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AWARDS

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2020 BEST PRACTICES AWARD



**Lightning
Systems**

**2020 NORTH AMERICAN
ELECTRIC COMMERCIAL VEHICLE
CUSTOMER VALUE LEADERSHIP AWARD**

Contents

Background and Company Performance	3
<i>Industry Challenges</i>	3
<i>Customer Impact and Business Impact</i>	7
<i>Conclusion</i>	7
Significance of Customer Value Leadership	8
Understanding Customer Value Leadership	8
<i>Key Benchmarking Criteria</i>	9
Best Practice Award Analysis for Lightning Systems	9
<i>Decision Support Scorecard</i>	9
<i>Customer Impact</i>	10
<i>Business Impact</i>	10
<i>Decision Support Matrix</i>	11
Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices	12
The Intersection between 360-Degree Research and Best Practices Awards.....	13
<i>Research Methodology</i>	13
About Frost & Sullivan	13

Background and Company Performance

Industry Challenges

Among the novel solutions in vehicle propulsion that were expected to eliminate the internal combustion engine (ICE), electric vehicle (EV) technology has come the furthest. In the United States, nearly 35% of light commercial vehicles (CVs) for in-town applications are estimated to be equipped with alternative powertrains in 2030, and battery EVs are expected to make up 86% of this category. The corresponding figures for the medium-duty truck category are 17% and 75%, respectively. EVs naturally dominate the discourse on green and sustainable motoring, and any debate or policy that seeks to reduce the carbon footprint is incomplete without deliberation on the positive impact of EVs on the environment. Such enthusiasm for wider deployment notwithstanding, EV technology has had to cope with its fair share of headwinds, especially in the CV space.

Stakeholders (e.g., fleet owners, managers, facility teams, and maintenance department personnel) in the CV ecosystem have been apprehensive about hopping on the EV bandwagon. The pain points that deter traditional CV operators contemplating the gradual electrification of their fleets invariably include high upfront costs and anxiety regarding the downtime spent charging. Range uncertainties typical of EVs are aggravated by the limited availability of well-networked charging infrastructure suited to their applications. In addition, the vague total cost of ownership calculations and the absence of a suitable product offering that optimally addresses the specificities of each application are other dissuading factors. Of these, downtime and range anxiety merit special consideration.

Range anxiety with EVs is regarded as the commercial electric fleet operator's foremost irritant because breakdowns can wreak havoc on revenues and profits in a sector where time is money. Failure to deliver loads, especially perishable commodities, on time can significantly dent business prospects and reputations in the commercial space. Any unforeseen surge in energy demand during a trip such as heavy heater/air conditioning usage or exceptionally hilly routes, can adversely impact the range if an adequate buffer charge is not ensured beforehand. Assuring range requirements are met through vehicle planning, route optimization, driver training, and suitable charging solutions is thus a crucial prerequisite if wider adoption of EVs in the commercial segment is to become a reality.

Furthermore, application-specific constraints and requirements with respect to charging must be addressed. The diverse nature of commercial applications calls for an equally diverse range of deployed battery replenishment strategies. Vehicles driven around the city intermittently throughout the day, such as public transport, require high-voltage, fast-charging solutions, whereas vehicles on shorter routes can be managed with low-voltage sources.

Operators in the CV space are vocal about the challenges they encounter and would gladly welcome appropriate solutions that address these unique concerns. US-based fleet electrification participants are tailoring their portfolios to address the unmet need for a reliable, fail-safe end to end solution. One of these market participants, Colorado-based

Lightning Systems, is addressing the need with a comprehensive fleet electrification offering in response to this market demand.

Lightning Systems is a fleet electrification company that provides the full breadth of solutions including electric vehicles, EV charging, and telematics. As an original equipment manufacturer (OEM)-qualified vehicle modifier, Lightning Systems manufactures all-electric powertrains and then converts ICE-equipped CVs to zero emissions vehicles. In addition, the company offers conventional AC and DC charging solutions, and robust, integrated telematics in all vehicles. Lightning caters primarily to the North American market.

The core business for Lightning Systems is commercial fleet electrification. Popular commercial vehicle models with GVWR spanning from 10,000 lbs to 45,000 lbs are upfitted with electric powertrains that are energy efficient and eco-friendly while maintaining or improving functionality in terms of Power-to-Weight ratio, load-carrying ability and turn-around times. Common platforms are chosen for upfits like the Ford Transit 350HD (Passenger & Cargo type), E-450 (Shuttle & Cutaway), F-550, F-53/59 Commercial Stripped Chassis models, and Gillig transit buses. The fleet managers therefore do not have to worry about serviceability as they can access readily available spares at short notice, even from e-commerce websites like Amazon. Manpower with the requisite training and expertise to repair and maintain these time-tested platforms are also not hard to find. Lightning is a Ford certified eQVM partner.

During the electrification process, the vehicle in its stock configuration undergoes what is called a “de-contenting” process wherein the IC engine, transmission, fuel tank, exhaust system and other ancillaries are dismantled from the chassis. These are then replaced with the electric powertrain and accessory bank, followed by connections of the low and high voltage wiring harnesses. The battery packs are mounted on a framework built by in-house welders and assembled on to the stock frame. The electric powertrain is elegantly engineered to optimize vehicle performance, safety, and maintainability. The specifics of the application may limit the longitudinal and lateral position of the battery pack(s) to a restricted area due to safety and/or load carrying requirements, which vary widely between use cases. At the same time, fitment of battery and other components must also be in-line with OEM guidelines for modification processes like hole drilling and surface grinding. The overall process must also not alter the vehicle weight distribution and dynamics beyond permissible levels defined by the OEM, who perform periodic audits of the upfit process. The result of this stringent scrutiny and adherence to quality standards is Lightning's status as a Ford certified eQVM partner that assures the OEM warranty remains intact post modification and the vehicle still qualifies for the OEM's Motor credit financing program.

From humble beginnings with hydraulic hybrid systems, Lightning Systems has made rapid strides towards providing zero emission solutions in the commercial passenger and cargo delivery segments. The contribution made by Lightning to the whole eco-system cannot be overstated. At the forefront of fleet electrification, Lightning along with other players in the upfitting community have driven down the per kWh costs of CV Batteries by 50% to \$500 compared to five years ago, and Lightning expects to make additional improvements in battery cost in the next 12-24 months. By addressing supply chain constraints through

vertical integration, Lightning now offers its own line of chargers which are the lifeblood, and arguably the most complex aspect, of fleet electrification. For applications with daily range of 200+ miles, Lightning also has hydrogen fuel cell technology to offer. Every additional mile of range in transit applications beyond 150 miles costs at least \$500 when powered purely by batteries, which is where the marriage of battery and hydrogen fuel cells makes economic sense.

Lightning operates in a niche segment where it does not make business sense for OEMs to channel investments into. The Class 3 and above commercial segment is characterized by low volumes, and diverse operational requirements where a one-size fits all approach does not work. Last mile delivery in fixed route passenger and freight applications require specific modular battery solutions that Lightning is well poised to offer. Lightning offers training to drivers, maintenance staff, and fleet managers, and has also tied up with service and conversion partners nationwide, ultimately serving the customer better from a logistics standpoint.

The numbers reflect Lightning's growing popularity as the electric CV industry is at the threshold of Electrification 2.0. Lightning deployed 40 vehicles, across 15 customer groups in 2019, and is confident of putting another 260 vehicles on the road in 2020. With an ambitious target of 1,500 vehicles in 2021, Lightning seems to be taking one step at a time towards achieving the milestone of \$1bn in revenues in the next five years with local regulatory interventions like the zero-emissions freight zones nudging the industry towards sustainable motoring.

Customer Impact and Business Impact

Customer Acquisition and Growth Potential

Extensive outreach to industry veterans has helped Lightning Systems develop a deep understanding of the complications in the CV business. The company has addressed the following recurring concern that arose during its interaction with existing customers: a lack of a stable fallback option in the face of unforeseen business exigencies that necessitate the emergency charging of CV batteries.

Customers opine that progress can be crippled because of incomplete or partial charging from charger malfunctions or time overruns beyond regular vehicle operation schedules prior to a subsequent long-haul trip for a freight truck or a heavy-duty schedule for a work truck. Another hassle that customers reported to Lightning Systems is the protracted and occasionally year-long licensing and permitting procedure that precedes the on-site installation of Level 3 DC fast chargers.

Based on customer feedback, Lightning Systems learned that a mobile charging solution that enables regular Level 2 AC charging off the grid, but replenishes DC fast charging on a charge-starved vehicle addresses the emergency charging woes that plague the segment. In addition, this type of solution makes life easier for customers that have already purchased vehicles that require Level 3 DC fast charging. In the wake of their purchase, customers need an interim solution that can help them overcome the limited access to a full-fledged stationary charging source as they wait for in-house installation permits. The wider

proliferation of public charging infrastructure along the routes customers frequent is expected to take some time, and a mobile charger could alleviate the existing concern.

Furthermore, a high-capacity charging system, such as Lightning Mobile, can address the following key challenge highlighted by customers: the need to mitigate peak charging time upcharges. For example, peak demand charges in California can double or more the cost of electricity. For fleets that must charge their CEV during peak periods, a battery storage device such as Lightning Mobile can be charged during off-peak periods, and then dispense electricity via DCFC during peak times saving significant money.

Lightning Systems relies heavily on industry feedback to develop customized product solutions that effectively address end user's specific issues. This approach has paid rich dividends for the company in terms of acquiring customers through favorable word of mouth and has enhanced the satisfaction and retention of existing customers, auguring well for the company's growth prospects in the medium term.

Operational Efficiency

Lightning Systems has created a robust telematics framework by investing in manpower, equipment, and customizable reports capability that enables the on-demand monitoring of key performance indices by fleet managers. Every Lightning Systems-modified vehicle and mobile charging unit is equipped with a telematics controller that interfaces with the CAN bus and connects to servers over an encrypted 4G network to monitor the vehicle's operational parameters and - in aggregate - the fleet's overall health.

Dedicated teams work on dashboards that offer deep insights into both quantitative and qualitative business metrics that can steer decision making toward higher profitability. Input from the staff analyzing the telematics data can bring calibrated course corrections to the business where required.

The staff at Lightning Systems ensures that variables, such as driving behavior, acceleration and braking patterns, the nature of terrain and topography, weather, loading patterns, power draws of electrical accessories, and the combined effects on energy consumption, are analyzed thoroughly and acted upon by the end user to set up the EV for optimal savings and efficiency. The attendant luxury of remotely tracking the state of charge can aid in route selection and optimization for efficient energy use. Operators unperturbed by range anxiety can then focus more on other avenues to improve fleet productivity and efficiency. These reports are offered at a nominal cost and provide good value for the money because they will ultimately pay for themselves in the longer run based on insight-driven savings. Employees at Lightning Systems, therefore, play a crucial role in helping customers get their basics right.

Customer Purchase, Ownership, and Service Experience

Traditional CV fleet operators are generally uninitiated in the nuances of fleet electrification and are likely to encounter challenges that come with venturing into uncharted territory. Customer intimacy can thus go a long way in reassuring customers until they can navigate the EV landscape independently.

What sets Lightning Systems apart from the competition is its high-touch approach to customer engagement throughout the product's lifespan. Unlike OEMs and other modifiers and charging solution providers in the electric CV space, Lightning Systems is well equipped with manpower, expertise, and the willingness to go the extra mile to understand customers' requirements. Lightning Systems, therefore, can develop bespoke solutions and make its go-to-market model a positive outlier among the traditional methods of market needs assessment. This 'close-knit' philosophy enables Lightning Systems to score high on indices that gauge customer satisfaction.

In addition, the company offers a full charging as a service (CaaS) offering, taking the burden of deploying and maintaining charging infrastructure off the plate of their customers. For a monthly fee, Lightning will design an optimal charging solution, provide the chargers, and then project manage the installation including obtaining permits from concerned state and federal authorities where applicable. They then maintain and monitor the full solution providing the fleet with all needed reporting. Such liaison activities can be a gamechanger, especially in a market that is exploring nascent technologies that have concomitant procedural and legal implications.

Lightning Systems' products are conceived to ensure that servicing and maintenance activities require minimal incremental expenditures incurred by training existing manpower. The company offers an hour-long basic familiarization course to ensure the customer is prepared for maintenance across its range of products. End-user convenience and peace of mind are thus of paramount importance and a high priority for the customer support team at Lightning Systems.

Conclusion

Lightning Systems has undertaken a holistic approach to the electrification of the CV segment and has based its major business decisions on a comprehensive evaluation of key pain points in the EV ecosystem. While helping electrify CV fleets with reliable retrofit powertrains, Lightning Systems also offers a full suite of commercial EV charging solutions to fit any fleet's needs, and robust vehicle telematics to optimize their use. Such an integrated approach to problem solving will continue paying rich dividends for both the company and its customers in the long run.

Lightning Systems is well positioned at the vanguard of the CV electrification agenda, spearheading cost-effective, convenient solutions that address customers' specific demands and concerns. In addition, the company is nimble enough to respond to emerging trends and receptive to customer feedback that indicates scope for further improvements in its product line and service delivery.

For its strong overall performance, Lightning Systems has earned Frost & Sullivan's 2020 Customer Value Leadership Award in the North American electric CV industry.

Significance of Customer Value Leadership

Ultimately, growth in any organization depends on customers purchasing from a company and then making the decision to return time and again. Satisfying customers is the cornerstone of any successful growth strategy. To achieve this, an organization must be best in class in 3 key areas: understanding demand, nurturing the brand, and differentiating from the competition.



Understanding Customer Value Leadership

Customer Value Leadership is defined and measured by 2 macro-level categories: Customer Impact and Business Impact. These two sides work together to make customers feel valued and confident in their products' quality and performance. This dual satisfaction

translates into repeat purchases and a lifetime of customer value.

Key Benchmarking Criteria

For the Customer Value Leadership Award, Frost & Sullivan analysts independently evaluated Customer Impact and Business Impact according to the criteria identified below.

Customer Impact

- Criterion 1: Price/Performance Value
- Criterion 2: Customer Purchase Experience
- Criterion 3: Customer Ownership Experience
- Criterion 4: Customer Service Experience
- Criterion 5: Brand Equity

Business Impact

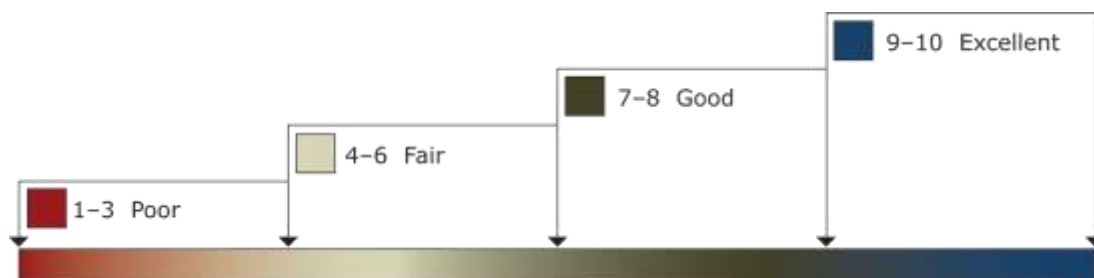
- Criterion 1: Financial Performance
- Criterion 2: Customer Acquisition
- Criterion 3: Operational Efficiency
- Criterion 4: Growth Potential
- Criterion 5: Human Capital

Best Practices Award Analysis for Lightning Systems

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows research and consulting teams to objectively analyze performance according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation. Ratings guidelines are illustrated below.

RATINGS GUIDELINES



The Decision Support Scorecard considers Customer Impact and Business Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criterion are provided beneath the scorecard). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, Frost & Sullivan has chosen to refer to the other key participants as Competitor 1 and Competitor 2.

<i>Measurement of 1-10 (1 = poor; 10 = excellent)</i>			
Customer Value Leadership	Customer Impact	Business Impact	Average Rating
Lightning Systems	9	9	9
Competitor 1	4	7	5.5
Competitor 2	7	3	5

Customer Impact

Criterion 1: Price/Performance Value

Requirement: Products or services offer the best value for the price, compared to similar offerings in the market.

Criterion 2: Customer Purchase Experience

Requirement: Customers feel they are buying the optimal solution that addresses both their unique needs and their unique constraints.

Criterion 3: Customer Ownership Experience

Requirement: Customers are proud to own the company’s product or service and have a positive experience throughout the life of the product or service.

Criterion 4: Customer Service Experience

Requirement: Customer service is accessible, fast, stress-free, and of high quality.

Criterion 5: Brand Equity

Requirement: Customers have a positive view of the brand and exhibit high brand loyalty.

Business Impact

Criterion 1: Financial Performance

Requirement: Overall financial performance is strong in terms of revenue, revenue growth, operating margin, and other key financial metrics.

Criterion 2: Customer Acquisition

Requirement: Customer-facing processes support the efficient and consistent acquisition of new customers, even as it enhances retention of current customers.

Criterion 3: Operational Efficiency

Requirement: Staff is able to perform assigned tasks productively, quickly, and to a high quality standard.

Criterion 4: Growth Potential

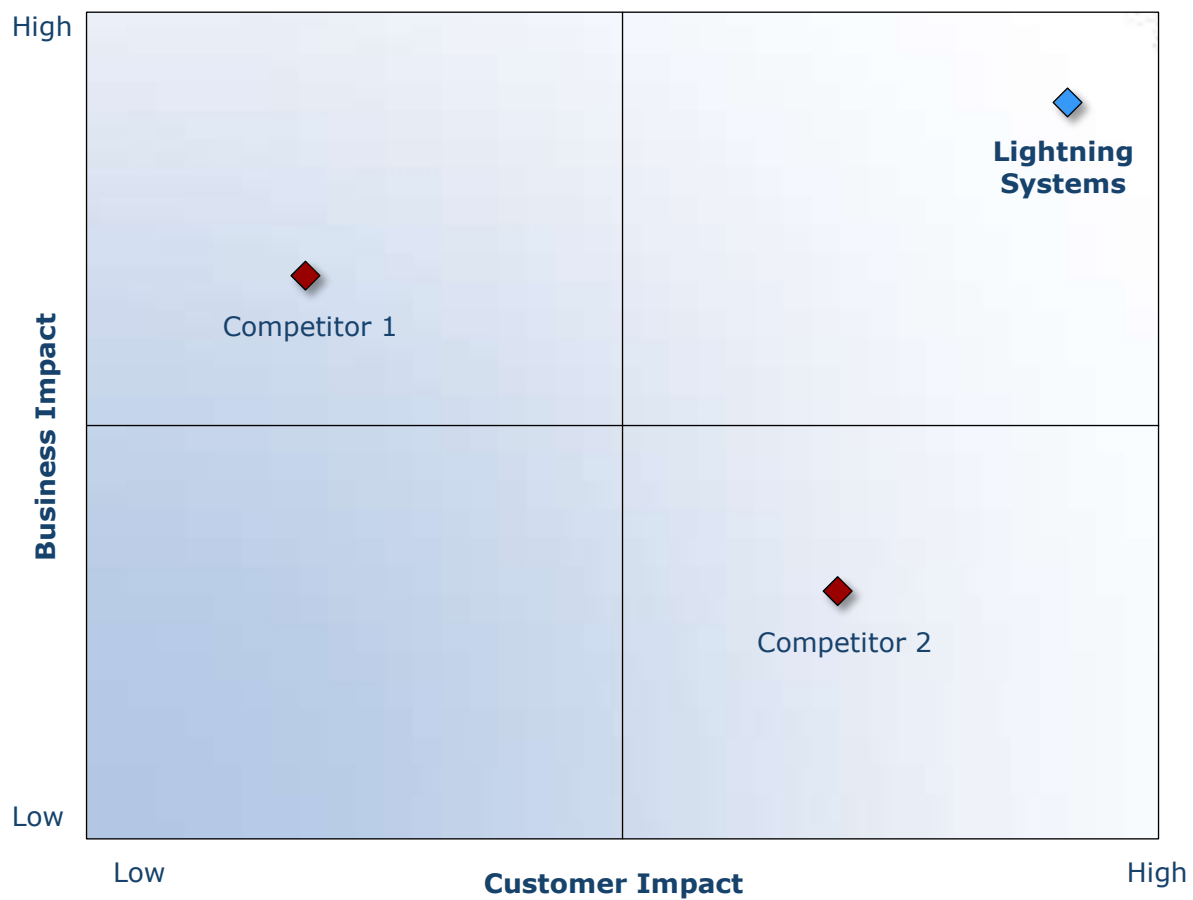
Requirements: Customer focus strengthens brand, reinforces customer loyalty, and enhances growth potential.

Criterion 5: Human Capital

Requirement: Company culture is characterized by a strong commitment to quality and customers, which in turn enhances employee morale and retention.

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.



Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

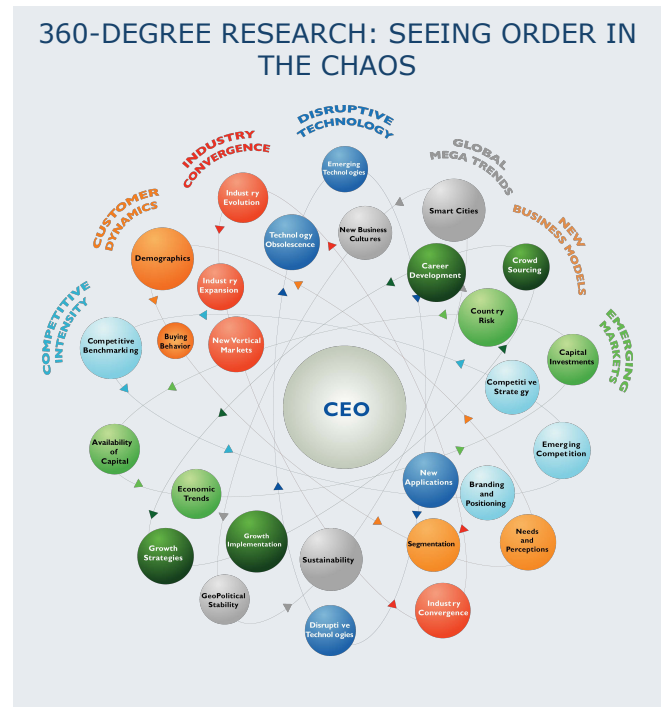
Frost & Sullivan analysts follow a 10-step process to evaluate award candidates and assess their fit with select best practices criteria. The reputation and integrity of the awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 Monitor, target, and screen	Identify award recipient candidates from around the world	<ul style="list-style-type: none"> • Conduct in-depth industry research • Identify emerging industries • Scan multiple regions 	Pipeline of candidates that potentially meet all best practices criteria
2 Perform 360-degree research	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> • Interview thought leaders and industry practitioners • Assess candidates' fit with best practices criteria • Rank all candidates 	Matrix positioning of all candidates' performance relative to one another
3 Invite thought leadership in best practices	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> • Confirm best practices criteria • Examine eligibility of all candidates • Identify any information gaps 	Detailed profiles of all ranked candidates
4 Initiate research director review	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> • Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles 	Final prioritization of all eligible candidates and companion best practices positioning paper
5 Assemble panel of industry experts	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> • Share findings • Strengthen cases for candidate eligibility • Prioritize candidates 	Refined list of prioritized award candidates
6 Conduct global industry review	Build consensus on award candidates' eligibility	<ul style="list-style-type: none"> • Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates 	Final list of eligible award candidates, representing success stories worldwide
7 Perform quality check	Develop official award consideration materials	<ul style="list-style-type: none"> • Perform final performance benchmarking activities • Write nominations • Perform quality review 	High-quality, accurate, and creative presentation of nominees' successes
8 Reconnect with panel of industry experts	Finalize the selection of the best practices award recipient	<ul style="list-style-type: none"> • Review analysis with panel • Build consensus • Select recipient 	Decision on which company performs best against all best practices criteria
9 Communicate recognition	Inform award recipient of award recognition	<ul style="list-style-type: none"> • Announce award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance 	Announcement of award and plan for how recipient can use the award to enhance the brand
10 Take strategic action	Upon licensing, company is able to share award news with stakeholders and customers	<ul style="list-style-type: none"> • Coordinate media outreach • Design a marketing plan • Assess award's role in strategic planning 	Widespread awareness of recipient's award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of the research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, resulting in errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.



About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, helps clients accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's growth team with disciplined research and best practices models to drive the generation, evaluation, and implementation of powerful growth strategies. Frost & Sullivan leverages nearly 60 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on 6 continents. To join Frost & Sullivan's Growth Partnership, visit <http://www.frost.com>.