

FROST & SULLIVAN

GE POWER

2022
CUSTOMER
VALUE
LEADER

GLOBAL DATA CENTRE
POWER SOLUTION INDUSTRY

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. GE Power excels in many of the criteria in the data center power solutions space.

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

Match to Needs

GE Power’s commitment to unearth the marketplace gaps and unmet customer needs is highly commendable. The company has demonstrated excellence in tracking, studying, and understanding drivers of change that impact the current market dynamics and mega trends that will influence future market requirements. Its excellence data center power solutions is primarily driven by its profound knowledge and technology know-how in aeroderivative gas turbines, gained through years of experience. GE Power’s position is further bolstered by its drive for innovation based on voice of customer analysis. The company has found a niche to address the technological and socioeconomic challenges related to data center evolution, mainly pertaining to the growth of hyperscale, hybrid-cloud, multi-cloud, 5G networks, enterprise digital transformation etc. GE Power managed to set itself apart from the traditional data center power architecture by challenging the status quo with an unequivocal sustainability quotient, effectuated by operational efficiencies, cost effectiveness, and reliability of the highest magnitude. This is exactly the need of the hour for data center operators; especially for hyperscale data centers. In essence, the company delivers products and solutions that not only help address the current marketplace gaps and challenges but are also developed to accommodate future anticipated needs.

GE’s data center power solutions portfolio is based on the aeroderivative gas turbine (Aero GT) technology, which is derived from the highly proven and established GE aviation platform; where it is a literal case of using passenger aircraft engines with over +182 million flight hours, for power generation

application. The sheer amount of reliability and availability this brings to the table is unparalleled. This is substantiated by the data submitted to Operational Reliability Analysis Program (ORAP) by customers. While the Aero GT forms the core of GE's data center power solutions, the company has also dedicated tremendous amount of time and resources in R&D to go above and beyond Aero GT technology to include micro grid solutions involving renewables and energy storage (BESS) systems to help address the unique and evolving requirements of diverse data center segments. A crucial element in this rooted approach is its innovative micro grid controller called GE Grid Node microgrid solution. It essentially supports seamless interfacing of all involved assets, where the assets are brought together by communicating with each control system and consolidating it into one controller; ultimately all the assets operate as a fully integrated single entity. Some of the key functionalities that improve the load side output include synchronization, load sharing, firming capacity and frequency and voltage control. The micro grid solution also leverages an optimization engine that further enhances management of distributed energy resource (DER) and improves the assets for sustainability, reliability, and increased cost benefits. Another fine example to highlight GE's excellence in addressing marketplace gaps is its initiative to hybridize the Aero GT with a BESS to serve as a rapid backup solution for data centers.

Excellence in Technology Leverage

Technology leverage is embedded in GE's DNA. Frost & Sullivan research findings suggest that the Company's futuristic approach towards product development and ever-increasing focus on technology and innovation will play a crucial role in propelling the company's growth and penetration in the data center segment. The company's technology and innovation excellence is primarily driven by ability to envisage visionary scenarios by constantly analyzing mega-trends and creating revolutionary solutions to help address those marketplace shifts. To that end, the company has developed a unique portfolio of data center power solutions that are strategically segmented into six models. It is noteworthy that each model is engineered to offer a host of value-added benefits targeted at specific data center applications and architectures. This is a perfect testament to GE's staunch commitment to address evolving marketplace and customer needs through technology leverage.

Its first model is targeted at regions with weak grids or high electricity prices. It is based on captive generation where the aeroderivative gas turbine (Aero GT) acts as the sole source of power, independent of the grid. This solution offers data center operators the flexibility to operate as a simple cycle or a more efficient system such as combined cycles and heat recovery options. The second model is engineered for data centers to receive prime power from the grid and leverage Aero GT as backup. This model allows data center operators to create new revenue stream by selling power to the grid when the Aero GT is not serving as a backup asset. This is followed by hybrid backup model that incorporates a unique electric gas turbine (EGT™) which leverages advanced battery energy storage system (BESS) and digital controls to offer instant switchover to backup power. The fourth solution is a distinctive blend of a microgrid with thermal and renewable hybrids. With this green model, data centers are able to draw power using a thermal hybrid integrated solution, which seamlessly integrates with renewable assets. This model allows the renewable power system to generate at its maximum capacity while reducing curtailment and fuel burned, while also ensuring reduced levels of blended Levelized Cost of Electricity (LCOE) and CO2 emissions. The next model leverages a cutting-edge configuration to integrate green hydrogen, further

endowing data center operators in their decarbonization journey. The last model is a temporary solution with trailer mounted Aero GT to serve the commissioning phase of the data center or until the availability of the utility feed. Frost & Sullivan believes that that these solutions will be instrumental in creating a step-change in data center power capabilities not only from an operational and environmental standpoint, but also from a cost effectiveness perspective.

Leading Product/Service Value

GE's excellence in product/service value is underpinned by its ability to empower data center operators with highly tangible alternates to the traditional power architecture and standard design practices, that can be more efficient, reliable, and sustainable. The company achieves this through its rich aviation heritage and profound technology know-how in the energy and power sector. This is reflective in its wide portfolio of products that include renewable energy assets, energy storage, gas turbines, as well as digital and microgrid controls. In simple terms, GE is perfectly positioned to support data center operators in their transition towards a highly sustainable and efficient power infrastructure. The foundational element of the company's ethos is to not simply deliver a product, but rather a holistic solution and substantial value to its customers. Frost & Sullivan firmly believes that this trait will be a crucial driver that elevates GE's position in this segment. The company is highly cognizant of the intricacies involved in delivering data center power solutions, and it goes to great lengths to address those with a high level of attention to detail.

GE's LM2500Xpress™ Aero GT package is a perfect example to demonstrate the company's excellence in delivering product/service value. At the outset, the LM2500Xpress™ features a truly modular configuration that makes it highly scalable, allowing data center operators to seamlessly add capacity as they grow their business. It is noteworthy that the 95% of the unit assembly is done at the factory and it comes with 11 simplified modules and significantly reduced interconnects. This inherent prefabricated modularity also allows for faster installation and commissioning which empowers its customers with a unique edge in terms of deployment speeds and time to market, which is a crucial competitive factor in the data center industry. It is engineered to deliver up to 37MW of power output in a highly compact and drastically reduced footprint, while offering a high degree of flexibility in terms of operational cycles and fuel mix. Furthermore, the LM2500Xpress™ also creates an ideal scenario to support grid firming and help ensure high grid stability with its synchronous condensing mode. On the other hand, GE's TM2500™ is another innovative product that enhances customer value to a great extent. While it offers similar value additions such as scalability, resilience, compactness, and rapid installation as the LM2500Xpress™, it goes an extra mile and serves as a temporary solution as well owing to its trailer mount configuration. The nature and the engineering elements of this unit makes it ideal to cater to diverse data applications including edge data centers.

Focus on Customer Service and Ownership Experience

GE's Aero GT solutions mark a corner stone in the evolution of data center power architecture. The company's excellence in offering superior customer ownership experience is characterised by its unwavering focus and commitment to tailor its well-established gas turbine technology to suit the evolving needs of the data center industry. GE's Aero GT solutions mark a corner stone in the evolution

of data center power architecture. The company's excellence in offering superior customer ownership experience is characterised by its unwavering focus and commitment to tailor its well-established gas turbine technology to suit the evolving needs of the data center industry. More specifically, Frost & Sullivan finds GE's sharp focus on adding capabilities to support emissions' reduction and decarbonization initiatives of data center operators highly commendable. As established in the above sections, GE's Aero

"GE's Aero GT solutions offer industry leading reliability, availability, flexibility, and scalability, far exceeding the traditional diesel genset based back up architecture. This combined with its ability to offer cleaner and greener power makes it a perfect choice for data centers on a quest for longevity and greater versatility for future growth, resiliency, and sustainability."

**- Gautham Gnanajothi,
Vice President of Research**

GT solutions offer industry leading reliability, availability, flexibility, and scalability, far exceeding the traditional diesel genset based back up architecture. This combined with its ability to offer cleaner and greener power makes it a perfect choice for data centers on a quest for longevity and greater versatility for future growth, resiliency, and sustainability. GE's Aero GT technology has a diversified fuel burning capability, including Hydrogen that can play a crucial role in supporting the decarbonization goals of data center operators. The Aero product leveraging single annular combustor currently has the ability to burn a mix of hydrogen and

natural gas, where the hydrogen volume is up to 85% in certain models. In essence, the Aero GT solution offers carbon reduction either via pre combustion by leveraging hydrogen as a fuel, or through hybrid operation.

It is also impressive to note that GE has also developed a unique software in-house called the Hybrid Architect, which is engineered to support the modelling of operations and provide key performance indicators for its various power solution models. By performing an in-depth analysis, this software provides a comprehensive view into the annual energy production of the renewable asset to feed the electrolyzer, therefore providing an estimated hydrogen production and an estimated average LCOH/LCOE. It also offers visibility and insights on capacity factor as well as the NPV and IRR in case the asset owner exports power to the grid and generates revenue.

Excellent Operational Efficiency

GE's strong strategic focus is fortified by its excellence in operational efficiency. The company took a giant leap in the right direction when it embraced the concept of lean management to implement best practices for continuous improvement. With a strategy emphasizing waste reduction, strategic thinking and long-term vision, the company was able to completely transform and positively disrupt operations in its factories across the world. It also enabled it to empower its senior leaders with the necessary tools to perform scrupulous problem identification, root-cause analysis and ultimately plotting a successful course for seamless and improved operation. GE's effective implementation of lean principles has greatly helped the company in reducing lead time, inventory, costs and freeing up floor space. For instance, A GE Gas Power plant in Schenectady, New York was able to achieve 63% reduction in lead time (down from 11 to 4 weeks), 88% reduction in time taken to move a part, and 48% reduction in floor space utilization by implementing lean best practices. Furthermore, it is impressive to note that while the company has

leveraged lean management to optimize its factory operations and manufacturing lines, it has also implemented lean principles to augment other commercial aspects such as project management, software development etc.

Growth Strategy Excellence

GE's Aero GT solutions, combined with its microgrid and hybrid technologies, have a high growth potential in the data center industry over the coming years. The company's ability to pre-empt changing demand and profoundly understand customer needs, along with its deep-rooted technology expertise will be a key growth driver. The company's product positioning strategy and the effectiveness of its customer centric approach towards product development will play a vital role in its expansion in the data center power solutions segment. Its products and solutions are creating a sense of excitement and anticipation in the industry, especially among end users who are trying to gain a competitive edge by engaging with state of the art, futuristic technologies.

Conclusion

GE's avant-garde approach towards product development combined with its steadfast resolve to fill marketplace voids and un-met customer needs, offers great potential in the data center segment. Its deep-rooted engineering expertise along with its superior R&D capabilities have resulted in path breaking power solutions that will prove to be a boon to data center operators. Frost & Sullivan believes that GE has great potential to capitalize on the phenomenal growth of the hyperscale data center segment; its portfolio of Aero GT power solutions is perfectly positioned to address the evolving needs and unique requirements of hyperscale data centers.

With its strong overall performance, GE Power earns Frost & Sullivan's 2022 Global Customer Value Leadership Award in the data center power solutions industry.

What You Need to Know about the Customer Value Leadership Recognition

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

Best Practices Award Analysis

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

Business Impact

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

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

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

Growth Strategy Excellence: Company demonstrates an ability to consistently identify, prioritize, and pursue emerging growth opportunities

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

Customer Impact

Match to Needs: Customer needs directly influence and inspire the product portfolio's design and positioning.

Technology Leverage: Company is committed to incorporating leading-edge technologies into product/service offerings to enhance performance and value

Product/Service Value: Products or services offer the best value for the price compared to similar market offerings

Customer Service Ownership Experience: Customers proudly own the company's product or service as the company strives to provide a positive experience throughout the life of the product or service. Customer service is accessible, fast, stress-free, and high quality

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

About Frost & Sullivan

Frost & Sullivan is the Growth Pipeline Company™. We power our clients to a future shaped by growth. Our Growth Pipeline as a Service™ provides the CEO and the CEO's growth team with a continuous and rigorous platform of growth opportunities, ensuring long-term success. To achieve positive outcomes, our team leverages over 60 years of experience, coaching organizations of all types and sizes across 6 continents with our proven best practices. To power your Growth Pipeline future, visit Frost & Sullivan at <http://www.frost.com>.

The Growth Pipeline Engine™

Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fuelled by the Innovation Generator™.

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Key Impacts:

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



The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

Analytical Perspectives:

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

