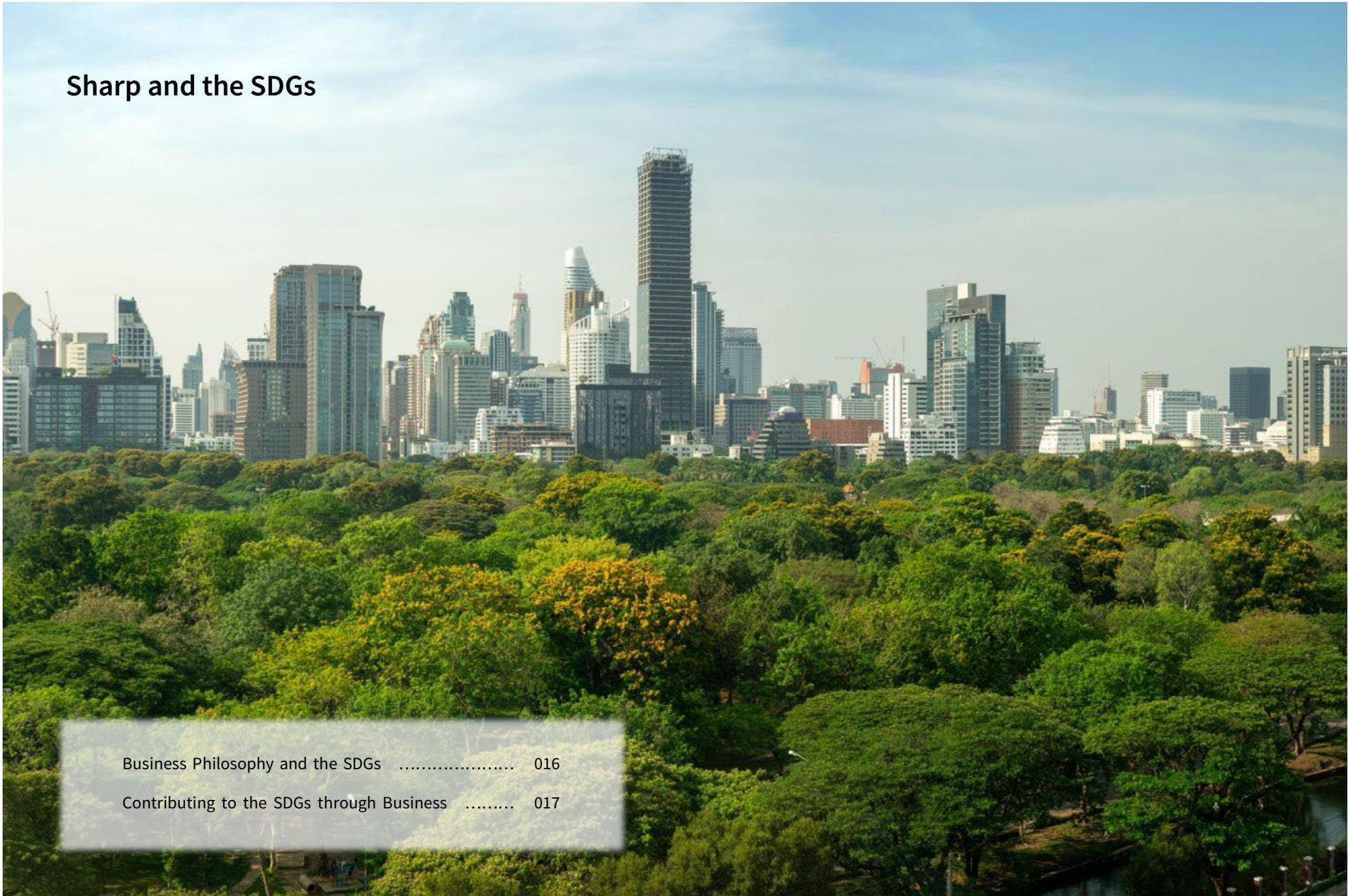


# Sharp and the SDGs



Business Philosophy and the SDGs ..... 016

Contributing to the SDGs through Business ..... 017

## Sharp and the SDGs: Business Philosophy and the SDGs

In 1973, Sharp put into writing its business philosophy, which says the company will “contribute to the culture, benefits and welfare of people throughout the world” and that “our future prosperity is directly linked to the prosperity of our customers, dealers and shareholders.” These and other vows of the business philosophy share the aims of the Sustainable Development Goals (SDGs), which the UN enacted in 2015.

Under its business philosophy, Sharp carries out ESG management with a two-pronged approach: creating solutions to social problems through business and technological innovation, and reducing social and environmental impact through sustainable business activities. This approach will help achieve the SDGs and thereby contribute to a sustainable and better world where no one on Earth is left behind.

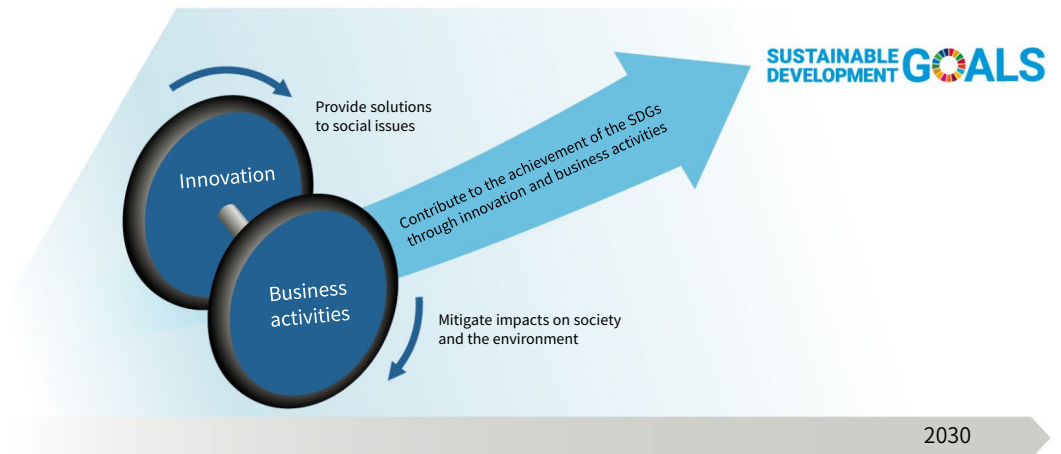
### Business Philosophy

We do not seek merely to expand our business volume. Rather, we are dedicated to the use of our unique, benefits and welfare of people throughout the world.

It is the intention of our corporation to grow hand-in-hand with our employees, encouraging and aiding them to reach their full potential and improve their standard of living.

Our future prosperity is directly linked to the prosperity of our customers, dealers and shareholders ...indeed, the entire Sharp family.

### SUSTAINABLE DEVELOPMENT GOALS

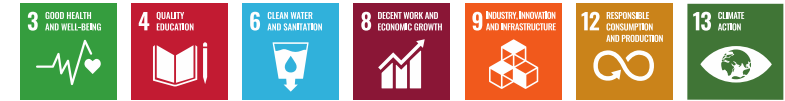


## Sharp and the SDGs: Contributing to the SDGs through Business

Segment	Business Unit / Subsidiaries	Related SDGs																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Brand Businesses	Smart Life & Energy	Smart Appliances & Solutions BU			●	●		●		●	●			●	●				
		Sharp Energy Solutions Corporation (SESJ)								●			●	●	●				
	Smart Office	Smart Business Solutions BU	●		●	●	●	●	●	●	●	●	●	●	●			●	●
		Dynabook Inc.				●			●	●	●	●		●	●				
	Universal Network	TV Systems BU			●					●	●		●		●				
		Mobile Communication BU			●					●	●			●	●				
Device Businesses	Display Devices	Sharp Display Technology Corporation (SDTC)				●			●		●	●	●	●				●	
		Sakai Display Products Corporation (SDP)	●		●		●	●	●	●	●	●	●	●	●	●	●		
	Electronic Devices	Sharp Sensing Technology Corporation (SSTC)								●	●								
		Sharp Semiconductor Innovation Corporation (SSIC)			●				●	●	●		●	●	●	●			
		Sharp Fukuyama Laser Co., Ltd. (SFL)				●				●		●	●	●	●				
	Corporate Research & Development Group			●	●		●	●	●	●	●	●	●	●				●	

## Smart Appliances & Solutions BU

Offering support through AIoT for a safe, healthy, and comfortable lifestyle.  
Yielding a smart life for the near future through people-oriented AIoT.



### Business Overview

In our aim to help create a healthy and comfortable life, the Smart Appliances & Solutions BU supplies end consumers and B2B customers globally with a variety of appliances, such as air conditioners, refrigerators, washing machines, microwave ovens, and air purifiers.

### Activity Status

We offer users a safe, healthy, and comfortable lifestyle in a variety of ways by applying AIoT<sup>\*1</sup> to conventional household appliances. Products include cooking appliances that propose healthful dishes that suit customers' lifestyles and preferences, refrigerators that propose meal plans to minimize waste while keeping food fresh with highly sealed construction and refrigeration control, air conditioners and air purifiers that provide a safe and comfortable indoor air environment, and washing machines and vacuum cleaners that help reduce household chores. We also strive to realize smart homes that integrate AIoT and storage batteries that further the use of renewable energy.

Further, we carry out ongoing eco-friendly practices at the development stage, such as the development of energy-saving technologies for refrigerators, air-conditioners, and washing machines, which use an especially large proportion of household energy; development of No-Holes Tub washing machines that save water; adoption of resource-saving designs; and active use of plastic recovered from used appliances in new appliances through repeated recycling using our closed-loop material recycling technology<sup>\*2</sup>.

In the production stage, we establish numerical objectives for each factory and work to achieve them in an effort to reduce the consumption of electricity and gas by the factories and reduce the volume of waste produced.

Our electronic dictionaries contribute to goal 4 (quality education) of the SDGs.

<sup>\*1</sup> AIoT is a word coined by Sharp, combining the words AI (artificial intelligence) and IoT (Internet of things). Sharp is pursuing a more people-oriented world through AIoT-driven devices and services.

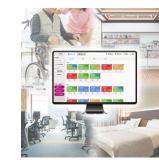
<sup>\*2</sup> Jointly developed with Kansai Recycling Systems Co., Ltd., a consumer electronics recycling company established in Japan with joint investment from Sharp and five other companies.

### Major SDG Contribution Examples

- Ongoing development of AIoT-compatible models
  - Japan: In fiscal 2022, we developed 114 AIoT-compatible models. They include the Plasmacluster air conditioner, which is the first product of its kind to incorporate a CO<sub>2</sub> sensor to notify users when to ventilate the room and which provides a comfortable environment while automatically saving energy and ventilating the space. There's also the Plasmacluster refrigerator, which helps reduce food loss with an advanced AIoT function that lets users register food and then proposes dishes that can be prepared with remaining food before it expires or users forget about it.
  - Overseas: We are updating and expanding the range of services we offer that are tailored to the needs of overseas markets, including ASEAN, Taiwan, and North America.
- Launching a B2B AIoT business  
SMART CONSOLE, Sharp's centralized management system, lets users check AIoT-compatible air conditioners and air purifiers as well as air quality and remotely operate those devices from a PC or tablet. It streamlines administrative work by reducing the workload associated with tasks like making sure employees don't forget to turn off equipment at medium-size nursing care facilities and offices.



Plasmacluster air conditioner with CO<sub>2</sub> sensor



SMART CONSOLE centralized management system

### Awards and Honors

- Healsio Hotcook development team wins METI Minister's Prize at the 9th Monodzukuri Nippon Grand Awards

## Sharp Energy Solutions Corporation (SESJ)

Providing eco-friendly, energy-producing solar power systems to countries around the world to help realize carbon neutrality. Making life easier with energy solutions (systems and services) that make smarter use of electricity.



### Business Overview

SESJ carries on the philosophy of founder Tokuji Hayakawa as it operates energy solutions businesses in Japan and overseas.

### Activity Status

As countries and companies accelerate their efforts to achieve carbon neutrality, SESJ is actively contributing to the drive to realize a decarbonized society by providing appropriate solutions.

- In the Japanese residential market, SESJ is evolving energy management technology for producing, storing, and intelligently using clean energy. In addition, it is working to realize smart living in which humans play the leading role while AI works with IoT devices to propose optimal lifestyles.
- The mobility sector is forecast to see widespread adoption of electric vehicles (EVs) and rapid market growth. In addition to developing systems that link homes and EVs, SESJ is working to develop high-efficiency solar cell for use on EVs.
- With regard to products for corporate customers, heightened attention on corporate efforts to advance environmental, social, and governance (ESG) issues and to achieve the SDGs is driving interest in companies' ability to produce renewable energy to cover their energy needs as a way to contribute to the environment. SESJ offers companies a solar power generation service featuring zero initial investment as one solution to meet these needs.
- In the global market, SESJ has established a joint venture in Thailand to operate a power retail business targeting corporate customers, the company's first foray into the sector. The venture has begun supplying clean energy produced by solar power systems installed on factories, and it is receiving numerous inquiries from Japanese companies that operate plants in Asia as well as from leading local companies. SESJ also continues to promote even more widespread adoption of renewable energy on a global scale by constructing megasolar installations in the ASEAN region and beyond.

### Major SDG Contribution Examples

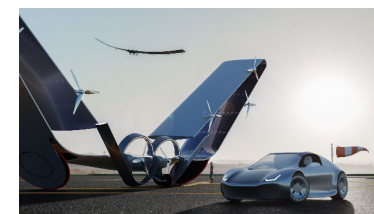
- Samegawa Aono Solar Power Plant\*<sup>1</sup>, a megasolar installation in the village of Samegawa in Higashishirakawa District, Fukushima Prefecture, for which SESJ received a development, design, construction, and maintenance management contract, began commercial operation in April 2023. With a large output of about 40.8 MW-dc power, the facility is expected to reduce anticipated greenhouse gas emissions by about 17,000 tons of CO<sub>2</sub> each year.
- SESJ released the NU-228AP, a monocrystalline solar module for residential use that can be easily and efficiently installed on homes with limited roof space, for example in urban settings.
- Sharp achieved a conversion efficiency of 32.65%, the world's highest\*<sup>2</sup>, in a lightweight, flexible, practically sized triple-junction compound solar module.



Samegawa Aono Solar Power Plant



NU-228AP solar module installation (conceptual image)



Compound solar module for future mobility

### Awards and Honors

- BLACKSOLAR ZERO residential solar module wins New Energy Foundation Chairman's Prize at the 2022 New Energy Awards
- Sharp's "Compound solar module for future mobility" concept wins a 2023 iF Design Award\*<sup>3</sup>

\*<sup>1</sup> Operated by Samegawa Energy LLC, which was formed through a joint investment with Fuyo General Lease Co., Ltd.

\*<sup>2</sup> As of June 6, 2022, for solar modules at the research level (based on Sharp findings).

\*<sup>3</sup> The iF Design Award is one of the world's most prestigious product design awards.

## Smart Business Solutions BU

By strengthening B2B solution proposals built on the customer’s perspective, we are contributing to the resolution of business and social issues by providing safe, secure environments that let people concentrate on their jobs no matter when or where they are.



### Business Overview

As changes in the social environment drive demand for a variety of reforms in the workplace, the Smart Business Solutions BU works to solve a variety of issues facing customers and society by fostering business transformations through eight solutions that combine technologies, products, and services. We will continue to contribute to the resolution of social issues by providing unique products, services, and solutions based on Sharp’s business creed of “Sincerity and Creativity” and the SDGs policies described below as we strive to realize a sustainable society.

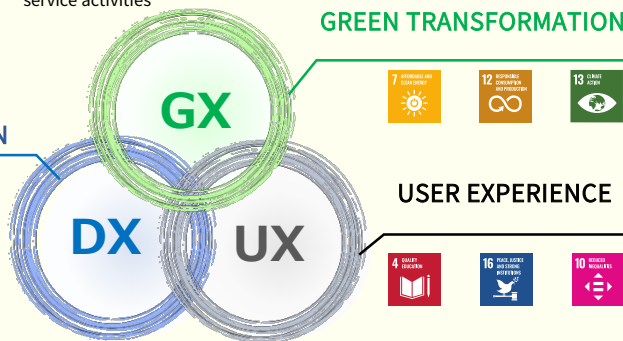
### Activity Status

#### Sharp’s SDG Policies

##### Target Social Issues

- Environmentally friendly products
- Changing workstyles
- Compliance with legal requirements
- Prevention of environmental pollution
- Reduction of environmental impacts
- Aging of the population and labor shortages
- Environmental and community service activities
- Reduction of greenhouse gas emissions
- Prevention of resource scarcity
- Rapidly rising distribution volume

#### DIGITAL TRANSFORMATION



#### Eight solution domains for resolving issues

- (1) Smart offices/IT services (2) Environment (3) Public (4) Digital imaging  
(5) Security (6) Retail (7) Smart factories (8) Logistics

### Major SDG Contribution Examples

We carry out life cycle assessments (LCAs) designed to reduce environmental impacts throughout the product life cycle, starting during the earliest stages of design and development and going beyond the domain of initiatives at Sharp’s plants, in line with the Sharp Green Product concepts\*1 that were established companywide in 1998. We also strive to ensure assessments comply with international standards and to visualize their results.

#### ● EcoLeaf environmental label\*2

Sharp has registered with the EcoLeaf environmental labeling program, which is dedicated to the disclosure of quantitative information about environmental impacts throughout the life cycle of products and services. In addition to assessing and evaluating environmental impacts in a quantitative manner and working on an ongoing basis to efficiently lower environmental impacts, we strive to disclose information in a highly reliable manner.



EcoLeaf environmental label



BP-70C55

#### ● Chinese manufacturing plant SOCC starts producing solar power

A 4.73 MW solar power system installed at SOCC, Sharp’s flagship multifunction printer (MFP) production plant, began operating in January 2023. By switching to locally produced power for its annual use of about 3 million kWh, the facility is expected to reduce its greenhouse gas emissions by about 1,830 tons of CO<sub>2</sub> per year.



Bird’s-eye view of the SOCC plant

### Awards and Honors

- Six models of A3 digital MFP win a 2022 Good Design Award



BP-70C/60C/50C/40CC/70M series

\*1 See page 066.

\*2 Organized by the Sustainable Management Promotion Organization.

## Dynabook Inc.

Dynabook is making people’s lives and society better by “changing the world through computing and services,” developing “true computing that reflects real needs and that supports communities,” and offering “new added value and services developed from the user’s standpoint.”



### Business Overview

Dynabook plans, develops, manufactures, sells, supports, and services personal computers and system solutions. We are pursuing the fusion of hardware (“dynabook as a Computing”) and services (“dynabook as a Service”) and strengthening the technology that supports this endeavor.

### Activity Status

Since developing the world’s first laptop computer in 1985, Dynabook has leveraged its innovative technologies and expertise to plan, develop, manufacture, and sell PCs that people turn to in their everyday lives and to provide after-sales support. In recent years, we have worked actively in building the foundation for industrial and technological innovation to realize a sustainable society. Efforts include manufacturing PCs that accommodate today’s diversifying work styles and providing solutions that help resolve labor shortages and streamline work at manufacturing plants.

Specifically, Dynabook is applying its proprietary “empower” technology to work towards SDGs 8 (decent work and economic growth) and 9 (industry, innovation and infrastructure) by offering mobile notebook PCs that deliver high performance. We are also contributing to SDGs 12 (responsible consumption and production) and 13 (climate action) by, for example, achieving year-on-year reductions in greenhouse gas emissions during the manufacturing process, lowering the amount of waste from factories sent to landfills, increasing use of recycled materials, and reducing use of plastic materials.

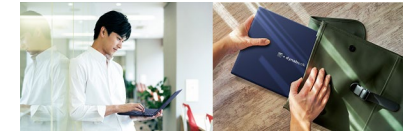
In its solutions business, Dynabook proposes AI solutions, an area in which it has extensive experience at its own computer manufacturing plants, to bring the digital transformation (DX) to manufacturing with a focus on AI technology and edge computing devices. In addition, its life cycle management (LCM) service is contributing to SDGs

7 (affordable and clean energy) and 12 (responsible consumption and production) by, for example, proposing an economical, effective approach to computer management.

In the area of culture and education, we help with the development of, and services for, ICT-driven school education environments, thereby working toward SDG 4 (quality education).

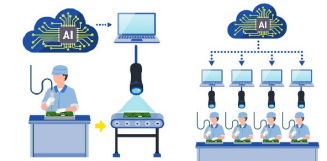
### Major SDG Contribution Examples

- Personal computers  
We launched the dynabook R9 and R8, a pair of high-end 14-inch mobile notebook PCs featuring the latest 13th-generation Intel® CPUs and Dynabook’s proprietary “empower” technology. These models boast light weight, fast processing speeds, robust enclosures, and exceptional ease of use. They allow processor-intensive creative work and concurrent use of multiple applications while facilitating lifestyles that aren’t bound by restrictions of place or time.



dynabook R9 • R8

- Solutions business
  - Providing the manufacturing industry with solutions that use image recognition AI to improve work quality  
Dynabook is helping companies boost production efficiency while maintaining product quality by providing an AI defect inspection system that automatically detects defects in about half the time as can be accomplished with visual inspections (based on Dynabook results) and an AI worker movement detection system that helps reduce forgotten steps and backtracking.
  - Strengthening and expanding an LCM service  
Dynabook launched a new portal website as part of its LCM service, by means of which it manages companies’ computer fleets across the entire equipment life cycle, from deployment to disposal, to aggregate information for centralized management.



LCM service

- Culture and education  
Dynabook goes beyond supplying highly capable computers by supporting initiatives to bring ICT to education by leveraging proprietary functionality and services by, for example, supplying learning apps and account management tools.

TV Systems BU

Promoting innovation, better health, and environmental protection with ideas that make life more convenient and comfortable.



Business Overview

The TV Systems BU develops and sells products, such as TVs and wearable neck speakers, with unique features that put them ahead of what other companies are offering. We continue to work to expand the possibilities of AV equipment.

Activity Status

TVs, which are our core product, are not simply terminals for receiving broadcast waves; rather, they are devices with a broad range of ever-evolving uses, from entertainment to support with daily living, thanks to their increasing size and definition, broadband connectivity, streaming service features, smartphone-like apps, and much more.

TVs are found in 92.5%\*1 of households in Japan and are the electric home appliance with which we interact the most in our daily lives, as evidenced by the fact that we spend around three hours per day watching broadcast television (including recorded programs)\*2.

In addition to developing basic functionality, i.e., picture and sound quality, for TVs and audio products, we pursue the following ESG and SDGs-related manufacturing and solutions in order to deliver ideas that will make life more convenient and comfortable.

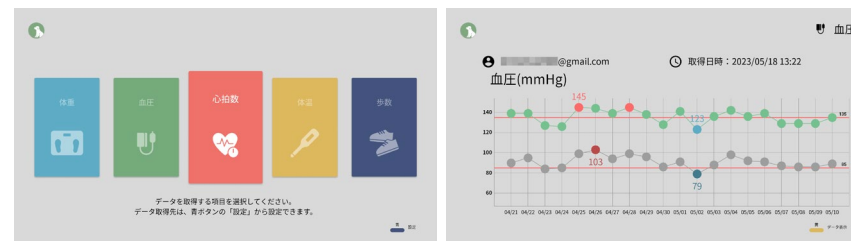
- Incorporating TV-driven health promotion solutions and health-conscious functionality
- Improving energy-saving performance
- Reducing usage of virgin plastic and using more recycled materials

\*1 Source: Prevalence and ownership of major durable consumer goods (total households), Consumer Confidence Survey (March 2023), Cabinet Office.  
\*2 Source: Average usage of major media, Information and Communications in Japan 2022 White Paper, Ministry of Internal Affairs and Communications.

Major SDG Contribution Examples

- Installing the health care-related AQUOS Health Viewer app on big-screen TVs  
This app can be linked with smart watches, bodyweight scales, and blood pressure monitors to display large, easy-to-understand graphs on the TV, showing daily changes in number of steps, heart rate, body weight, body temperature, and blood pressure measured by these devices\*3. It also provides other functionality such as sharing of measured data with family members to support daily health management.

\*3 Capable of linking with devices that are compatible with the Google Fit™ health management app operated by Google LLC.



App screen (image)

- Incorporating Relaxed View image quality mode, which does not hinder the onset of sleep in the hours leading up to bedtime  
This mode automatically adjusts the TV image quality to a color temperature more conducive to falling asleep during the hours set by the user.
- Using recycled plastics  
In fiscal 2023, recycled plastics are adopted for the stand covers of new TVs sold in Japan. For fiscal 2024 and beyond, we plan to use an increasingly larger amount of these plastics.

(1) Collect used home appliances. (2) Produce recycled plastics. (3) Reuse in TV components





## Mobile Communication BU

Using communication technology to build a society where everyone has an equal opportunity to find decent quality of life and work.



### Business Overview

The Mobile Communication BU aspires to be a business unit that leverages communication technology to keep on producing new value. By developing diverse networked devices like smartphones routers and creating solutions and services, we provide products and services that inspire people to live more joyful lives.

### Activity Status

Japan today is facing a variety of challenges and changes: in addition to a diminishing workforce due to low birthrates and an aging population, and diversifying work styles to accommodate birth, childcare, and family care needs, there are ongoing work style reforms and developments in ICT, such as telecommuting, remote and non-contact solutions, and the growth of DX. In addition, as the population grows increasingly older, there is also heightened interest in healthy life expectancy.

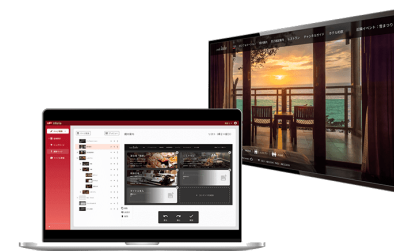
At the same time, efforts to tackle global environmental challenges, such as curbing greenhouse gas emissions, using more renewable energy, developing energy-saving technologies, promoting recycling, and reducing plastic waste, are beginning to pick up speed worldwide.

We will continue to apply the technology and know-how our business has cultivated over the years to pursue new developments in communication networks, such as 5G, so that we can continue to provide products and solutions that help address these social and environmental challenges. Examples of our efforts include:

- Developing corporate solutions that support work style reform
- Developing digital health solutions that contribute to extended healthy life expectancy
- Creating industry-leading energy-saving products (smartphones, routers)
- Using environmentally friendly materials and recycled plastics in more products
- Reducing greenhouse gas emissions accompanying business activities

### Major SDG Contribution Examples

- Inforia for Hotel in-room information service  
Facilitates non-contact/non-face-to-face customer reception and better operational efficiency.
- “home 5G” router for NTT Docomo  
With simple installation that requires only a power outlet to plug it into, this router turns users’ homes into an ultra-high-speed Wi-Fi environment convenient for telework and online learning.
- Medical Listening Plug in-the-ear hearing aid  
Helps in the realization of an “ageless society” by giving users better hearing for longer.
- AQUOS series smartphones  
The casing of the AQUOS wish3 uses recycled plastic, and this environmental-mindedness extends to the slim packaging that cuts down on paper usage. Environmental-mindedness is displayed in the AQUOS R8 pro through the use of plant-derived plastics in the buttons, and the use of recycled plastic in the casing and sensors of the AQUOS R8.



Inforia for Hotel in-room information service



AQUOS wish3 smartphone recycling (conceptual image)

## Sharp Display Technology Corporation (SDTC)

Capitalizing on display and display application technology cultivated over many years to create new products, services, and solutions, which help to address social challenges and which contribute to the realization of a sustainable society.



### Business Overview

SDTC develops, manufactures, and sells state-of-the-art display modules of all sizes and for a wide range of applications to meet the diverse needs of global users. Products include head-mounted displays, smartphones, tablets, PCs, vehicular on-board devices, and large-screen TVs.

### Activity Status

The history of LCDs at Sharp goes back to 1973 and the development and release of the world's first LCD-equipped COS\*<sup>1</sup> pocket calculator. Since then, Sharp has continued, as a leading LCD company, to open up a new era in the field of LCDs by pursuing ever more sophisticated technologies that lead to new products that enrich people's lives. SDTC is focused on strengthening display technology development in areas indispensable to technological progress, such as ultra-low power consumption, environmental resistance, high definition, and high-speed drive. This allows us to create innovative devices, which help ensure a competitive advantage for the three brand businesses fundamental to the growth of Sharp—Smart Life & Energy, Smart Office, and Universal Network—and which lead to new products, services, and solutions that provide support for daily life and business and allow Sharp to continue providing new value to the world. At the same time, through its business activities, Sharp is pursuing the twin sustainable management goals of “creating solutions to social problems through business and technological innovation,” and “reducing the social and environmental impact of business activities through sustainability measures.” These efforts are aimed at building a prosperous society where everyone can live safely and securely and at advancing a variety of business fields towards achievement of the SDGs, helping ensure Sharp is a company that contributes to society, the future, and the global environment.

\*<sup>1</sup> COS: Calculator on substratum. All of the calculator system elements, i.e., the display, drive unit, key contacts, etc., are organized on a single substrate.

### Major SDG Contribution Examples

- Contributing to carbon neutrality and reducing environmental load
  - Development and mass production of a next-generation LC-LH\*<sup>2</sup> indoor photovoltaic device (fiscal 2023)  
We achieved the development and mass production of this photovoltaic device by combining a dye-sensitized solar cell\*<sup>3</sup> capable of high-efficiency power generation under weak indoor light with LCD manufacturing technology cultivated by Sharp over many years. Replacing disposable batteries with LC-LH helps reduce environmental load.
  - Development and commercialization of ePoster (fiscal 2024)  
We combined an ultra-low power display with LC-LH to bring to market ePoster digital signage. This product does not require a power line or primary battery.
- Supporting the creation of a safe and sustainable transportation system
  - Development and mass production of a vehicular on-board sensing camera (fiscal 2023)  
The development and mass production of a vehicular on-board sensing camera for advanced self-driving applications and ADAS\*<sup>4</sup> applications will help contribute to the expansion of means of transportation that will reduce traffic accidents and better accommodate the needs of vulnerable members of society.

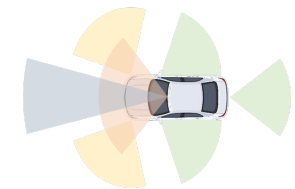


CEATEC  
AWARD

LC-LH



ePoster



Vehicular on-board sensing camera

### Awards and Honors

- LC-LH indoor photovoltaic device wins Minister of Economy, Trade and Industry Award at CEATEC 2022

\*<sup>2</sup> LC-LH: Liquid and crystal light harvesting.

\*<sup>3</sup> A type of organic solar cell that converts light absorbed by dyes into electricity.

\*<sup>4</sup> ADAS: Advanced driver assistance systems.

## Sakai Display Products Corporation (SDP)

Pursuing energy-saving, zero-emissions activities at our large LCD plant while conserving energy and resources for products manufactured at the large LCD plant in order to develop environmentally friendly business activities, which contribute to SDGs achievement.



### Business Overview

SDP is a leading LCD company and the first in the world to utilize 10th-generation (G10) mother glass.

The use of G10 mother glass allows for more efficient production of large displays (70-inch, 60-inch, 42-inch, etc.) for large-screen TVs, electronic whiteboards, and digital signage. Through the development, manufacture, and sale of these displays, SDP is contributing to society by helping develop visual culture and the IT industry.

### Activity Status

- SDP is pursuing energy-saving, zero-emissions activities at its large LCD plant.
  - (1) Reduction of greenhouse gas emissions through energy-saving measures
  - (2) Reduction of waste through zero-emissions activities
  - (3) Compliance with the international CSR standards of the RBA\*1 Code of Conduct (undergoing RBA audits and then taking corrective action)
- SDP works to conserve energy and resources for products manufactured at its large LCD plant.
  - (1) Development of low-power-consumption displays contributing to the realization of a sustainable society
    - Reflective displays that do not require a backlight
    - Power-saving displays utilizing IGZO\*2 technology
  - (2) Reuse of packaging boxes used for overseas shipping of displays, and introduction of recycled raw materials
  - (3) Use of VE\*3 design when developing new models to reduce the number of mounted components

\*1 RBA: Responsible Business Alliance—a nonprofit organization that pursues social responsibility across the global supply chain.

\*2 IGZO: An oxide semiconductor comprising indium, gallium, zinc, and oxygen.

\*3 VE: Value engineering. VE efforts focus on the relationship between function and cost in order to better understand and improve the value of products and services.

### Major SDG Contribution Examples

- Reduction in power usage at the large LCD plant
 

As a result of the following efforts, average daily usage has been reduced 5.8% compared with fiscal 2021.

  - Reduction in power usage (-75 MWh/day) as a result of reducing the fan filter unit air volume
  - Reduction in power usage (-9 MWh/day) as a result of efficient air conditioner operation
- Reduction in chemical liquid industrial waste as a result of changing the metal wire etching solution
  - A new chemical solution for etching metal wires was chosen in August 2022, and a mass production trial period began in April 2023. As a result of the change in chemical solution, a roughly 7% annual reduction in liquid waste is anticipated.
- Development of low-power-consumption displays contributing to the realization of a sustainable society
  - Reflective displays are low-power-consumption displays that do not need a backlight, as they use reflected external light. By capitalizing on high outdoor visibility, these displays are expected to be utilized in outdoor signage and other applications.
  - Displays incorporating IGZO technology have high electron mobility, enabling TFT miniaturization and, thus, a large aperture ratio that saves on the amount of back lighting. They also save energy by taking advantage of a characteristic resistance to current leakage even when displaying still images.



Reflective display-mounted outdoor signage



Reflective IGZO display with high outdoor visibility

## Sharp Sensing Technology Corporation (SSTC)

Producing unique camera modules and sensing modules that contribute to the advancement of self-driving, XR, smart homes, and other technologies that enrich our daily lives.



### Business Overview

SSTC pursues the development and designing in of ultra-high-speed AF polymer lenses\*<sup>1</sup> and ultra-compact camera modules, which will help with the advancement of XR\*<sup>2</sup> devices, the key to the spread of the metaverse.

SSTC is accelerating the pace of development and commercialization of on-board camera modules\*<sup>3</sup> that ensure greater safety and security when driving and of unique camera modules for devices intended for smart homes and offices.

### Activity Status

SSTC develops, manufactures, and markets camera modules for smartphones, tablets, and other IT equipment. In 2000 Sharp released the world's first mobile phone with a camera, which was equipped with a camera module developed by SSTC. The camera module we developed at that time had a resolution of only 0.11 megapixels. We pursued higher and higher image quality and eventually came out with a camera module with a 1-inch, 20.2-megapixel sensor in 2021, followed by a camera module equipped with a 47.2-megapixel sensor in 2022. This gave image quality equivalent to that of a single-lens-reflex camera and let users easily take high-resolution photographs.

SSTC is also applying the elemental technologies that it has cultivated over the years to developing camera modules and sensing modules for XR devices, in-vehicle devices, and smart home and office devices. It is through the creation of devices such as these that SSTC is helping to enrich society.

\*<sup>1</sup> Lenses that focus by changing the lens thickness.

\*<sup>2</sup> A general term for technology that fuses the real world with the virtual world.

\*<sup>3</sup> Camera modules that monitor the driver and passengers.

\*<sup>4</sup> As of December 2022, based on Sharp findings.

### Major SDG Contribution Examples

- Development of a camera module for XR devices
  - RGB (red, green, blue) camera modules with polymer lenses focus by changing lens thickness. They can focus more quickly than conventional cameras and are more pleasant to use as they are less prone to inducing motion sickness.
  - We developed an ultra-compact camera module, which, at approximately 1.96 mm, is the world's thinnest\*<sup>4</sup>, making possible smaller and lighter devices.



VR head-mounted display

- Development of an on-board camera module that monitors the driver and passengers  
A camera module system integrated with the display helps ensure greater safety and security when driving.



Incorporation into an on-board display

- Development of a unique camera module for smart homes and offices  
This camera module is installed in electrical appliances, digital signage, and elsewhere to help with the creation of new services that have a more personal feel.



Incorporation into digital signage

## Sharp Semiconductor Innovation Corporation (SSIC)

Contributing to a sustainable society by developing devices that impact society in a positive way while creating and expanding new businesses with the potential to form new ecosystems.



### Business Overview

SSIC creates, develops, and sells the key devices that underpin so many of Sharp’s unique products. They include the PCI module, sensor devices used primarily in home appliances, such as robot vacuum cleaners, and communication modules for infrastructure monitoring systems.

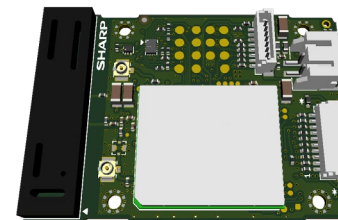
### Activity Status

We are developing and selling devices and modules that will serve as technological infrastructure for DX and digital healthcare solutions utilizing 8K+5G and AIoT\*<sup>1</sup>.

- We are making possible health support in a variety of situations by utilizing sensors that apply existing optoelectronics technology to develop devices with bio-sensing functionality and building solutions that can monitor people’s state of health.
- We are developing infrastructure monitoring IoT communication devices that enable us to contribute to the development of society through industry DX solutions.
- As a Sharp Group company, we will contribute to the digital healthcare field by developing devices for in-house products, such as key devices for Plasmacluster, a unique feature of Sharp products.
- The resulting expansion in the range of unique, proprietary devices, particularly for major global corporations, can be expected to spur reforms in a variety of lifestyle settings and improve both social activities and quality of life.
- We will contribute to the development of our communications-based society by creating new technologies (Beyond 5G) for next-generation communications.

### Major SDG Contribution Examples

- Providing IoT communication modules for infrastructure applications  
We will realize continuous, interruption-free IoT equipment using IoT adapters as an alternative to non-mobile communications infrastructure (ADSL/ISDN).
- Rolling out new opto-device products in new fields  
We will facilitate the evolution of new products, including ToF\*<sup>2</sup> ranging sensors for robot vacuum cleaners, photointerrupters for smart water meters, and proximity sensors for TWS\*<sup>3</sup> earphones.
- Ongoing R&D work for development of a B5G SoC\*<sup>4</sup>  
We were selected to carry out work under the R&D of B5G IoT, SoC, and IoT Solution Building Platforms Enabling Continuous Evolution, a program of the National Institute of Information and Communications Technology (NICT). Having passed the R&D stage gate evaluation with the highest rank, we continue to be contracted by NICT to carry out research and development. We are working to accelerate establishment of next-generation technologies to replace current 5G communications in Japan.



IoT communication module



Various sensors (optical sensor, others)

\*<sup>1</sup> AIoT is a word coined by Sharp, combining the words AI (artificial intelligence) and IoT (Internet of things). Sharp is pursuing a more people-oriented world through AIoT-driven devices and services.

\*<sup>2</sup> ToF: Time of flight. A method for measuring distance from a target object by measuring how long it takes light from an optical source to reflect off the target and return to a sensor (optical detector).

\*<sup>3</sup> TWS: True wireless stereo.

\*<sup>4</sup> SoC: System on a chip.

## Sharp Fukuyama Laser Co., Ltd. (SFL)

**Semiconductor business:** Aggressively expand production capacity in order to contribute to the growth of a semiconductor industry that sustainably supports the foundations of society.

**Laser business:** Create novel laser devices focused on those technologies, such as 5G and EV, essential to the society of tomorrow.



### Business Overview

SFL's wafer foundry business involves the development of semiconductor manufacturing processes and manufacturing based on customer design data. SFL's semiconductor laser business provides light sources for industrial use in copper processing and FPC substrate processing and for use in lighting and measurement.

### Activity Status

The semiconductor business involves the development of manufacturing processes for LCD driver ICs\*1 associated with LCD image display and control used in a wide range of fields, including consumer and industrial, and power supply ICs\*2, which play an important role in ensuring stable power supply to electronic devices and efficient energy management, as well as the manufacture and sale of wafers. Through this business, SFL contributes to the realization of SDG 9 (industry, innovation, and infrastructure).

The laser business involves the development, manufacture, and sale of high-powered blue laser diodes for the copper processing needed to manufacture the thin electrical wiring of environmentally friendly EVs, and of green laser diodes, which serve as a light source for laser levels used at construction sites and elsewhere to measure and check horizontal and vertical axes alignment. Through this business, SFL contributes to the realization of SDG 11 (sustainable cities and communities).

These businesses drive industrial and technological innovation, and through the contributions we make to building a healthy and comfortable society for all, we are working to improve the social value of our company.

\*1 Integrated circuits that send the electrical signals that operate LCDs.

\*2 Integrated circuits responsible for controlling power supply in electrical appliances.

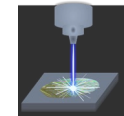
### Major SDG Contribution Examples

- Expansion in production of the semiconductors upon which society depends
  - We contribute to a stable supply of LCD driver ICs and power supply ICs by increasing production capacity
  - We develop next-generation manufacturing processes for power supply ICs in order to achieve greater power savings



Semiconductor plant

- Development and expanded sales of semiconductor lasers, which contribute to sustainable cities and communities
  - We developed a high-powered blue laser diode for the copper processing of thin electrical wiring used in EVs.
  - We expanded sales of green laser diodes for use with levels.



High-power blue laser diode

- Resource recycling centered on reducing and recycling waste  
We promote safety awareness and risk communication through plant wastewater sampling and analyses conducted jointly by local residents, government, and Sharp.



Plant wastewater sampling and analyses

- Participation in local cleanups  
Employees took part in Fukuyama City's Ashida River Conservation Day cleanup. SFL helps keep the city clean by picking up trash and preventing waste from getting into rivers and oceans.



Employees participating in a local cleanup

## Corporate Research & Development Group

By using society-changing, proprietary, world-first, and world's-best technology to build entirely new ecosystems and create and expand new businesses, we are contributing to a sustainable society.



### Business Overview

The Corporate Research & Development Group is working to create innovative technologies that will serve as the fundamental engine for innovation company-wide, as well as to build platforms centered on Sharp's unique technologies. Our aim is to help make society both people and environmentally friendly by tackling the challenge of new business creation and accelerating the pace of innovation achievement through the rapid deployment in society of the fruits of development.

### Activity Status

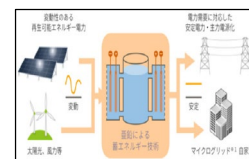
In order to realize a sustainable society, we pursue the development of innovative technology in four areas that will help address the increasingly diverse and complex challenges facing society, as well as generate new business.

- Lifestyle innovation  
In this area, we are focused on digital healthcare business that will improve quality of life and on helping to address societal challenges through improvement of air, food, and water quality.
- Green innovation  
In this area, we are focused on achieving carbon neutrality via the creation of energy generation, storage, and conservation technologies, as well as pursuing greater technological innovation via the 3Rs (reduce, reuse, recycle).
- Industry DX and AI applications
  - We are working to expand the application of AI technology in industry DX solutions that will provide labor savings and greater operational efficiency.
  - We are working on people-friendly AI applications that will provide functional innovation in household appliances, and on strengthening AIoT\*1 platforms.
- Communication innovation  
Sharp holds a total of more than 6,000 patents in more than 50 countries. These patents play an essential role in communications standards including 5G. In addition, Sharp is actively involved in the development of international standards, creating technology to be used for next-generation communications and video encoding standardization.

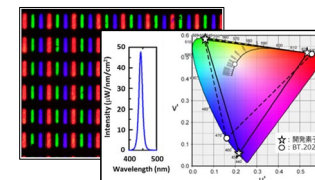
\*1 AIoT is a word coined by Sharp, combining the words AI (artificial intelligence) and IoT (Internet of things). Sharp is pursuing a more people-oriented world through AIoT-driven devices and services.

### Major SDG Contribution Examples

- Spreading the use of renewable energy and achieving carbon neutrality  
With the aim of realizing and rapidly commercializing innovative power storage technology, Sharp has begun developing energy storage technology that utilizes a flow-type zinc-air battery well-suited to large-scale power storage.
- Development of a new, self-illuminating display, which reduces environmental load  
Sharp has succeeded in patterning RGB (red, green, blue) pixels using quantum dots with a narrow spectral width and that do not contain cadmium. It is aiming to rapidly commercialize this technology as a “nano LED” next-generation, high-efficiency display.
- Deployment of next-generation mobile communications technology in society  
Sharp is performing validation testing of local 5G-driven, wide-area rangeland management that will help reduce the labor required for rangeland mowing and snow removal.
- Development of 5G wireless communications/video standards patents and standardization technology  
Sharp owns standard-essential patents declared for 1,846 patent families for 5G standards (13th largest globally, 2nd largest in Japan)\*2. It uses these to help with the wireless communication standardization technology and standardization that underpin social infrastructure.



Energy storage technology utilizing zinc (image)



Quantum dot light-emitting element RGB pixels and blue quantum dot emission spectrum and color gamut



Local 5G validation testing

### Awards and Honors

- 2022 Industrial Science and Technology Policy and Environment Bureau Director-General's Award\*3, given to industry standardization projects

\*2 As of June 2023. Based on findings from a third-party institute.

\*3 Awarded by the Ministry of Economy, Trade and Industry for achievements in industry standardization activities, such as standards formulation and conformity assessment activities.