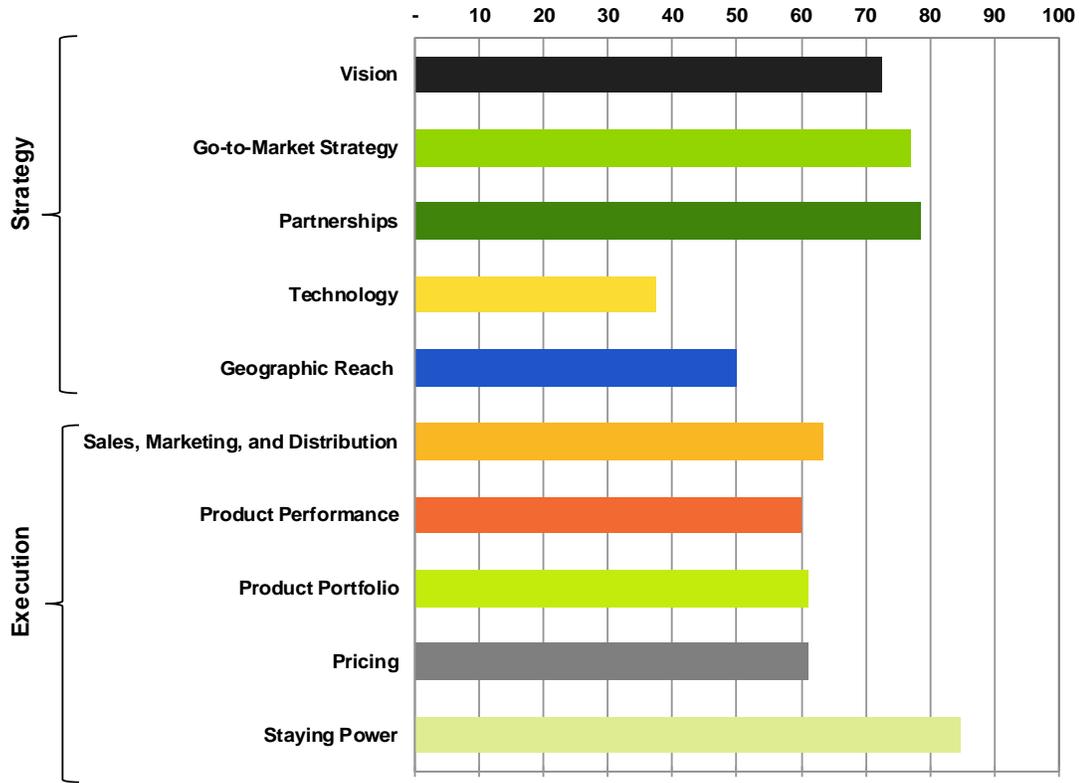
The ESWare suite is an end-to-end software solution, meaning all three products run on the same algorithm—which creates greater certainty that planned operation and real-time operation match. The ES/Analyzer carries out an analysis before a project is built to identify the optimal configuration. The ES/Optimizer carries out consistent onsite optimization of the operational schedule for the system. The ES/Pilot robustly and securely controls the physical hardware. This end-to-end algorithm structure coupled with the support offered by a well-established parent organization enables IHI Energy Storage to provide an advanced warranty to customers, reducing project risk and increasing clarity on system scheduling and deployment. The configuration of the software platform does not yet support VPP aggregation, building energy management, or BASs, and IHI has not established a publicly announced financing partnership.

In 2018, IHI Energy Storage and Convergent Energy + Power announced the launch of a 10 MW/ 20 MWh BTM ESS located in Sarnia, Ontario and designed to reduce Ontario's Global Adjustment charge for an industrial customer. Convergent contracted with IHI Energy Storage to provide O&M services and a capacity guarantee in addition to the ESS. This project marked IHI Energy Storage's entry into the Ontario market, with another 21 MW contracted in the region. IHI Energy Storage's Ontario offering also includes a neural-network based forecasting tool, ES/Forecaster. The ES/Forecaster is designed to enable customers to reduce their Global Adjustment charge. The software provides peak prediction services to help accurately determine when peak hours occur. With day-ahead forecasts, real-time alerts, and an online web portal with up-to-date forecasts and insight into peak probability, ES/Forecaster allows 2-hour battery systems to achieve 85% accuracy.

In July 2018, IHI Energy Storage and NRStor C&I LP announced eight contracted projects based on a new Memorandum of Understanding (MOU) between the two companies. The MOU was signed on June 8, 2018. Under the MOU, IHI Energy Storage is expected to deliver 42 MWh of BTM Li-ion battery solutions for transactions executed with eight C&I customers in Ontario, Canada. IHI Energy Storage's obligations under the agreement include delivery of the battery, inverter, energy storage software, temperature-controlled enclosure, full balance of plant and a full wrap of the system, including a warranty and O&M for the life of the project.

[www.ih-energystorage.com/](http://www.ih-energystorage.com/)

**Chart 4-14. IHI Energy Storage Strategy and Execution Scores**



(Source: Guidehouse Insights)

#### 4.2.8 Chint Power Systems North America

*Overall Score: 59.8*

*Strategy: 61.5*

*Execution: 58.0*

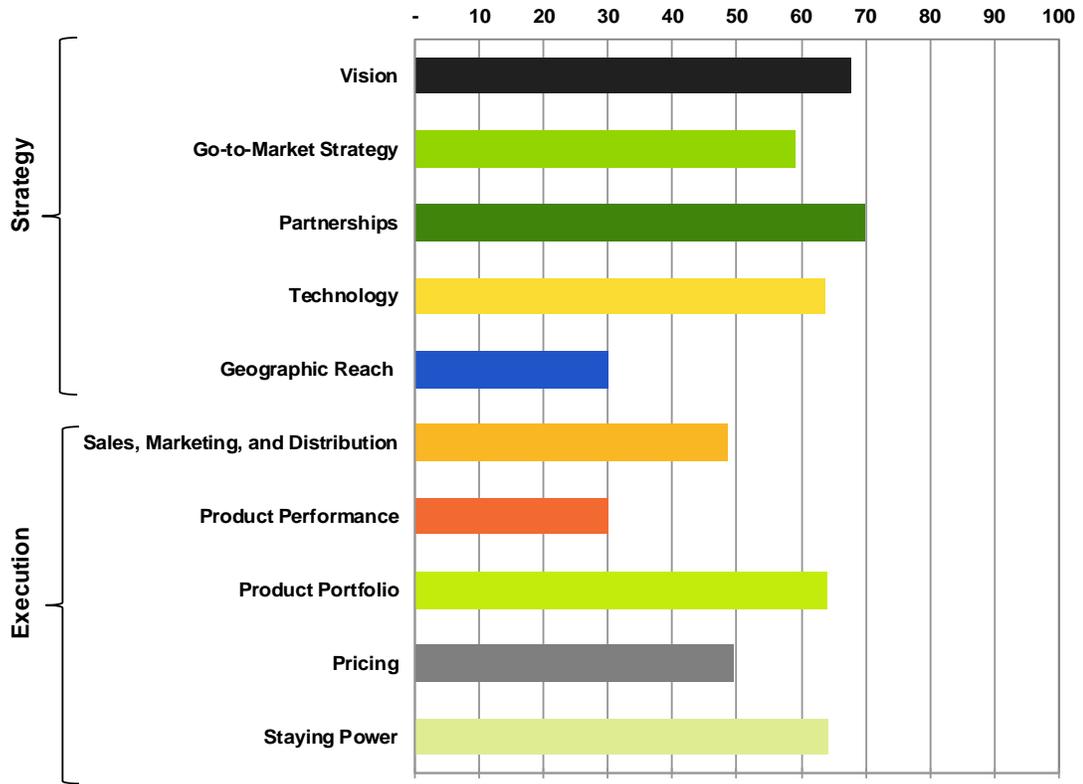
Chint Power Systems (CPS) North America is a subsidiary of Chint Power Global, a publicly traded smart energy company founded in China in 1984. CPS was founded in Texas in 2009. It has invested heavily in a local team and operates a service operations center in Dallas, Texas; a warehousing and distribution in Los Angeles, California; and a sales and marketing office in San Francisco, California. With more than 3 GW installed in the US market since 2009, CPS is widely regarded as the market leader for commercial string inverters and has recently made a strategic entry as a vertically integrated ESS provider.

In 2019, CPS and Pason Power, a provider of adaptive intelligent software for energy assets, announced that CPS has chosen Pason Power's software to be integrated into its ESS as the exclusive platform for C&I customers. As a result, CPS energy storage solutions come fully integrated with Pason Power's intelligent Energy Management System (iEMS) software, which uses machine learning and AI to optimize the dispatch of the system. The integration of the Pason Power platform with the CPS systems gives customers the ability to confidently size, procure, and install intelligent ESSs, while also providing faster delivery times and cost certainty. The CPS ESSs are designed for demand charge reduction, time of use shifting, PV self-consumption, and backup power applications. For its turnkey energy storage solution, CPS has achieved UL 9540 certification for the 30 kW/65 kWh, 30 kW/130 kWh, and 60 kW/130 kWh sizes.

In 2019, Energy Toolbase, an industry-leading software platform that specializes in modeling and proposing the economics of solar and energy storage projects, merged with Pason Power following the Pason Systems Inc. acquisition of a majority interest in the company. The combination is anticipated to lead to a full suite of project estimating, storage control, and asset monitoring products for developers to more efficiently develop and deploy projects. In addition, Energy Toolbase has integrated the CPS energy storage solution into its platform. This integration allows distributed energy developers to quickly and accurately analyze the economic viability of standalone storage and solar-plus-storage projects for C&I customers. There is no additional cost for Energy Toolbase users to use the CPS integration to run storage dispatch simulations and savings analyses representative of how the CPS system, controlled by the Pason Power iEMS, would operate in the field.

[www.chintpowersystems.com](http://www.chintpowersystems.com)

**Chart 4-15. Chint Power Systems North America Energy Strategy and Execution Scores**



(Source: Guidehouse Insights)

## Section 5

### Acronym and Abbreviation List

AI .....	Artificial Intelligence
AMS.....	Advanced Microgrid Solutions
BAS .....	Building Automation System
BEMS .....	Building Energy Management System
BTM.....	Behind-the-Meter
C&I .....	Commercial and Industrial
CPS.....	Chint Power Systems
DC .....	Direct Current
DER.....	Distributed Energy Resources
DES.....	Distributed Energy Storage
DESS.....	Distributed Energy Storage System
DG .....	Distributed Generation
DR .....	Demand Response
DSS.....	Distributed Storage Solutions
EPC.....	Engineering, Construction, and Procurement
ESCO.....	Energy Service Company
ESS .....	Energy Storage System
EV.....	Electric Vehicle
GEMS.....	Greensmith Energy Management Systems
GHG .....	Greenhouse Gas
GW .....	Gigawatt
GWh.....	Gigawatt-Hour
EMS.....	intelligent Energy Management System
kW .....	Kilowatt

kWh .....	Kilowatt-Hour
Li-ion.....	Lithium Ion
MOU.....	Memorandum of Understanding
MW.....	Megawatt
MWh.....	Megawatt-Hour
NPV .....	Net Present Value
O&M .....	Operations and Maintenance
PG&E .....	Pacific Gas and Electric
PPA .....	Power Purchase Agreement
PV.....	Photovoltaics
ROI.....	Return on Investment
SCADA.....	Supervisory Control and Data Acquisition
SCE .....	Southern California Edison
UK .....	United Kingdom
US .....	United States
VPP .....	Virtual Power Plant

# Section 6

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## Section 8

### Scope of Study and Methodology

#### 8.1 Scope of Study

Distributed-scale ESS technology and project delivery chains for single ESS deployments, as well as VPPs, are starting to mature. Few companies are playing strictly a standalone systems integration role. In this *Leaderboard*, Guidehouse Insights ranks companies that exhibit the following characteristics:

- Focus a significant portion of their go-to-market strategy on the DES segment
- Develop and implement (or acquire access to) a comprehensive energy storage software platform exhibiting many of the criteria outlined in Section 2
- Incorporate several of the beyond standalone systems integration capabilities outlined in Section 2 as part of their go-to-market strategy and execution efforts

#### 8.2 Sources and Methodology

Guidehouse Insights' industry analysts use a variety of research sources in preparing Research Reports. The key component of Guidehouse Insights' 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 Guidehouse Insights' 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 Guidehouse Insights' 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.

Guidehouse Insights is a market research group whose goal is to present an objective, unbiased view of market opportunities within its coverage areas. Guidehouse Insights 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.

### 8.2.1 Vendor Selection

Guidehouse Insights included companies in this report that focus a significant portion of their go-to-market strategy and software platform technology development on the DES segment. These companies also incorporate several of the beyond standalone systems integration capabilities outlined in Section 2 as part of their strategy and execution efforts.

### 8.2.2 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

#### 8.2.2.1 **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.

## 8.2.3 Criteria Definitions

### 8.2.3.1 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. Higher scores are given to companies that have a strong software platform focus and site-specific tariff/load analysis capabilities, are strategically aligned investors with access to C&I customers, are primarily focused on C&I segment, have access to innovative no money down financing, and are moving toward designing and procuring standardized ESSs.
- **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. Companies that engage in direct project development, have implemented a multi-channel sales approach, pursue VPP channels, have created access-to-customers/customer data advantages, and can deliver no money down financing through multiple contract options score higher.
- **Partnerships:** Measures the company's established partnerships with key organizations that will provide an advantage in financial backing, sales, business, and product development. Companies that are pursuing strategic partners to access grants, batteries, inverters, solar PV, financing, tariff/load analysis, and retail electricity procurement across a multipronged channel sales approach score higher.
- **Technology:** Evaluates whether the company has developed technology that provides a significant business advantage over competitors that is likely to have an enduring effect on its success. Higher scores are given to companies that have commercially available ESS modules and can integrate site-specific load and tariff analysis, DG, and building controls into their analytics analysis, operations, and optimization algorithms.
- **Geographic Reach:** An evaluation of companies' ability to reach national and international customers through networks of distributors and resellers. Scores are lower if the company does not have a sales strategy in key distributed-scale ESS markets and market segments.

### 8.2.3.2 Execution

- **Sales, Marketing, and Distribution:** Evaluates the company's marketing and sales performance and current distribution channel. Higher scores are given to companies with that are executing on the go-to-market advantages outlined above.
- **Product Performance:** Evaluates the competitive performance of the company. Higher scores are given to companies with a track record of positive performance for projects deployed and a pipeline project under development for single ESS and aggregated ESSs in VPPs with no money down financing options.
- **Product Portfolio:** Addresses the products' relative competitiveness in and suitability to the market. Higher scores are given for companies that have commercially available ESS modules with access to multiple vendors and string software capabilities and can integrate site-specific load and tariff analysis and DG such as solar PV and building controls into their analytics analysis, operations, and optimization algorithms.
- **Pricing:** Determines the suitability of product pricing based on the feature set, including whether products are available at multiple price points and how pricing compares to that of competitor products. The ability to integrate DG such as solar PV and building controls into companies' delivery with multiple technology vendors and financing options is important in this segment.
- **Staying Power:** Evaluates whether the company has the financial resources to withstand weak or variable markets and price-based assaults by competitors. Companies score higher if they are part of a large well-funded corporate entity or are aligned with strategic investment partners that can accelerate their access to customers and customer data in the distributed-scale ESS segment.

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*This report closed for editing prior to the World Health Organization's declaration of the COVID-19 global pandemic on March 11, 2020, and therefore, reflects conditions in the commercial and industrial energy storage systems integrator market and the general economy prior to the outbreak. Subsequent changes to government priorities and supply chain, manufacturing, and other economic disruptions experienced as a result of the global COVID-19 pandemic are not factored into the forecasts or analysis included in the report.*