Initiatives that Contribute to Addressing Social Challenges

Public Utility Systems Group

Contributing to creation of a sustainable, safe, secure, comfortable and affluent society by providing products, systems and services for the social infrastructure that underpins our lives

Hideto Negoro
Executive Officer,
Group President,
Public Utility Systems

The Public Utility Systems Group provides a host of products, systems and services used in social infrastructure in the areas of water environment, rivers, railways, roads, aviation, and communication. Integrating the wide range of technologies. We have accumulated over the years, we provide solutions to address various social challenges in order to contribute to a safe, secure, comfortable and affluent society.

1. Realizing a society with rich water cycle

We will continue to reduce environmental burdens and realize a society with rich water cycle by advancing water and sewage systems using IoT technology and introducing highly efficient water recycling systems that make use of ozone.

2. Contributing to the achievement of carbon neutrality

We will contribute to further development of environmentally-friendly railways and to the achievement of carbon neutrality with energy efficient electrical components for rolling stock and by providing solutions that improve maintenance efficiency.

3. Creating safe, secure and comfortable cities

Mitsubishi Electric aims to create safe, secure and comfortable cities by providing disaster prevention and mitigation systems in response to natural disasters as well as services that enhance maintenance and management of social infrastructure.

Major social challenges for which risks and opportunities have been recognized and evaluated

- Appropriate use of water
- Optimal use of energy
- Addressing climate change
- Measures against air, water, and soil pollution
- Waste reduction and management
- Sustainable use and development of resources
- Development of safe, secure, comfortable, and sustainable cities

Priority SDG initiatives

Public Utility Systems Group

Topics

Railway LMS on INFOPRISM*

Solutions to support safety, security and efficiency of railway operation

"Railway LMS on INFOPRISM" is designed for railway operators, who are tasked with ensuring safe and suitable transportation. We provide multifaceted support by utilizing our proprietary IoT platform "INFOPRISM" which leverages our own AI technology.

* LMS stands for "Lifecycle Management Solution", i.e., a total life-time support for rolling stock in railway business.

Wide range of support for "Railway LMS on INFOPRISM"

Improved rolling stock availability

In the event of a breakdown, Realtime remote monitoring for rolling stock equipment data enables quick and accurate operations and reduces the impact on personnel arrangement and rolling stock operations. In the future, we will attempt to prevent breakdowns and malfunctions by using data analysis to detect signs in advance.

Tokyo Metro and Tobu Railway have conducted the trial operation of the Rolling Stock Information Monitoring System, which enables data linkage between railway operators.

Mutual data utilization among railway operators

If railway operators have already set up the rolling stock information monitoring system on INFOPRISM, they can monitor the failure statuses of other operators' rolling stock running on the same line, which can lead to improved operations.

In addition, the analysis of various rolling stock data is expected to make a wide range of other contributions, such as improving and streamlining maintenance as well as optimizing operations from the perspectives of management and the environment.

Launch of "Railway LMS on INFOPRISM," a maintenance solution for railway rolling stock

Voice

Combination of railway expertise and data analysis to promote customer challenges

Since its introduction in 2019, we have gradually expanded the number of routes and added features that go beyond data analytics. Customers have commented that when a breakdown occurs, they can check data in real time without having to visit the site, which enables faster, more accurate, and more efficient recovery. They also note that having data-based views at their fingertips makes it easier to consider energy-saving measures. Through Railway LMS, we will continue to contribute to operation, maintenance and development of railways, which are critical social infrastructure, from safe, secure transportation to advanced, efficient maintenance, energy savings, and passenger services.

Yohei Harashima
Public Utility Systems Group
Transportation Systems Division,
Transportation Division,
Transportation Section 1 and Railway Asset Management Business Promotion Group

Energy & Industrial Systems Group

In response to increasing electric demand to support a sustainable society, we will contribute to realization both of carbon neutrality and stable power supply through our strong development and engineering capabilities

Soichi Hamamoto
Executive Officer,
Group President, Energy & Industrial Systems

Amid growing awareness concerning response to increasingly severe natural disasters as well as energy security, the markets surrounding the energy industry face various challenges. While solving technology challenges, including increase of local production for local consumption in terms of the supply and demand of electricity due to the spread of renewable energy resources and storage batteries, fluctuations in the output of variable renewable energy resources such as solar and wind power, and the influx of surplus electricity generated at factories, households, etc. (consumers) into the power grid, the industry needs to realize both stable power supply and its efficient operation.

In the midst of this situation, the Energy & Industrial Systems Group has defined the realization of both carbon neutrality and the stable power supply as a social issue to be resolved. While investing resources in the creation of digital energy (via visualization of electricity) business value within the power ICT field and in the technology development to contribute maximum use of renewable energy, such as DC power transmission and power system stabilization technology as well as distributed energy resources control and wide-area monitoring control systems, we will contribute to realization of carbon neutrality. In the power generation and transmission & distribution business, which are underlying business of the Group, we will also work to ensure the stable power supply by enhancing maintenance service that supports stable power grid operation.

Major social challenges for which risks and opportunities have been recognized and evaluated

- Optimal use of energy
- Introduction of clean energy
- Sustainable use and development of resources
- Addressing climate change

Priority SDG initiatives

Energy & Industrial Systems Group

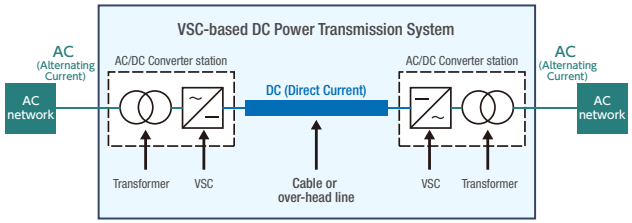
Topics

VSC-based high-voltage direct current systems "HVDC-Diamond®"*

Stable supply of electricity from offshore wind power generation

* High Voltage Direct Current (HVDC) range is more than 1500VDC in the power industry.

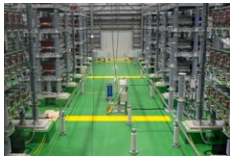
Renewable energy, which is considered to be an effective energy resource to achieve carbon neutrality which has come to be a global environmental challenge in recent years, is typically generated far from onshore substations or where power is needed, so advanced transmission technology is required to ensure effective, reliable power supply. Thus, direct current (DC) power transmission has been attracting attention. DC transmission has higher transmission efficiency than alternating current (AC) transmission and can easily be interconnected with offshore wind, solar power generation, and other renewable energy resources. In particular, demand for "VSC-based" DC power transmission systems, which do not require a generator appropriate for the converter to convert between AC and DC, is expected to grow because it has few limitations on the grid conditions to connect.



Leveraging its extensive experience in power generation and transmission & distribution fields, Mitsubishi Electric has developed the HVDC Diamond®, a VSC-based HVDC power transmission system that integrates a power converter station with covering all DC power transmission system. The system contributes to realizing stable power supply generated from wind firms by installing in onshore wind substations.

Comprehensive evaluation at the HVDC verification facility

The HVDC-Diamond® verification facility has been operating since 2018. In addition to accumulating data on control, long-term stability, and practical performance, we will verify operation in the event of a fault on the AC network and DC network with actual scalet to provide highly reliable systems that meet diversifying market needs.



Voice

Contributing to social infrastructure toward carbon neutrality

MMC(Modular Multi-level Converter)-based Voltage Sourced Converter, which have excellent controllability and contribute to converter station miniaturization, have become the mainstream of power converters. I was involved in the development, commercialization, and product testing of the MMC-based STATCOM (SVC-Diamond®), which became operational in 2017, and the construction of a demonstration plant for the same system (HVDC-Diamond®). I am presently involved in product development to apply the technology to actual projects in the future, and system development to achieve greater efficiency and further miniaturization. Our aim is to contribute to the safety and stability of social infrastructure, with a view to introducing renewable energy, which is attracting a great deal of attention in the age of carbon neutrality.

Daisuke Yamanaka
Energy & Industrial Systems Group
Transmission & Distribution Systems Center
Power Systems Engineering Center
FACTS/HVDC System Development Section

Building Systems Group

Making the most of the Mitsubishi Electric Group's advanced and environmental technologies to provide solutions that satisfy customers in all aspects of safety, comfort, efficiency and the environment

Iwao Oda
Senior Executive Officer,
Group President, Building Systems

The Building Systems Group manufactures building management systems and elevators and escalators that provide vertical transportation within buildings. As part of our mission to deliver products and systems and the subsequent maintenance thereof, we believe it is important to give priority to the safety and security of our customers throughout the product lifecycle. In doing so, we help to create a comfortable, environment-friendly society through our products and services. Maintaining this promise, the Building Systems Group is focused on the following initiatives:

1. Pursuing user-friendly, eco-conscious products
2. Offering one-stop ZEB*1 solutions
3. Contributing to smart buildings*2 and smart cities*3

*1 A building where the net consumption of fossil fuel energy is zero or roughly zero, offset by energy savings and the utilization of renewable energy resources.
*2 Buildings where people feel safe and comfortable and can work efficiently that also solve social challenges through energy and labor savings achieved with in-building data collected using IoT technology.
*3 Cities with optimized urban infrastructure and facility management operations as well as increased convenience and comfort for businesses and consumers. AI is used to analyze big data generated from facilities, the environment, and consumer behavior data in order to remotely control facilities and equipment.

Major social challenges for which risks and opportunities have been recognized and evaluated

- Optimal use of energy
- Development of safe, secure, comfortable and sustainable cities
- Waste reduction
- Addressing climate change

Priority SDG initiatives

Building Systems Group

Topics

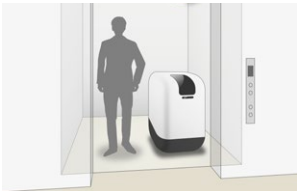
Robot mobility support service utilizing Ville-feuille®

Solving labor shortages by creating a robot-friendly building environment

To solve the labor shortage, one of current social challenges, service robots are being introduced in many buildings. Mitsubishi Electric, which has extensive expertise in building equipment, provides robot mobility support services utilizing the Ville-feuille® building IoT platform. By connecting robots to elevators and other equipment, this service facilitates the movement of robots within buildings, enabling robots to autonomously move between floors and managing multiple robots with various applications. We support the activities of service robots and their coexistence with humans, thus contributing to solving the labor shortage.

Toward a safe, secure environment in which humans and robots coexist

An experiment was conducted at Fujita Health University Hospital (in December 2022) to verify elevator safety when a human and a robot ride together. Safe, smooth transportation has been realized by alleviating the existing problem of reduced operational efficiency due to robot-only operation that forbids human passengers from riding in the same elevator car.



Mitsubishi Electric SOLUTION SITE "Robot Management Solution" (in Japanese text)

Voice

Robot-friendly building environment for easy robot movement

Using my experience as a former building systems engineer, I have been involved in the concept planning and demonstration testing of Ville-feuille® since its inception. Utilizing Ville-feuille®, we have achieved synergy between the long-established technology of elevators and the new service of robots. The number of service robots is expected to grow rapidly in the next few years, and we will support their smoother movement within buildings to help establish traffic rules among robots.

Tomoaki Sugiyama
Mitsubishi Electric Building Solutions Corporation
Domestic Business Group
Business Development Division
Administration & Sales Management Department
System Planning Department
Service Section

Defense & Space Systems Group

Contributing to solving environmental issues and create sustainable cities by providing artificial satellites and other high added-value products and services

Tomonori Sato
Executive Officer, Group President, Defense & Space Systems

The Defense & Space Systems Group is contributing to the realization of an affluent society by providing artificial satellites, various sensor systems, and other ranges of products and services. By further enhancing our strength in the satellite system, sensor, high-precision positioning, and other technologies and advancing the following initiatives by leveraging these strengths, we will continue to solve social issues:

1. Providing products and services that contribute to solving environmental issues

With our observation satellites, represented by the greenhouse gases observing satellites (the GOSAT series), we contribute to solving global-scale environmental issues by providing data on the global environment, such as greenhouse gas density distribution and air pollution monitoring.

2. Providing solutions that contribute to solving various social issues by using satellite data

By utilizing image data and location information from observation and positioning satellites to provide new solutions for disaster prevention and reduction as well as automated driving, we will contribute to creating secure, safe, and comfortable sustainable cities.

Major social challenges for which risks and opportunities have been recognized and evaluated

- Securing of a sustainable food production system
- Integrated management of water resources
- Infrastructure development that supports economic growth and disaster prevention
- Creating secure, safe and comfortable sustainable cities
- Reduction and management of waste
- Addressing climate change
- Prevention of marine pollution
- Prevention of deforestation

Priority SDG initiatives

Defense & Space Systems Group

Topics

Quasi-Zenith Satellite System MICHIBIKI

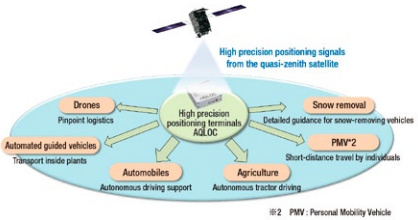
The number of satellites monitoring our whereabouts is scheduled to increase from four to seven*

Navigation functions enable you to view your whereabouts on a map using a variety of devices. In the Quasi-Zenith Satellite System MICHIBIKI, one of the four positioning satellites developed and manufactured by Mitsubishi Electric is constantly positioned near the zenith over Japan. This makes it possible to send positioning signals to places where it was previously unavailable, such as built-up urban areas and mountainous regions. By supplementing GPS signals, it enables positioning accuracy down to the centimeter level. Three additional satellites are planned to be launched from fiscal 2025 onwards, and these are expected to further stabilize positioning accuracy.

* In addition to the four satellites currently in operation, three additional satellites (Nos. 5 to 7) are scheduled to be launched from fiscal 2025 onwards.

Active in a variety of fields directly related to our daily lives

By combining high-precision positioning terminals that receive positioning signals from satellites with highly accurate 3D maps generated from location information obtained by MMS,* we are working to provide various solutions that contribute to the creation of safe, secure, and comfortable communities in the following areas:
・The automobile sector, such as eco-drive control and automated driving;
・Railways, such as improving the efficiency of train operations and management;
・Automated operation of agricultural and construction machinery in the agricultural sector; and
・Construction and civil engineering, etc.



* Mobile Mapping System: A system in which a GPS antenna, laser scanner, camera, and other devices are mounted on a vehicle to collect 3D positioning information about the shapes of buildings, roads, and their surroundings while the vehicle is in motion.

Quasi-Zenith Satellite System MICHIBIKI (in Japanese text)

Voice

Services to realize a high-precision positioning society using “MICHIBIKI”

MICHIBIKI, which has offered services as a four-satellite constellation since 2018, will add three additional satellites from fiscal 2025 onwards, bringing the total number of satellites in service to seven. The seven-satellite constellation will provide continuous positioning by Japan's own satellites, without relying on GPS or other satellites, and is expected to continue to be used as part of the country's sustainable infrastructure. Our centimeter level augmentation service is used in advanced driver assistance and autonomous driving systems, including hands-free systems, as well as in automotive and snowplow applications, and their applications continue to expand. Future expected applications include the fields of drones, agricultural machinery, construction machinery, ships, and so on. We will continue to support the government in developing and expanding infrastructure that contributes to creating a safe, secure, and comfortable society for people.

Hisashi Domoto
Quasi-Zenith Satellite Promotion Division Sales Section

Living Environment & Digital Media Equipment Group

Providing products that are helpful for society and the environment in wide areas to create comfortable spaces

Yasumichi Tazunoki
Executive Officer, Group President, Living Environment & Digital Media Equipment

The Living Environment & Digital Media Equipment Group is working to expand our businesses including the air conditioning and refrigeration systems business as one of the key growth sectors at Mitsubishi Electric. In addition, we are pressing forward with proposals of total solutions using IoT and AI technologies as well as products within and outside the Mitsubishi Electric Group to realize life solutions for everyone, from workers to people at home, to live by their own values.

As we expand business, we believe it is important to provide products and services that contribute simultaneously to achieving sustainability, safety, security, and comfort as well as to resolving social challenges in the living environment. As part of this, we offer environment-friendly systems and services, including air conditioners that produce less CO2 during use and our energy-saving EcoCute product lineup, to create comfortable spaces across a broad range of areas such as the home, the office, and industry. Additionally, Mitsubishi Electric proposes solutions that aim to achieve energy savings by building systems as a whole in support of programs such as ZEB, promoted by the Japanese government, in cooperation with the Building Systems Group.

Major social challenges for which risks and opportunities have been recognized and evaluated

- Optimal use of energy
- Introduction of clean energy
- Development of safe, secure, comfortable and sustainable cities
- Sustainable use and development of resources
- Proper management of chemical substances
- Addressing climate change

Priority SDG initiatives

Living Environment & Digital Media Equipment Group

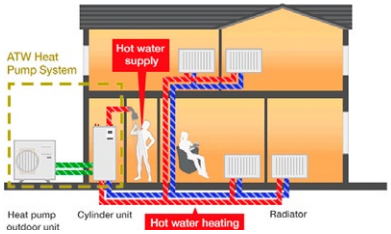
Topics

"ecodan" series

All eyes on ATW,* a highly energy efficient heating and hot water system

In European countries that are advancing decarbonization policies, the trend in heating and hot water supply equipment is shifting from fossil fuel boilers to heat pumps that use air heat. In particular, demand for air-to-water systems, which can be used directly with hot water heating systems prevalent in Europe, is growing rapidly. Air-to-water systems are also highly energy efficient and are attracting attention as a solution to skyrocketing utility costs.

* Air to Water (heat pump hot water system)



Using heat pump technology that utilizes electricity, heated water is circulated through pipes and radiated from floor heaters and radiators to warm the entire residence. It can also be used to provide hot water for shower and cooking.

"ecodan" uses new refrigerants to significantly reduce environmental impact

In Europe, Mitsubishi Electric has expanded "ecodan" series of air-to-water (ATW) heat pump hot water systems. In response to the trend toward replacing refrigerants having high global warming potential (GWP), which are subject to F-gas regulations, with refrigerants having lower GWP, we have launched the new PUZ-WZ series in 2023, which use R290 as a refrigerant. R290 reduces the GWP to 1/225 compared to conventional R32 refrigerant, significantly reducing environmental impact.

Strengthening of the development and production

EHL (ecodan Heating Lab.) was established in France to strengthen the development system for accelerating the introduction of products and services that meet market needs. Regarding production, we started mass production of the ATW at a new plant in Turkey. The target production volume for the first year is 100,000 units, and we are planning to increase production in subsequent years.

Voice

Meet local needs while responding to rapidly expanding markets

We don't expand ATW in Japan, so it is difficult to understand customer's needs. However, the establishment of EHL in France has made it possible to gather market information from various European countries and to apply it to development. ATW leads the market by offering a product lineup that is carefully tailored to local cultures, such as featuring low noise and compactness, while striving to reduce environmental impact. In addition, by strengthening our plant in Turkey and establishing a production system, we will meet the increasing demand in Europe.

Mariko Nakamura
Shizuoka Works
Sales Department
Air Conditioning Overseas Planning Section

Factory Automation Systems Group

Contributing to the realization of a sustainable society through the provision of energy saving equipment and solutions and the utilization of automation technology at production sites

Toshie Takeuchi
Executive Officer, Group President,
Factory Automation Systems

The Factory Automation Systems Division is focused on enriching the lives of people around the world by contributing to co-innovation with industry and infrastructure customers through the use of technology.

Going forward, we will continue to contribute to solving social challenges, such as decarbonization and labor shortages, with the aim of realizing a sustainable society by providing production sites with energy-saving equipment and solutions that utilize automation technology.

1. Contributing to decarbonization by providing energy-saving equipment and solutions

Amid the growing demand for decarbonization related products, such as batteries, electric vehicles, and solar panels, we will contribute to manufacturers of those products by providing equipment, systems, and solutions with high energy saving capabilities for use in production equipment helping to reduce their overall energy consumption.

2. Contributing to measures to reduce the impact of labor shortages by utilizing automation technology

We will contribute to measures to reduce the impact of labor shortages by supporting customers in improving manufacturing efficiency through the utilization of automation technology.

Major social challenges for which risks and opportunities have been recognized and evaluated

- Sustainable use and development of resources
- Addressing climate change
- Measures against air, water, and soil pollution
- Addressing the declining labor force population

Priority SDG initiatives

Factory Automation Systems Group

Topics

Key growth businesses (Controllers (PLCs), Servo, and CNC)

Helping address labor shortages, especially in growing industries, by improving manufacturing efficiency

In an aging society with a declining birth rate, pursuing automation is essential to making manufacturing sustainable. By using automation technology to streamline manufacturing, we can prepare for an era of labor shortages. In 2022, the Factory Automation Systems Group established a global slogan of "Automating the World" with the determination to "support the innovation of cutting-edge automation technology and contribute to the realization of a more prosperous society" through strong support for growth industries, such as EVs and batteries, semiconductors, and displays, as well as helping solve social challenges.

From left to right: Controllers (PLCs), Servo, and CNC (numerical control unit). In these key growth businesses, we will enhance our competitiveness and do our part to address social challenges.

Voice

Contributing to sustainability through innovation in motor control technology

We develop and manufacture servo systems used to drive the various moving parts of manufacturing equipment. Our servo systems are supplied to equipment manufacturers and others globally. Devices such as servo motor's execute precise angular rotation of the motor shaft as commanded, in order to accurately control machine positioning. Servo systems are widely used in manufacturing equipment for LCD displays, smartphones, semiconductors, and other products that require high-speed, high-precision positioning control, and they have contributed to improving the quality and lowering the cost of our customers' products. In recent years, servo systems have been increasingly applied to the production of batteries used in EVs as well as photovoltaic equipment, both of which are attracting attention for their role in achieving carbon neutrality. We are focusing our efforts on developing energy-saving systems and motors that can be produced in a resource-efficient manner.

Takashi Okamuro
Nagoya Works,
Drive System Department

Automotive Equipment Group

Aiming to achieve the SDGs through development of technologies and corporate activities that contribute to the decarbonization of the automobile industry and the creation of a safe and secure society

Atsuhiro Yabu
Executive Officer, Group President, Automotive Equipment

The Automotive Equipment Group aims to provide a range of equal opportunities to move safely and freely with low impact on the environment for all people, including the elderly, those with disabilities, and visitors from foreign countries people who do not understand language, by providing electronic and electric device components. Through these efforts, we will contribute to realizing a sustainable society.

As an example of efforts for decarbonization in the manufacturing processes of automotive equipment, we are reducing electricity usage by introducing high energy efficiency equipment, using waste heat for production equipment, and thoroughly implementing energy-saving technologies such as centralized monitoring and optimized control of air conditioning and ventilation equipment. Moreover, we are promoting energy generation, such as new installation and expansion of our own PV*1 and the introduction of PPA*2 models, and procurement of renewable energy in a planned manner to accelerate decarbonization. These activities are also being implemented at overseas manufacturing bases to accelerate our global decarbonization efforts.

*1 Photovoltaic
*2 Power Purchase Agreement

Major social challenges for which risks and opportunities have been recognized and evaluated

- Reduction of air pollution and climate change countermeasures
- Zero traffic accidents, elimination of traffic congestion, and comfortable travel
- Elimination of regional gaps
- Enhancement of QOL for vulnerable road users
- City development
- Measures to address aging infrastructure

Priority SDG initiatives

Automotive Equipment Group

Topics

Infrastructure-coordinated local autonomous driving system

Toward the practical deployment of autonomous driving technologies that enable high levels of safety and comfort

As the public and private sectors work together to promote the use of autonomous driving against the backdrop of labor shortages due to the declining birthrate and aging population, as well as heightened safety awareness, Mitsubishi Electric has been developing an "infrastructure-coordinated local autonomous driving system" by extending to infrastructure the ADAS (Advanced Driving Assistance System) technology that it has cultivated in the market. As part of a policy project under the auspices of the Ministry of Economy, Trade and Industry, which we have been participating in since 2021, we realized Japan's first Level 4 autonomous driving system in Eiheiji-cho, Fukui Prefecture (approved in May 2023), and have been relentlessly developing the technology.

Vehicles in the area are provided with a dynamic map* that is "blind spot free" based on peripheral information from the infrastructure side and obstacle information generated by roadside machine sensors that detect vehicles and pedestrians. Based on location information, the autonomously driving vehicle performs optimal route calculation to achieve safe unmanned vehicle control.

* Technology that displays real-time dynamic information on a high-precision map

Japan's first Level 4 unmanned autonomous driving service starts (in Japanese text)

Voice

Safe, secure autonomous driving to create comfortable urban spaces

Since 2021, we have been participating in the Theme 1 activities of the Project on Research, Development, Demonstration and Deployment (RDD&D) of Automated Driving toward the Level 4 and its Enhanced Mobility Services (RoAD to the L4), a policy project of the Ministry of Economy, Trade and Industry, with the aim of implementing this system in Japan. We have been making products mainly for automakers, so we are new to the field of mobility services and are iterating a trial-and-error process to develop services that will please our customers. Please look forward to our contribution to improving users' quality of life through Japan's first Level 4 autonomous driving experiment, which is the first step to realizing a more vibrant society.

Hideyuki Tanaka
Himeji Works
Automotive Electronics Development Center
AD Engineering Division

Semiconductor & Device Group

Contributing to the realization of a decarbonized society and GX* by providing energy-efficient products, key devices for customers, in response to energy and environment-related social issues

Masayoshi Takemi
Senior Executive Officer,
Group President,
Semiconductor & Device

*Green Transformation

The Semiconductor & Device Group supports reducing energy use as well as affluent and comfortable living by providing low-power-consumption, cutting-edge power semiconductor and other devices using silicon carbide (SiC) for EVs and air conditioners, as well as by supplying high-performance, low-power, compact high-frequency devices and optical devices enabled by compound semiconductor technologies for wireless and optical fiber communications equipment, data centers, sensors, and more.

In order to achieve carbon neutrality, a requirement for sustainable societies, it is imperative to use generated power while minimizing power loss in the process. Power semiconductor devices are incorporated into a number of power electronics, playing a significant role in reducing power loss. In addition, Mitsubishi Electric manufactures state-of-the-art products using SiC, which enables significant reductions in power loss, and conventional products using Si.

Going forward, the Semiconductor & Device Group will continue to contribute to the realization of a safe, secure, comfortable, and sustainable society by providing key devices for realizing a decarbonized society.

Major social challenges for which risks and opportunities have been recognized and evaluated

- Appropriate use of water
- Optimal use of energy
- Proper management of chemical substances
- Addressing climate change

Priority SDG initiatives

Semiconductor & Device Group

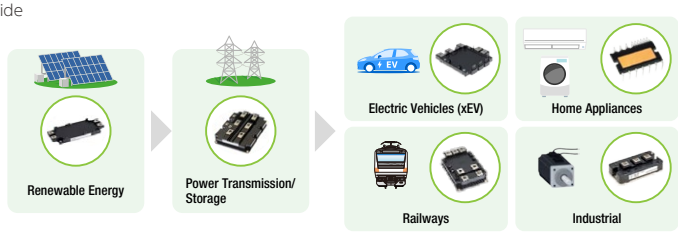
Topics

Power semiconductors

Serving as a key device to decarbonized society

Electronic devices equipped with power semiconductors play an important role in reducing CO_2 emissions from power generation, transmission/storage, and consumption. Mitsubishi Electric aids in energy conservation by providing power semiconductors for power generation with low greenhouse gas emissions, power transmission/storage with low power loss, and various applications such as EVs, home appliances, railways, industrial equipment, and others. We will continue to contribute to realizing GX (Green Transformation) by further developing (increasing the efficiency and functionality of) SiC* power semiconductors that have superior energy-saving performance in addition to our conventional Si products.

* Silicon Carbide



Construct new wafer plant to boost sic power semiconductor business

Including the construction of a new plant building (in Kumamoto Prefecture) to strengthen our SiC power semiconductor production capacity, we will double our cumulative capital investment from fiscal 2022 to fiscal 2026 over that of our previous plan* to approximately 260 billion yen. The plan is to respond to increasing demand for EVs, as well as expanding markets for new applications that require, for example, low energy loss, high temperature operation or high-speed switching. We will strengthen our production capacity in the power device business to contribute to realizing GX and further expand our business.

* The previous plan was approximately 130 billion yen.

Mitsubishi Electric to Construct New Wafer Plant to Boost SiC Power Semiconductor Business

Voice

Gentle and durable. We will continue to maintain customers' high level of confidence in our products.

I am responsible for translating customer needs into consumer electronics products, primarily home appliances such as air conditioners. Our IPM*1 for consumer products has the largest market share in the world.*2 Its strength is that we were the first to provide our customers with simple and compact design in an optimal package that incorporates peripheral components. As numerous customers use our products, we have achieved de facto standardization, with cumulative shipments reaching 1 billion units as of 2022. In fact, many have commented that the product has "few failures," and we will further respond to our customers' expectations and trust by improving our production system.

*1 Highly functional module with built-in self-protection function in IGBT (Insulated Gate Bipolar Transistor) module.
*2 As of 2021, according to internal research.

Toma Takao
Power Device Works
Product Strategy Department
Marketing and Application
Engineering Section C

Information Systems & Network Service Group

Contributing to the realization of improved customer value and a safe, secure, and sustainable society through the provision of IT services

Eiichiro Mitani
Executive Officer, Group President, Information Systems & Network Service

The Information Systems & Network Service Group is committed to enhancing customer satisfaction, helping achieve sustainable societies through solutions tailored to the management strategies and challenges of its customers, and developing solutions that contribute to solving social challenges.

More specifically, we provide solutions to support environmental management by visualizing GHG*1 emissions for companies working toward carbon neutrality. We also work to realize a safe, secure, and comfortable society through reducing energy use at data centers to reduce the CO_2 emitted as a result of business activities, support supporting those who lack physical strength using image analysis technologies, and more.

Going forward, in order to achieve smarter societies, we will leverage the many component technologies and strengths of the Mitsubishi Electric Group to build next-generation information systems using the latest IT solutions, such as IoT,*2 big data processing, and AI-related technologies.

*1 Greenhouse Gas
*2 Internet of Things: A system to remotely control, operate, monitor, and collect information from various "things" connected via the Internet.

Major social challenges for which risks and opportunities have been recognized and evaluated

- Optimal use of energy
- Introduction of clean energy
- Waste reduction and management
- Sustainable use and development of resources
- Addressing climate change
- Realization of a safe society
- Addressing labor force shortages

Priority SDG initiatives

Information Systems & Network Service Group

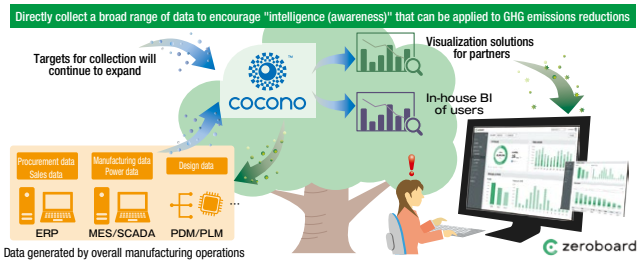
Topics

Centralized GHG*1 emissions data management solution "cocono"

Visualizing GHG emissions across the supply chain to support environmental management

Managing greenhouse gas emissions is an important issue for companies that aim to achieve carbon neutrality by 2050. In addition to emissions from their own operations (Scopes 1 and 2),*2 companies must also collect data and calculate emissions beyond their own operations from their supply chains (Scope 3).*2 This is a complex, challenging task for many companies. Against this backdrop, Mitsubishi Electric Information Systems Corporation (MDIS) has launched "cocono," a centralized greenhouse gas emissions data management solution. "cocono" collects and manages data without involving labor. It also provides knowledge that can be leveraged to reduce GHG emissions.

*1 Greenhouse gas
*2
Scope 1: Direct greenhouse gas emissions by companies (fuel combustion, industrial processes).
Scope 2: Indirect emissions from the use of electricity, heat, and steam supplied by other companies.
Scope 3: Indirect emissions other than Scopes 1 and 2 (emissions from other companies related to the company's activities).
Source: Ministry of the Environment and Ministry of Economy, Trade and Industry "Green Value Chain Platform"



Outline of cocono in action

By combining our expertise in automation and data collection technologies at manufacturing sites with visualization tools and dedicated GHG management services, we provide energy dashboards that enable multi-faceted analysis. We have also begun working with zeroboard Inc. to provide cloud services for calculating and visualizing GHG emissions.

cocono, a centralized GHG emissions data management solution (in Japanese text)

Voice

Reducing the burden of aggregation work and making it a useful tool for business management

As the movement toward carbon neutrality is rapidly accelerating and an increasing number of companies are including GHG emissions reductions as a management indicator, we have developed "cocono" as an IT-based support system. We strive to facilitate easy implementation and use for our customers. Collaborating with outside companies has improved our technology and enabled us to reflect accurate information in a timely manner, eliminating the need for manual data collection. In addition, we have improved system reliability by, for example, incorporating relevant regulatory compliance and advice from environmental consulting firms. We believe that we can help companies in their efforts to promote carbon neutrality by using this up-to-date, highly accurate data for their management decisions.

Yurina Nihei
Mitsubishi Electric Information Systems Corporation
Industry and Service Systems Division A
System Department B
Manufacturing Digital Transformation Section

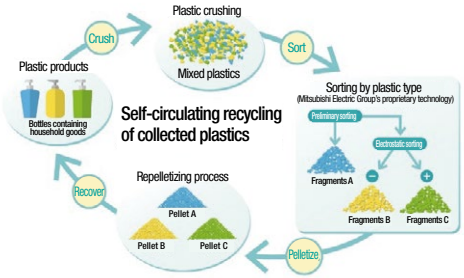
Co-creations with external parties

Co-creation initiatives using advanced plastic sorting technology

In recent years, various companies have been collaborating beyond the boundaries of industry to recycle plastic waste toward the realization of a circular society. Some plastic products use several types of plastic materials in combination. Recycling plastic waste requires sorting of such materials. Moreover, improving the rate of collection of plastic materials by sorting them at high purity has become a major challenge. Mitsubishi Electric aims to solve social issues through its business activities by using its advanced plastic sorting technology that it has cultivated over many years of work in home appliance recycling as well as by collaborating with companies across industries to solve this challenge.

Realizing advanced sorting of household plastics

Plastics sorting trial with Kao Corporation



In October 2022, we began a trial using our proprietary advanced plastic sorting technology on sorting mixed plastics originating from household products using plastics such as shampoo bottles supplied by Kao Corporation. Going forward, we will conduct similar trials in various fields to verify the effectiveness of the advanced sorting technology for recycling a wide variety of plastic products.

Mitsubishi Electric began a trial using our advanced plastic sorting technology on sorting household plastics supplied by Kao Corporation (in Japanese text)

Contributing to solving marine plastic waste problems

Joining CLOMA

CLOMA Ocean Material Alliance

In April 2023, Mitsubishi Electric joined the Japan Clean Ocean Material Alliance (CLOMA) to help solve marine plastic waste problems. By participating in the Technical Subcommittee consisting of CLOMA members as well as demonstration projects led by CLOMA, we will accelerate our efforts toward solving waste plastic problems, including those related to marine plastics, by utilizing our proprietary advanced plastic sorting technology.

Joining the Japan Clean Ocean Material Alliance (CLOMA) (in Japanese text)

Investing in startups to solve social issues

The Business Innovation Group creates new value through the creation of new businesses that transcend the framework of existing business domains and through the practice of open innovation. For example, the ME Innovation Fund, a corporate venture capital fund, works to solve various social issues by bringing innovative technologies and out-of-the-box business ideas to fruition through start-up investments.

Solving water pollution problems in Southeast Asia

A Collaboration with Hydroleap

Hydroleap Pte. Ltd is a Singapore-based startup company we invested in July 2023 that provides wastewater treatment solutions. Southeast Asia, also known as the “factory of the world,” is facing a serious water pollution problems caused by industrial effluents. Mitsubishi Electric also, with its many manufacturing bases, is also not immune to this problem. Through the business developments with Hydroleap, we will address the water pollution in Southeast Asia and use the knowledge we gain from this effort to contribute to solving global-scale environmental problems.

List of initiatives that contribute to addressing social challenges

Business Group headquarters	Social challenges for which risks and opportunities have been recognized and evaluated	Priority SDG initiatives	Examples of initiatives
Public Utility Systems Group	● Appropriate use of water ● Optimal use of energy ● Addressing climate change ● Development of safe, secure, comfortable, and sustainable cities		▪ Reducing Environmental Burdens and Realizing a Society with Rich Water Cycle by Advancing Water and Sewage Systems Using IoT Technology ▪ Developing High Efficiency Electrical Components for Rolling Stock and Providing Maintenance Solutions that Contribute to the Development of Railways, Which Are an Energy Efficient and Environmentally Friendly Transportation Network ▪ Providing Disaster Prevention and Mitigation Services and Other Solutions that Enhance Infrastructure Maintenance and Management that Contribute to the Development of Safe, Secure, and Comfortable Cities
Energy & Industrial Systems Group	● Optimal use of energy ● Introduction of clean energy ● Sustainable use and development of resources ● Addressing climate change		▪ Contributing Toward Economical and Reliable High-Quality Power Distribution Systems, Optimized Energy Use via ICT for Interconnectivity and Resilient Energy Infrastructure that Operates Seamlessly, Even During Emergencies ▪ Improving the Efficiency of Power Generators, Switchgear and Transformers ▪ Developing Equipment that Caters to Environmental Awareness for Eliminating or Reducing the Use of SF6 Gas, Known for Its High Global Warming Potential ▪ Supply and Demand Management with the Growing Use of Renewable Energy Resources, Integrated Management of Distributed Energy Sources Including Demand Control, and Driving Grid Stabilization Solutions ▪ Driving Distributed Power Supply Operation Solutions Capable of Responding to New Demand, Such As the Wide Area Supply and Demand of Electricity Through Interconnection of Electric Power Utilities
Building Systems Group	● Optimal use of energy ● Development of safe, secure, comfortable and sustainable cities ● Waste reduction ● Addressing climate change		▪ Pursuing Comfortable, Safe and Secure Elevator and Escalator Transport. Supporting Safe and Comfortable Use of Elevators and Escalators with Maintenance Services ▪ Further Improving Energy Savings, Safety, Comfort, and Functionality Through Elevator and Escalator Renewal ▪ Providing Smart Building Solutions by Supporting Robot Mobility within the Building, Supporting ZEB Operations, etc. ▪ Providing Safety and Security with Integrated Building Security Systems. Supporting Energy Savings and Comfort in Buildings Through Building Facilities Operations Systems ▪ Providing Both a Comfortable Indoor Environment and Improved Energy Efficiency by Maintaining and Replacing Building Systems
Defense & Space Systems Group	● Securing of a sustainable food production system ● Integrated management of water resources ● Creating secure, safe and comfortable sustainable cities ● Addressing climate change, prevention of marine pollution, and prevention of deforestation		▪ Contributing to World-Leading Global Environment Observation ▪ Contributing to Conserving Global Environment and Ensuring Secure and Safe Living by Using Satellite Observation Data ▪ Contributing to Secure, Safe, and Comfortable Living Through High Precision Positioning Solution
Living Environment & Digital Media Equipment Group	● Optimal use of energy ● Introduction of clean energy ● Sustainable use and development of resources ● Addressing climate change		▪ LossnayÒ for Commercial Use, High-performance Ventilation Equipment ▪ Achieving High Efficiency Operation and CO_2 Emissions Reduction for Hot Water and Heating Systems by Switching from the Combustion Type to the Air to Water (ATW) Heat Pump Hot Water System Mainly in Europe, Which Has Strict Environmental Regulations ▪ MILIE LED Lighting – Realizing Reduced Power Consumption and Comfort ▪ EcoCute Provides Excellent Energy Savings and Comfort ▪ Recycling of Home Electrical Appliances
Factory Automation Systems Group	● Sustainable use and development of resources ● Addressing climate change ● Measures against air, water, and soil pollution ● Addressing the declining labor force population		▪ Contributing to decarbonization by energy-saving ▪ Contributing to measures to reduce the impact of labor shortages by supporting improving manufacturing efficiency
Automotive Equipment Group	● Reduction of air pollution and climate change countermeasures ● Zero traffic accidents, elimination of traffic congestion, and comfortable travel ● Elimination of regional gaps ● Enhancement of QOL for vulnerable road users		▪ Technological Innovation of Automotive Equipment Products for a Decarbonized, Safe and Secure Society
Semiconductor & Device Group	● Appropriate use of water ● Optimal use of energy ● Proper management of chemical substances ● Addressing climate change		▪ SiC Power Semiconductor Devices that Achieve Low-Power Consumption of Customers' Devices ▪ Optical Communication Device that Contributes to Low Power Consumption of Network Equipment for 5G Mobile Communications Base Stations
Information Systems & Network Service Group	● Optimal use of energy ● Introduction of clean energy ● Realization of a safe society ● Addressing labor force shortages		▪ Using Internet Data Centers to Help Customers Reduce Environmental Impact ▪ Providing Smart Office Solutions that Also Contribute to Work Style Reforms