

# Through our Pursuit of Innovation in Energy and Environment Technology, We Contribute to the Creation of Responsible and Sustainable Society That Places Equal Emphasis on Economy and Environment

Since its inception in 1923, Fuji Electric has always pursued technological innovations in energy and the environment, making its wide contributions to society in the fields of industrial and social infrastructure. The international community today is moving toward a balance between economic growth and social challenges concerning energy, the environment, human rights and so on, as seen in the Paris Agreement, which is an international framework for reducing the emission of greenhouse gases, and the Sustainable Development Goals (SDGs).

At Fuji Electric, we established the Power Electronics Systems Business Group in April 2017. The purpose was to pursue global business expansion in the areas of “energy solutions” for stable and optimized power supply and “industry solutions” for plant automation and energy saving. Our energy and environment projects are in alignment with the requirements and needs of society today. We create and deliver to our customers’ high-value, environmentally aware products and systems through our world-leading power semiconductors, power electronics equipment that incorporates them, and system solutions that combine sensor and controller systems with the Internet of Things (IoT).

For research and development activities, we explore the synergy between semiconductors and power electronics. As more and more automotive systems are electrified today, we focus on this field and are developing automotive discrete, compact and light-weight automotive power semiconductor modules for high power density, and sealed high-voltage converters (HVC) for automotive applications. Using these components, we are also developing automotive power electronics equipment.

In the semiconductor sector, we have developed products using a next-generation material, silicon carbide (SiC). Compared to conventional Si semiconductors, SiC reduces watt loss up to high ranges of switching frequency and can be operated in a high-temperature environment. The SiC-based Schottky

barrier diode (SBD) and SiC trench-gate MOSFET can achieve both performance and stability at the world’s highest level.

Leveraging this technology in our power electronics equipment, we have developed the “FRENICEFIT” environmentally resistant, totally-enclosed self-cooled inverter with a fan-less cooling system. It can be used in a wide scope of applications in a harsh environment, such as the outdoors and a corrosive gas atmosphere. We are offering SiC-based semiconductor modules for various types of equipment of power electronics with potential added value.

Concerning the industry solutions sector, there is steady growth in the field of factory automation, backed by proactive investments for introducing automation into plants. Fuji Electric offers products such as the “FRENIC4800VM6” medium-voltage high-capacity inverter with a water-cooling system, designed for the drive of factory machinery such as large rolling mills, blowers and pumps. In ways like this, we provide our customers with ease of use and enable them to save labor. We offer motion control technology for the automation of factories that require high-precision control using our unique components, such as the “SPH3000D” motion controller and the “ALPHA 7” servo system that we have continuously developed since FY2016. We have also developed the “MICREX-OnePack” equipment information collection system that can gather several different types of data from processing equipment in aggregate units per production cycle. It facilitates the introduction of IoT into production lines.

In the process automation sector, we have core technologies in drive control, measurement control and industrial electric heating. They constitute components and systems for ensuring the reliable operation of production equipment and reducing energy unit consumption. In the steel and nonferrous sector, the “MICREX-VieW XX” with enhanced features has been used for renewing the large-scale monitoring and controlling system for steel plants. In the cement sector, we have developed a monitoring con-



trol system package that offers a platform of features necessary for plant control. It facilitates easy engineering for our partners and users across the world.

In the energy solutions sector, we are developing uninterruptible power systems (UPS), plant power systems and air conditioning systems for data centers, leveraging our power electronics technology. Data centers continue to grow as ITC systems become highly sophisticated and involve cloud technology. To meet the needs of such centers, we have developed the “UPS7400WX-T3U” large-capacity UPS with applied module control to satisfy the requirements not only for enhanced efficiency, but also for a reliable power source. It is comprised of modules with a capacity of 330 kVA each, thus enabling the total capacity of the system to be adjusted so as to flexibly cater to the needs of client equipment.

In the power and new energy sector, Fuji Electric strives to realize a low-carbon society and is proactive in advancing technologies for utilizing renewable energy, such as geothermal energy, solar and wind power generation coupled with power storage technology, and biomass thermal power generation. In Japan, we have helped the country’s largest geothermal binary power plant come into commercial operation.

In the food and beverage distribution sector, we aim for global expansion and leverage the technologies that we have gained through the development of cup vending machines to develop dispensers of real drip coffee for the international market. Fuji Electric also undertakes the development of new products and services in order to address the labor shortage and to assist with work style reform for the distribution and retailing industries in Japan. To this end, we leverage our technological expertise in IoT, mechatronics and cooling and heating, focusing on the three key concepts of convenience, labor savings and energy savings.

With reference to IoT, which is used as a company’s common technology, we have developed an IoT platform based on general cloud technology. It

is equipped with security functions; interfaces that facilitate the development of services easily; communications functions between the cloud and edge controllers, which collect and process data from on-site devices; and a mathematical engine for diagnosis, analysis, prediction and optimization of the data. Several projects including our own factories have used this platform to improve productivity, product quality, operation efficiency, maintenance efficiency, and plant efficiency and to provide process quality traceability. In this way, we are accumulating the use cases.

Our research and development is focused on the development of fundamental technology widely applicable to various products and advanced technology with an eye to the future. For example, we develop model-based designing technology to pursue innovation of design processes in product development. As for materials technology, we integrate experiments and computing science to strengthen theoretical evidence for solid insulation, semiconductor interface analysis, and prediction of metal corrosion, which is useful for remaining life assessments on turbines.

Our corporate philosophy is “We, Fuji Electric, pledge as responsible corporate citizens in a global society to strengthen our trust with communities, customers and partners.” Our slogan is “To be enthusiastic, ambitious and sensitive.” We have enthusiasm for making contributions to society through our new technologies and products; we have ambitious goals backed by firm determination to overcome any difficulty; and we have sensitivity that derives from gratitude toward our customers, colleagues and family members, who support us.

This slogan is the anchor point for our teams of diverse members, as we strive to achieve SDGs and contribute to the creation of a responsible and sustainable society. As we at Fuji Electric engage in these challenges, we would like to ask all of our stakeholders for their continued support and understanding.

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