

FROST & SULLIVAN

**TMEiC**

**2022  
COMPANY  
OF THE  
YEAR**

*GLOBAL POWER ELECTRONICS  
FOR CARBON NEUTRALITY 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. TMEIC excels in many of the criteria in the Power Electronics for Carbon Neutrality space.

AWARD CRITERIA	
<i>Visionary Innovation &amp; Performance</i>	<i>Customer Impact</i>
Addressing Unmet Needs	Price/Performance Value
Visionary Scenarios Through Mega Trends	Customer Purchase Experience
Implementation of Best Practices	Customer Ownership Experience
Leadership Focus	Customer Service Experience
Financial Performance	Brand Equity

### *Excellence in Addressing Unmet Needs*

TMEIC’s ability to uncover unmet market needs and under-served customer requirements is second to none. The company has demonstrated unmatched excellence in the power electronics industry when it comes to developing products and solutions that not only match the current market needs, but also anticipated future customer requirements. Its high level of success in this area can be attributed to its utmost focus and continued dedication in tracking, analyzing and comprehending market trends and voice of its customers; this is ultimately translated in to developing meaningful products and solutions. TMEIC’s efforts and initiatives to address the carbon neutrality challenge is highly commendable; the company has placed significant emphasis on all of its products in an effort to enhance its value proposition and cater to the carbon reduction needs. TMEIC’s excellence in addressing unmet market needs can be categorized in three distinct product lines; the first one is PV inverters for renewable power generations, the second one is high voltage motor drive inverters and the third one is UPS (uninterruptible power supply).

As a result of its extensive analysis on unmet market and gaps, in 2019 TMEIC developed and launched a next generation PV inverter called the “Universal Inverter”, which is based on a unique modular design concept. It includes inverter modules rated at 840kW, where the company is able to provide 4.2 MVA inverter system named "AC Station". It is noteworthy that the company has designed the Universal Inverter to offers significant additional advantages and value additions on top of the high performance

characteristics it inherits from its “Samurai” range of inverters. To highlight some of the key value additions, it firstly leverages a modular design which not only offers uninterrupted operations (in case of a module failure) but also increases energy availability. On the other hand, each module is equipped with its own MPPT control to maximize power generation from the PV panels. The other unique advantage is the fact that the Universal Inverter is designed to function as a hybrid system of PV generation and energy storage; the design element allows the inverter to be used for battery energy storage systems with a high degree of flexibility. Furthermore, the energy storage system (ESS)

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compensates for the varying output from PV panels, thus contributing to the high stability of power supply and interconnection to the power grid. This hybrid approach significantly increases the mix of renewables, ultimately aiding with carbon neutrality. The other unique value addition offered by the Universal Inverter is its high degree of installation flexibility, where it allows seamless transportation and installation in any given space without any restrictions.

While the company offers industry leading PV inverter solutions, it is important to note that TMEIC’s contributions towards the field of ESS have been enormous. It is highly impressive to see the company continuing its relentless efforts to develop ESS solutions based on the evolving market needs. During the early

2000’s the company developed ESS inverters for NAS batteries (1200kW to 3000kW), followed by ESS inverters for Lithium Ion batteries during 2010, more recent developments include the launch of the Universal Inverter (which could also be used as an ESS inverter) and the launch of the high-capacity ESS inverter rated at 2000kW per unit in 2021. The company developed this high capacity ESS inverter to address the evolving market needs pertaining to wind power generation and large-scale ESSs installed at substations in the AC power grids.

### **Industry Leading Customer Ownership Experience**

TMEIC is a class apart when it comes to offering a holistic and truly exemplary customer ownership experience. Its relentless pursuit to enhance customer value through continuous product development and technology innovation is highly commendable. Its carbon neutrality initiative is a perfect testament to this. TMEIC’s unparalleled excellence in contributing to carbon reduction through efficient use of energy is demonstrated through its cutting edge high voltage motor drive inverters. One of the pressing power related challenges in industries is the high power consumption by motors, which account for over 50% of the total power consumption. With its deep rooted technology know how and sophisticated R&D capabilities, TMEIC has developed an adjustable motor drive systems that is designed to greatly increase the energy efficiency of pumps and fans, thereby minimizing the power consumption by the motors. It achieves this by leveraging a unique design that controls the rotation speed of the fan or the pump by applying adjustable speed drive with the inverters. The other critical aspect that validates TMEIC’s

excellence in decarbonization for industries is the company's path breaking initiatives to extend the field of applications to larger scale heavy industry applications such as steel and metal industries. In order to serve this particular segment, TMEIC has developed high voltage motor drive inverters, which are also based on a unique modular design concept and offer significant energy savings. Furthermore, the unique design elements of this product empower industrial plants with higher overall operation efficiency. This is mainly derived from two critical aspects; power regeneration from the motors and minimizing the losses in the distribution systems. The high voltage motor drivers leverage 3-level PWM converter modules that are uniquely positioned to control the power in both directions, allowing for the regenerated power to be recovered and passed on to the distribution system to be used in other facilities and/or equipment in the plant.

In addition to the high voltage motor drive inverters, TMEIC has also developed yet another ground-breaking technology for its motor drive inverters based on 5-level motor drive inverters, specifically for extra-large capacity. This product is called the "XL drive inverters", which the company has designed for use in electrification of compressors, liquefaction of natural gas or for conveying the natural gas through the pipeline. In essence, this product contributes to carbon neutrality by increasing the compressor system efficiency significantly. While a gas turbine using traditional technology offers efficiencies of around 40 to 45%, TMEIC's XL drive inverter technology offers an efficiency of around 95%. The other key aspect contributing to TMEIC's excellence in enhancing customer ownership experience, specifically in terms of carbon reduction, is its industry leading UPS product offering. The company leverages a highly advanced three level inverter technology that is capable of delivering reliable power supply to large data centers or to large information/communication facilities with one of the highest efficiencies in the global market.

### *Visionary Scenarios through the Use of Mega Trends*

Frost & Sullivan finds TMEIC's efforts and initiatives to track, analyze and act on mega trends highly commendable. The company leaves no stone unturned when it comes to envisaging visionary scenarios based on mega trend analysis. As the world moves towards carbon neutrality, we are witnessing commendable initiatives and efforts from multiple stake holders in the ecosystem to take us closer to a carbon neutral environment. Frost & Sullivan research findings suggest that TMEIC's effort in this space is truly brilliant and top of the class. The company has gone above and beyond to help its customer's fast track their carbon neutrality journey. TMEIC's decarbonization strategy is built on three key pillars; increase the use of renewable energy, efficient use of energy and fuel switching. As highlighted in the above sections, TMEIC has invested significant effort, time and resources in enhancing its product lines (PV inverters, Motor Drives and UPSs) to cater to the decarbonization mega trend. With a far-reaching technology expertise in high-voltage and high-current power electronics, TMEIC has been highly successful in increasing its PV inverter capacity to exceptional levels. This has been instrumental in driving the growth of large-scale PV generation plants, and hence contributing to carbon reductions. The other intriguing aspect pertaining to TMEIC's deep-rooted decarbonization initiatives is its contribution to the development of green hydrogen energy system. The company has developed cutting edge, innovative power electronics products that play a crucial role in mass production of green hydrogen. TMEIC's steadfast dedication and focus on establishing visionary scenarios through use of mega trends is

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further bolstered by two radical initiatives; the first one is creation of a visionary concept called PEiE (Power Electronics in Everything). The company created the PEiE concept to bring together the power network and the communications network, and ultimately create new value streams by optimally managing energy and power through effective communication of power electronics products. It is noteworthy that the company has recently extended the PEiE concept to include green hydrogen as a third network in its frame work. The second initiative is the creation of the ERS-PJ (Energy Resource Solution Project) in December 2020. The project was not only

produced under strong leadership of the company's executive board, which has deep insight to the mega trend, it was also promoted directly by the board member to accelerate its activities. The ERS-PJ brings together highly experienced senior leaders from various departments within the company and has a clear vision and strategy in place to create new solutions through technology incubation; these new solutions are aimed at addressing the evolving mega trends and supporting its customers gain a competitive edge in the market. For instance, TMEIC’s green hydrogen initiative was born out of ERS-PJ.

### ***Excellence in Implementation of Best Practices***

One of the unique differentiating aspect that sets apart TMEIC from its competitors is its unmatched excellence in implementing best-in-class practices, processes, activities which are strategically formulated to enhance customer value multi-fold. The company’s best practice implementation excellence is underpinned by its strong cultural beliefs and value systems and further fortified by seamless executive vision alignment. There are three intrinsic characteristics that drive the best practice strategy for TMEIC. The first one is the life-long quality assurance where the company strives to continuously improve product quality and performance though a high degree of synergy with the engineering team. TMEIC’s unwavering focus on human capital management, especially with its development engineers has been a critical success factor for the company in this aspect. The second characteristic is its manufacturing excellence, which reinforces the overall build quality of the product. It is noteworthy that the company leverages “Kaizen” principles for continuous improvement of production processes. Furthermore, TMEIC’s manufacturing best practices are reinvigorated through use of state of the art digital manufacturing technologies. The third characteristic is its superior testing policies that are unrivalled in the industry; it is important to note that this meticulous testing policy stems from the company’s DNA of placing the customer first. TMEIC has built several innovative test methods that are unique in the industry and has also invested heavily in building these test facilities.

### ***Strong Financial Performance***

TMEIC has exhibited strong financial performance since inception. The company’s excellence in financial performance can primarily be attributed to its strong focus on all product categories and its overseas sales strategy. There are three key elements to TMEIC’s strong financial growth; sales growth, overseas

sales ratio and financial stability. The company has managed to achieve strong above market sales growth for the past 10 years, which is a significant achievement. TMEIC increased its consolidated sales by around 10% in 2019 (which is nearly double the growth rate of the overall market). TMEIC's financial performance in its global bases market has been extremely strong for the past two years, these markets include China, India, and North America. On the other hand, the company has been witnessing strong and steady growth in its overseas sales ratio; its overseas sales ratio has increased from 6% in 2014 to 38% in 2017 to 40% in 2020. TMEIC also has a high level of focus on the APAC market where it has experienced significant revenue growth over the past few years. In particular, India and Vietnam have delivered exceptional financial growth for the company. Frost & Sullivan's research indicates that TMEIC is well positioned to further increase its market share in the power electronics market and achieve significant revenue growth in overseas market in the next two years. Its avant-garde initiatives around carbon neutrality will play a crucial role in elevating the company's growth to greater heights.

### **Brand Equity**

TMEIC has established a unique brand image for itself in a highly competitive power electronics market; its brand name is synonymous with technology excellence, innovation, and, most importantly, customer focus. The company's innovative product development strategies and unique customer value enhancement initiatives are two key pillars of its brand equity. It is highly impressive to see the rapid pace at which TMEIC has evolved from a being a power electronics equipment manufacturer to an iconic brand that plays a crucial role in decarbonization. The company's tremendous effort towards building and strengthening brand equity is clearly evident in the company's year on year revenue growth where it has been constantly achieving above market growth rates. It is also underpinned by the exceptional rapport and bond the company shares with its customers and channel partners.

### **Conclusion**

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TMEIC has time and again proven its leadership in the power electronics industry by delivering products and solutions to cater to the evolving needs of the market and its customers. It is intriguing to see the company embark upon its next chapter of its leadership journey to address decarbonization. TMEIC's vast technology expertise combined with its unique flair for innovation based on customer value enhancement makes it an ideal candidate for addressing the mega trends that are shaping the industries of tomorrow. TMEIC is a boon to the industries that are looking to gain a competitive edge in addressing carbon neutrality.

With its strong overall performance, TMEIC earns Frost & Sullivan's 2022 Global Company of the Year Award in the power electronics for carbon neutrality industry.

## What You Need to Know about the Company of the Year Recognition

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Frost & Sullivan's Company of the Year Award is its top honor and recognizes the market participant that exemplifies visionary innovation, market-leading performance, and unmatched customer care.

### Best Practices Award Analysis

For the Company of the Year Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

#### *Visionary Innovation & Performance*

**Addressing Unmet Needs:** Customers' unmet or under-served needs are unearthed and addressed by a robust solution development process

**Visionary Scenarios Through Mega Trends:**

Long-range, macro-level scenarios are incorporated into the innovation strategy through the use of Mega Trends, thereby enabling first-to-market solutions and new growth opportunities

**Leadership Focus:** Company focuses on building a leadership position in core markets and on creating stiff barriers to entry for new competitors

**Best Practices Implementation:** Best-in-class implementation is characterized by processes, tools, or activities that generate a consistent and repeatable level of success

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

#### *Customer Impact*

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

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

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

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

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

