

Toshiba Group Management Policy

Toshiba Group's Vision

Contribute to the achievement of carbon neutrality & circular economy through digitization

Committed to People, Committed to the Future.

At Toshiba, we commit to raising the quality of life for people around the world, ensuring progress that is in harmony with our planet.

Future For our children

Social
Challenges

Achieving sustainability of people and the planet

Toshiba
Initiatives

Achieving carbon neutrality and a circular economy

People

Safe, secure lifestyles for everyone

Poverty, human rights, disasters, disputes

Building an infrastructure that everyone can enjoy

Planet

Social and environmental stability

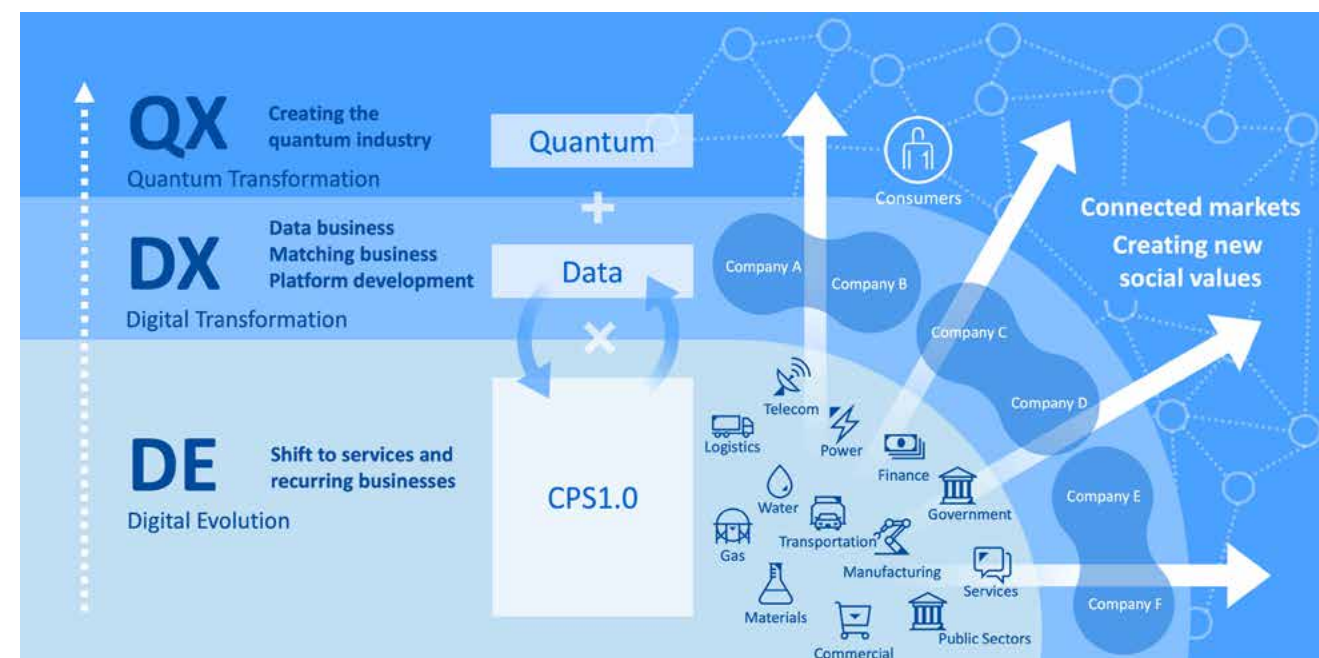
Education, equality & fairness, climate change, resource depletion

Building a society connected by data

“Committed to People, Committed to the Future,” this is the Basic Commitment of Toshiba. We commit to raising the quality of life for people around the world, ensuring progress that is in harmony with our planet.

It is important to first protect the safety and security of everyday life of each individual. It is to make a world without poverty, disasters or conflicts. What we can do is to “build an infrastructure that everyone can enjoy.” Once “People” are satisfied, the next level is to consider the “Planet.” Realization of social and environmental stability becomes the next important step, and Toshiba aims to “build a society connected by data.” After the society is further stabilized, we will move on to consider the “Future.” In other words, the greater question becomes the future of our children, and the sustainability of people and the planet. What we can do and what we should do is to “realize carbon neutrality and circular economy.”

Evolution of the digital economy



As means to realize these things that need to be done, “digital” is important. As the digital economy evolves, new social value will be created in the future having various companies get connected across industrial boundaries.

Toshiba has identified the DE, DX and QX strategy to respond to those changes.

The first step of its development is digital evolution (DE) to enhance services and recurring businesses.

That is to be followed by digital transformation (DX), which is a stage to build platforms based on DE. Once the platforms are built, it will be possible to create a cycle of rapidly expanding earnings.

We will further develop this into a quantum transformation (QX), a quantum world where various platforms are connected across industries. That will occur after DX, but Toshiba possesses numerous innovative technologies that can provide a foundation of DX.

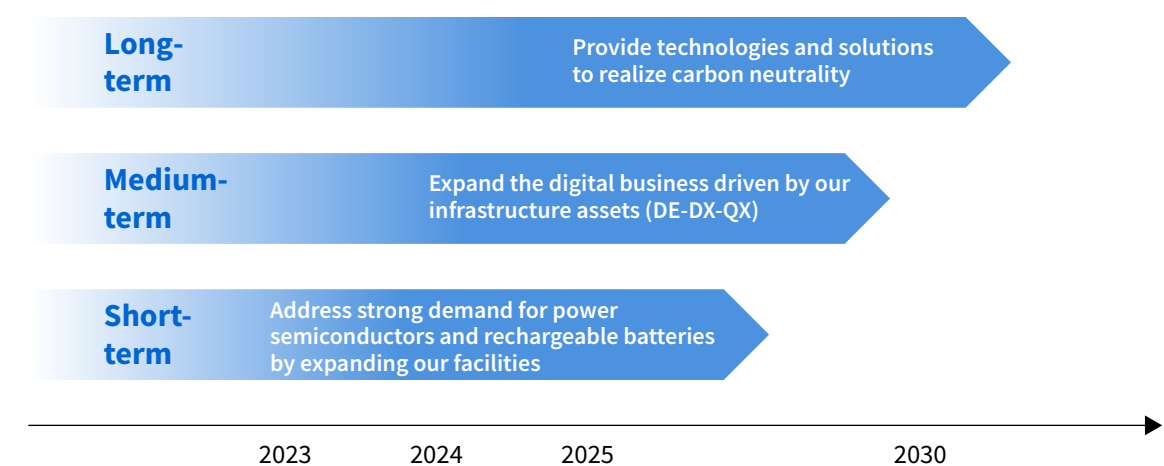
Business growth in three steps (time horizons)

Here is our growth strategy to enhance Toshiba Group's corporate value formulated in three phases; short-, medium- and long-term horizons.

In the short-term, we will strengthen our production capacity in the device field in order to capture demand for products including power semiconductors and SCIB™ rechargeable batteries, for which supply is short due to the rapid spike in demand for EV and other products.

Over the medium-term, we will transform our business by digitizing the infrastructure assets that Toshiba has cultivated over its long history and deployed across society.

Lastly, we believe that the technologies and solutions to achieve carbon neutrality, which will become increasingly important as we move toward 2030, will grow to become pillars of our earnings.



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Short-term Address strong demand for power semiconductors and rechargeable batteries by expanding our facilities

First, measures to respond to growing demand for power semiconductors and rechargeable batteries in the short-term.

Demand for power semiconductors, which efficiently control electric power, is growing worldwide as needs for energy saving expand.

In particular, demand for automotive and industrial applications where our semiconductor business excels is expected to continue to grow at a CAGR of 7% through 2025.

We are currently receiving inquiries from customers that far exceed our production capacity, and the construction of a new 300mm wafer fab at Kaga Toshiba Electronics Corporation, where power semiconductors are manufactured, has begun with the aim of starting operations in FY2024.

This is expected to make a significant contribution to sales and OP growth in FY2024 and beyond.

Deploy resources to start operations of new 300mm wafer fab at Kaga in FY2024

Kaga Toshiba's new 300mm fab

(computer-generated image of facility upon completion of Phase 2)

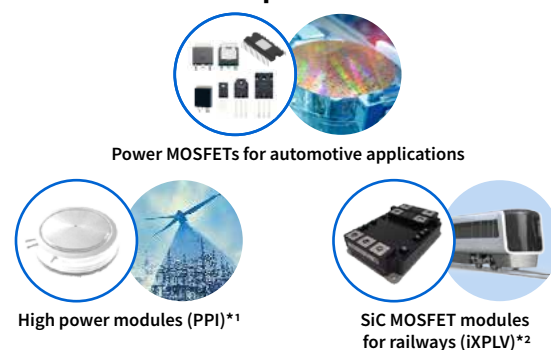


Construction of new fab began in April 2023

*1 PPI (Press Pack IEGT): Press pack hermetic sealed modules

*2 iXPLV (intelligent flexiBLE Package Low Voltage): Package for SiC modules

Products that support our competitiveness



We have also received orders for SCiB™ rechargeable batteries in a wide range of fields as an important device indispensable for achieving carbon neutrality.

They are used not only in transportation vehicles such as trains, passenger and commercial cars, but also in industrial equipment such as automated guided vehicles and infrastructure such as electricity supply demand adjustment facilities.

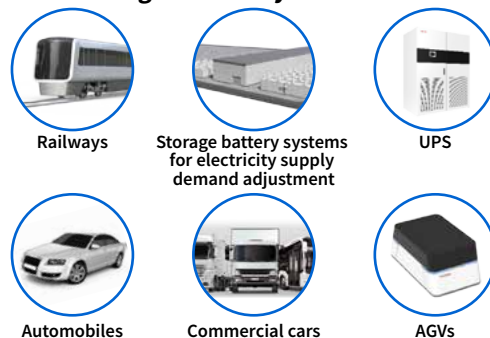
In line with the government policy of ramping up domestic production capacity, we have received a subsidy from METI and plan to ramp up production capacity at our Yokohama Battery Operations in 2025.

Increase production capacity to meet growing demand in heavy-duty domains where the strengths of SCiB™ can be leveraged

SCiB™ rechargeable battery main products



Business expansion targeting domains in which high input/output and high reliability are essential



Fab at Yokohama Battery Operations



Planning to increase production capacity from FY2025

Medium-term Expand the digital business driven by our infrastructure assets (DE-DX-QX)

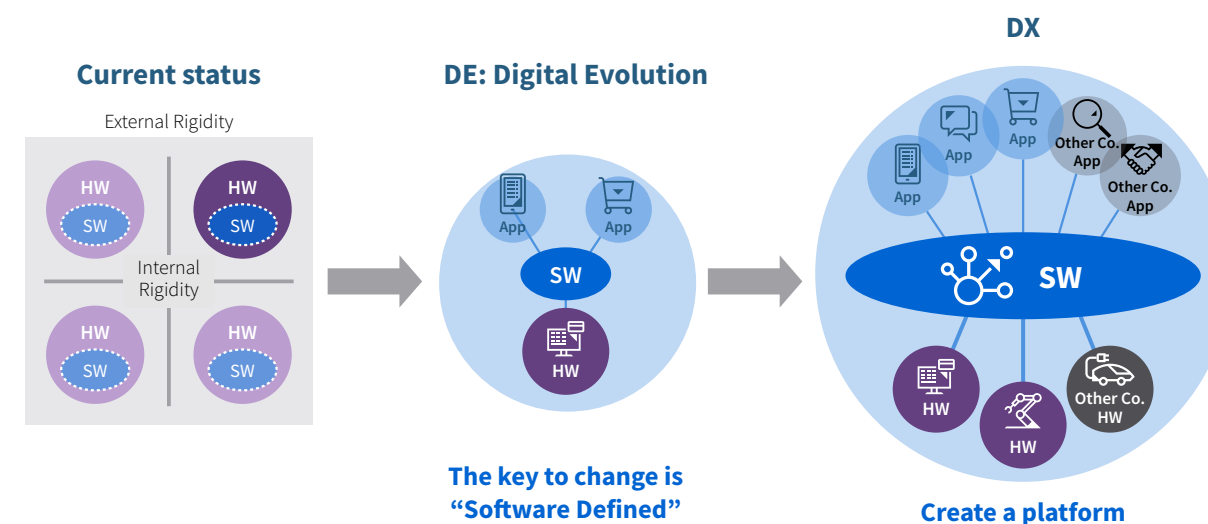
Here we explain software defined transformation, a medium-term effort that holds the key to expanding the digital business driven by our infrastructure assets.

Currently, software is embedded into hardware and provided as a system. To reach the DE, the first stage, it is important to first unbundle the software and hardware. We call this software defined transformation. In reality, some software remains within the hardware, but this software defined transformation which allows access to the outside world will make significant changes.

It enables the addition of a variety of applications, which will generate new services as well as to enhance the recurring businesses or providing SaaS business where necessary functions will be provided as a service for only the necessary volume. This will contribute significantly to making business more profitable.

Next, software standardization enables us to build platforms by securing connectivity with third-party hardware and applications. This is the DX, the second stage. It enables a highly scalable business model while keeping down the capital deployment and leads to exponential growth.

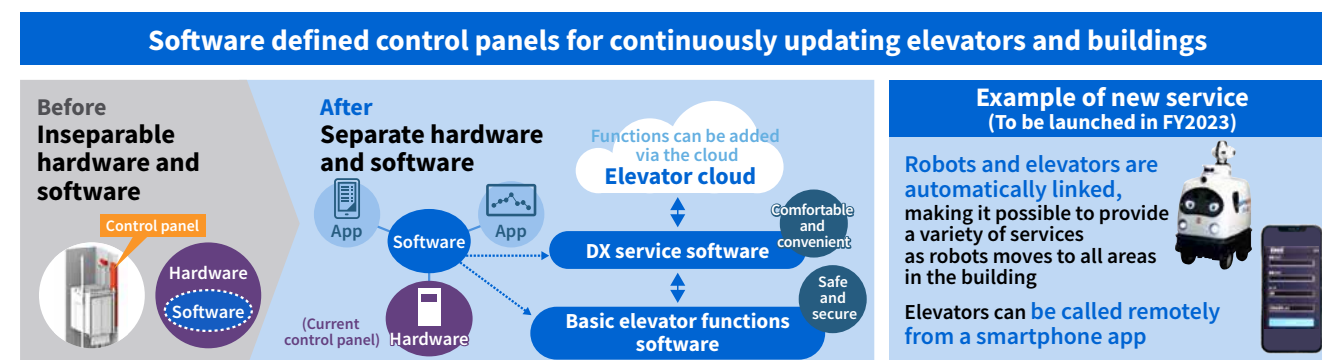
Create a platform after separating apps, software and hardware



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DE example: Software defined transformation for elevators

Here is an example of DE in the elevator business.



* The system is not available for certain elevators. Details such as service profiles and fees have yet to be developed and determined.

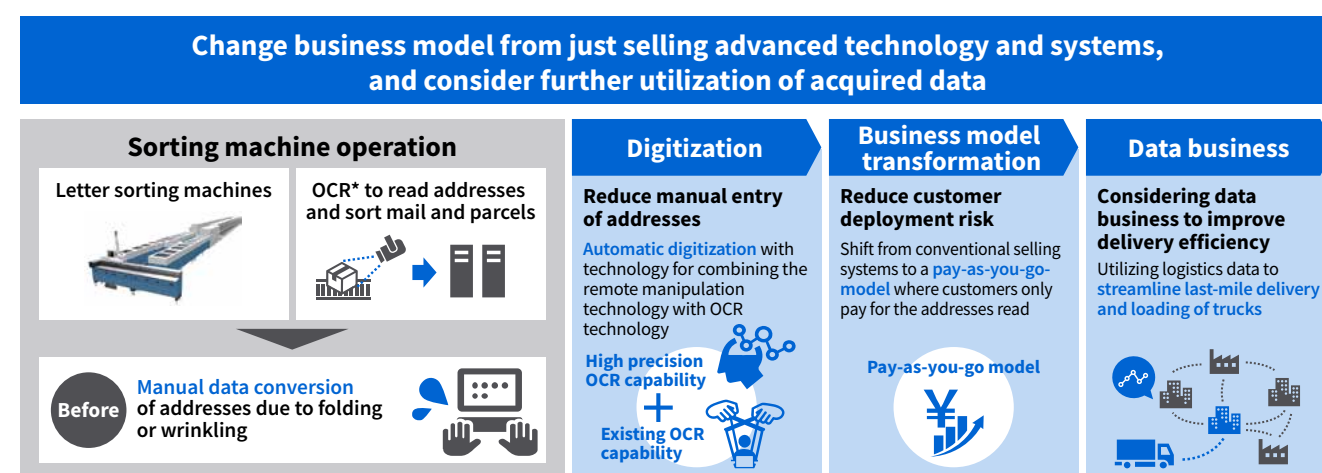
By separating the control panel of the elevator cage into hardware and software and by installing a DX controller, new functions can be added via the cloud without additional on-site work.

This is very convenient for customers as functions can be updated without interrupting the elevator operation.

For instance, new functions can be automatically linked to the building security and disinfection robots, which can then patrol every floor. The system can also be linked to a smartphone app to remotely call the elevators.

DX example: Logistics data entry service (pay-as-you-go OCR)

Here is an example of DX, a service that improves the digital recognition of recipients' addresses in logistics systems.



* OCR: Optical Character Recognition (the reading of text in images)

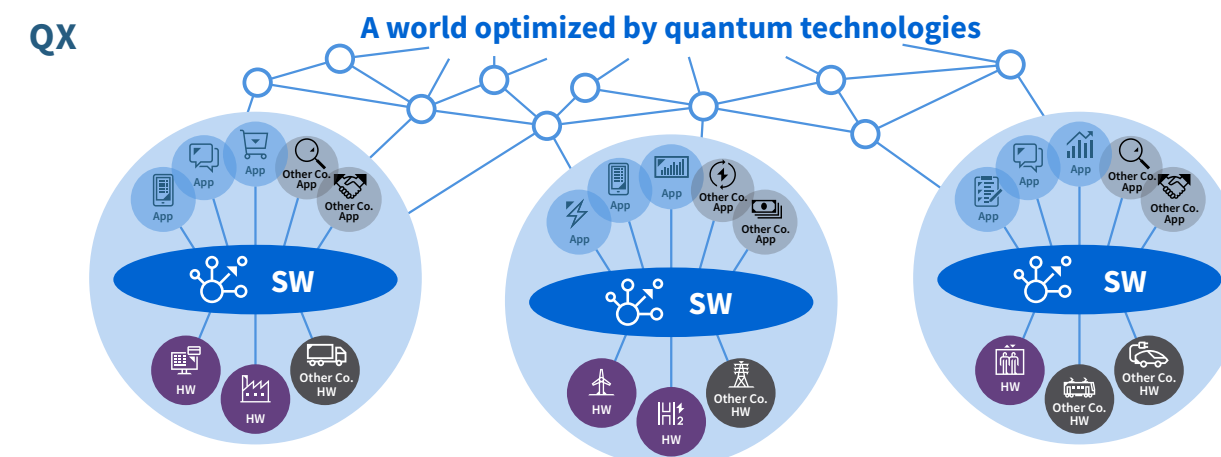
The first step is digitization. On the ground for logistics, OCR is used to read recipients' addresses, but addresses that cannot be recognized by the existing OCR are manually processed. We provide a service that achieves automatic digital conversion of data by combining the remote manipulation technology with high-precision OCR technology.

Also, as part of business model transformation, switching from outright system sales to a pay-as-you-go model reduces the burden and risk associated with system installation for the customers.

And for further business development, we envision a business that goes beyond simply reading the address to one that utilizes the data to improve the efficiency of last-mile delivery and loading of trucks.

The future created by quantum technologies (2030 onwards)

Beyond that, various platforms under DX stage will be created and a world of QX will emerge, in which optimal solutions are identified from a complex interplay of platforms.



Toshiba has been a pioneer in the field of quantum computing and some of our efforts have already reached the stage of commercialization.

Based on many years of research in quantum computing, we have developed SQBM+™, a solution that can solve society's complex combinatorial optimization problems and have begun offering it on the Amazon and Microsoft cloud.

The world is faced with the challenge of choosing the best solution from an exponential number of options for dynamic combinatorial problems such as logistics optimization, traffic congestion alleviation, and financial transactions, and static combinatorial problems such as new drug discovery.

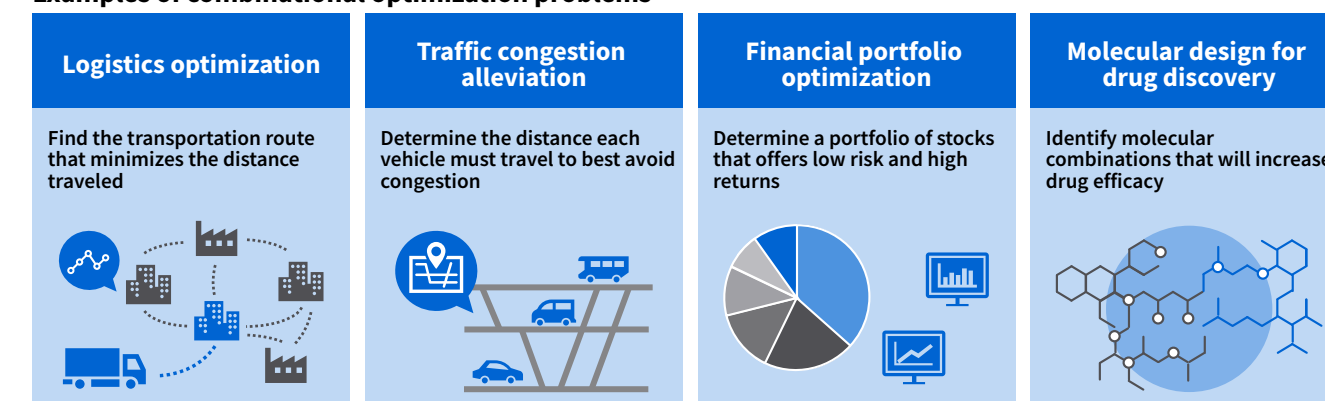
SQBM+™, an innovative technology born from quantum computer research

Toshiba's innovative SQBM+™ technology can solve these large-scale combinatorial optimization problems in a short time.

Launched a service for faster processing of large-scale “combinatorial optimization problems” on the Amazon and Microsoft cloud platforms, and continue to work with partners to improve performance and resolve issues

A practical solution that can handle even large-scale problems and be applied to multitude of social issues

Examples of combinatorial optimization problems

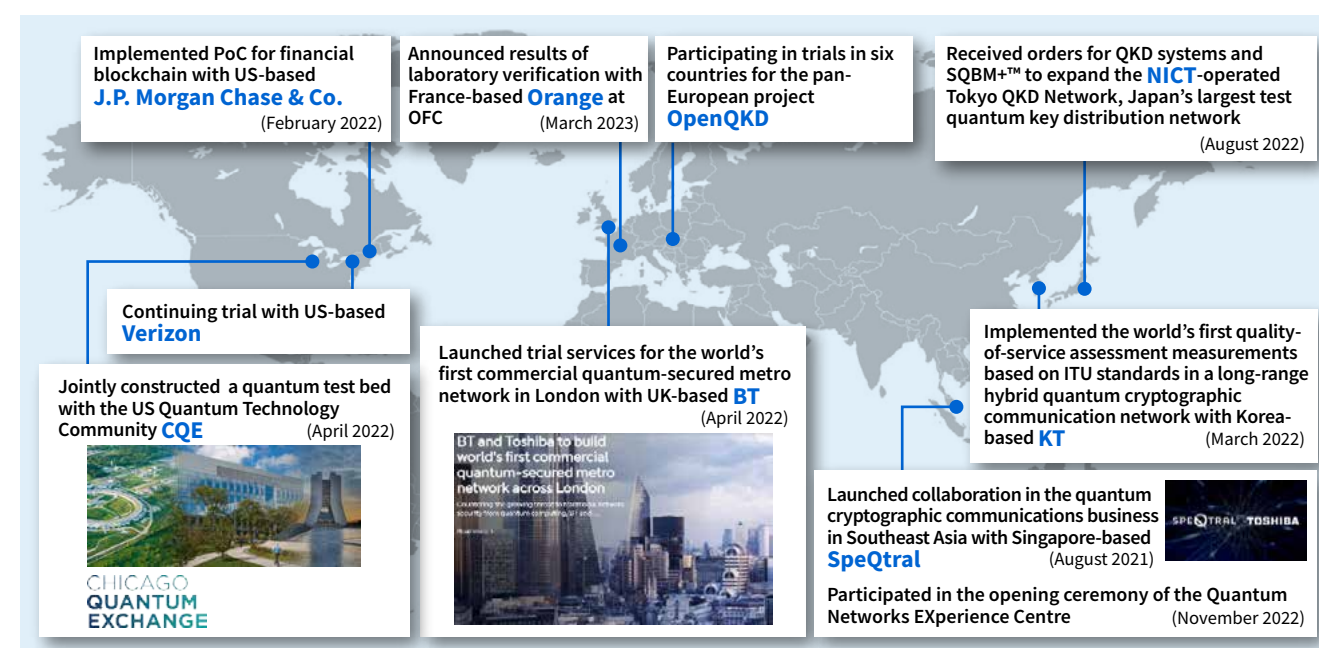


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Worldwide rollout of quantum cryptography communication business

It is a general understanding that once quantum computing is perfected, current mathematical encryption technologies will be easily undermined. Toshiba is a leading manufacturer in quantum cryptography, a communication method that prevents the theft of encrypted data.

We have already started commercial demonstrations of quantum cryptography and are deploying it with various partners around the world.



These new communication infrastructures will eventually lead to the quantum internet, where not only encryption, but also data itself will be connected in a quantum state.

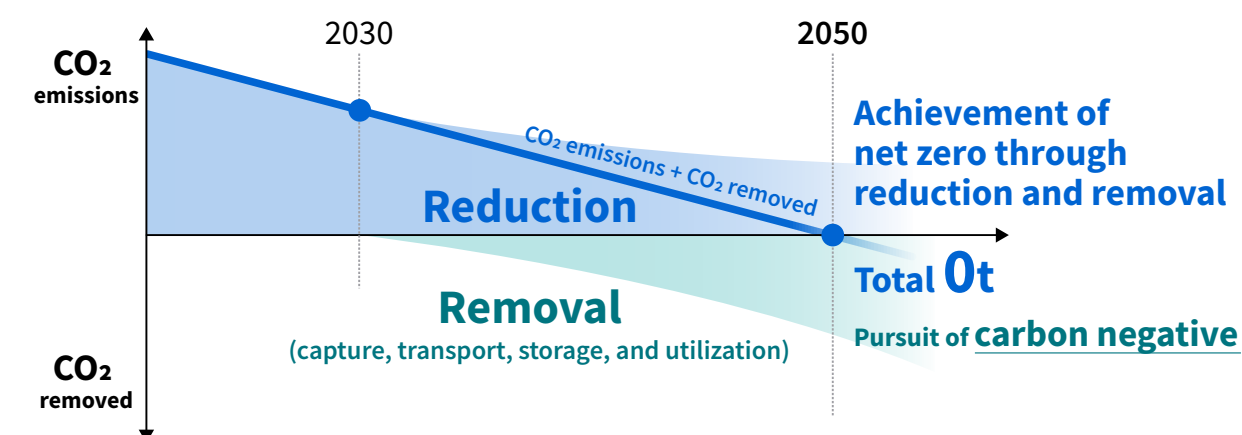
Long-term Provide technologies and solutions to realize carbon neutrality

Approach to achieving carbon neutrality

In view of the long-term horizon, technologies and solutions to achieve global carbon neutrality will be our key revenue driver.

In 2020, CO₂ emissions were reduced by 7% worldwide as a result of global economic slowdown stemming from the pandemic lockdowns. The challenge is that we will not achieve carbon neutrality unless we continue the 7% reduction every year until 2050. In other words, it is impossible to achieve net zero emissions only by reducing CO₂ emissions. We need to pursue carbon negative, by actively capturing and removing carbon from the atmosphere.

Carbon negative: Also focus on CO₂ removal (capture, transport, storage, and utilization)



Toshiba is committed to providing its customers with a variety of reduction and removal solutions.

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Toshiba Group sites’ efforts toward 100% renewable energy

Toshiba Group sites have also started efforts toward 100% renewable energy.

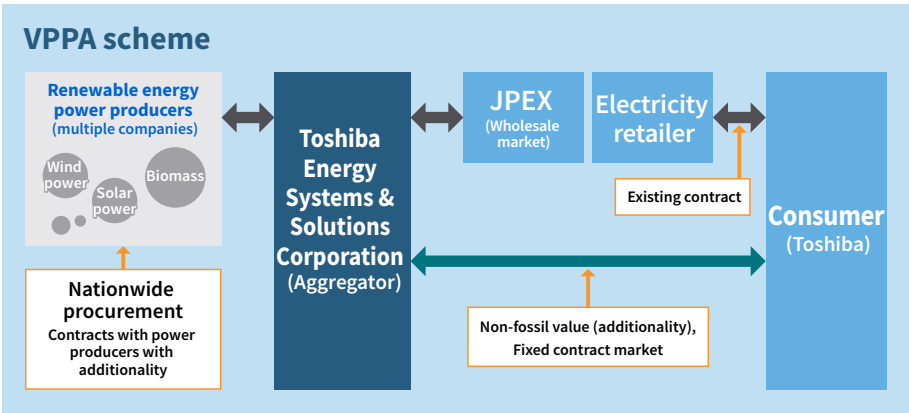
The Smart Community Center in Kawasaki initiated a Virtual Power Purchase Agreement (VPPA) for the use of its electricity and its energy needs have been 100% covered by electricity from renewable energy sources from April 2023.

Within this initiative, Toshiba Energy Systems & Solutions Corporation is playing the role of an aggregator linking the power generators to customers.

Going forward, we will continue to develop renewable energy aggregation services for customers both within and outside the Group.



Initiated a Virtual Power Purchase Agreement (VPPA*)
for the Smart Community Center, Toshiba Group’s business headquarters in Kawasaki. Alongside purchases of FIT non-fossil certificates, the center’s energy needs are **100% covered by electricity from renewable sources from April 2023.**



* VPPA (Virtual Power Purchase Agreement): A means by which a consumer virtually procures only the environmental value of renewable electricity generated at a power plant off the electricity consumer’s premises



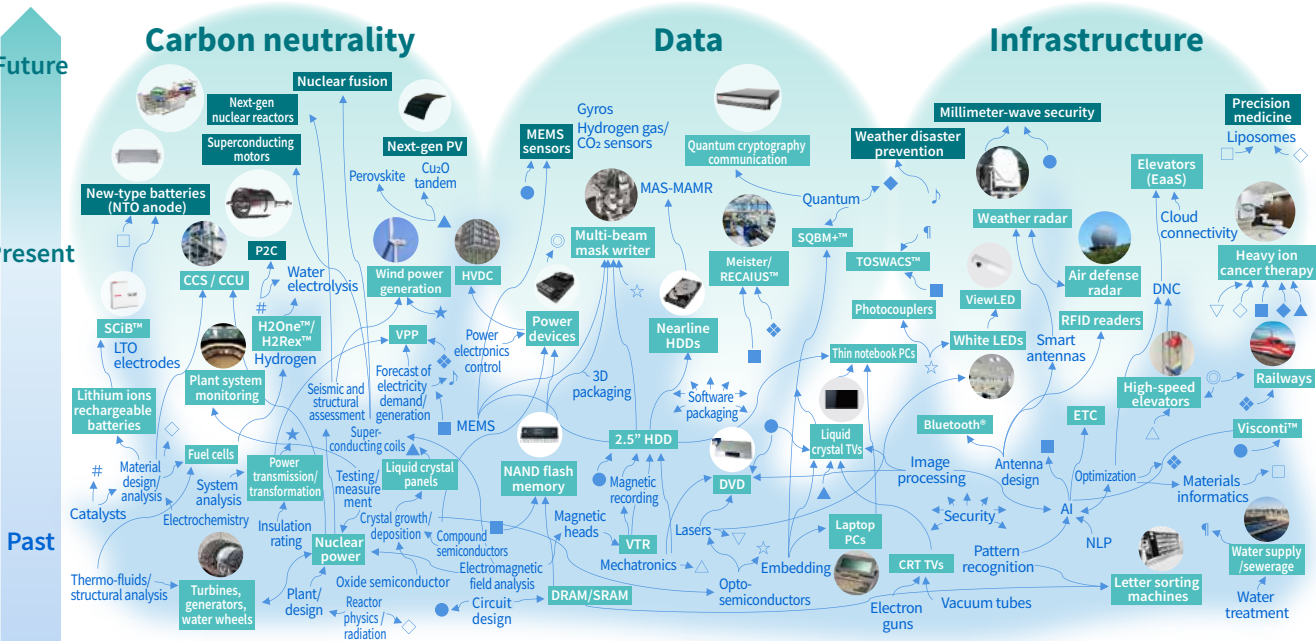
Technological diversity: the source of new products and services

Toshiba’s strength lies in its technological diversity.

For almost 150 years since its foundation, Toshiba has been providing products and services that make people’s lives more comfortable and convenient and society more safe and secure.

This has not simply been the result of a single technology creating a single product, but rather, the results of a combination of various technologies that we have accumulated in our research laboratories.

Combination of technologies accumulated at laboratories and within the Group to create one product and service one after another



Due to space limitations, the details, eras, etc. of technologies may be inaccurate.

Even today, we have numerous technologies with high business potential and these technologies can be combined across multiple areas to create products and services that do not exist in the world today.

However, there are challenges to commercializing these high-potential technologies and enhancing Toshiba Group’s corporate value. We need to break down two types of rigidity: internal rigidity, where the organization is siloed and the results of improvements are not shared throughout the Group, and external rigidity, where the organization is obsessed with proprietary technologies and the view that everything should be done in house.

We have taken various measures to break down the internal rigidity that had created barriers between organizations within the Group. In October 2023, for example, we integrated the corporate staff function and the subsidiaries’ staff function. And going forward, we will continue to review our business management structure to further break down internal rigidity.

In breaking down external rigidity, if we determine that values can be realized at an early stage through collaboration with external partners, we will consider using partners such as companies seeking to expand their business in specialized fields or existing players in those fields.

Under the Basic Commitment of Toshiba Group, “Committed to People, Committed to the Future,” we have continued to provide products and services that support people’s lives and society. This is our mission that will not change in the future.

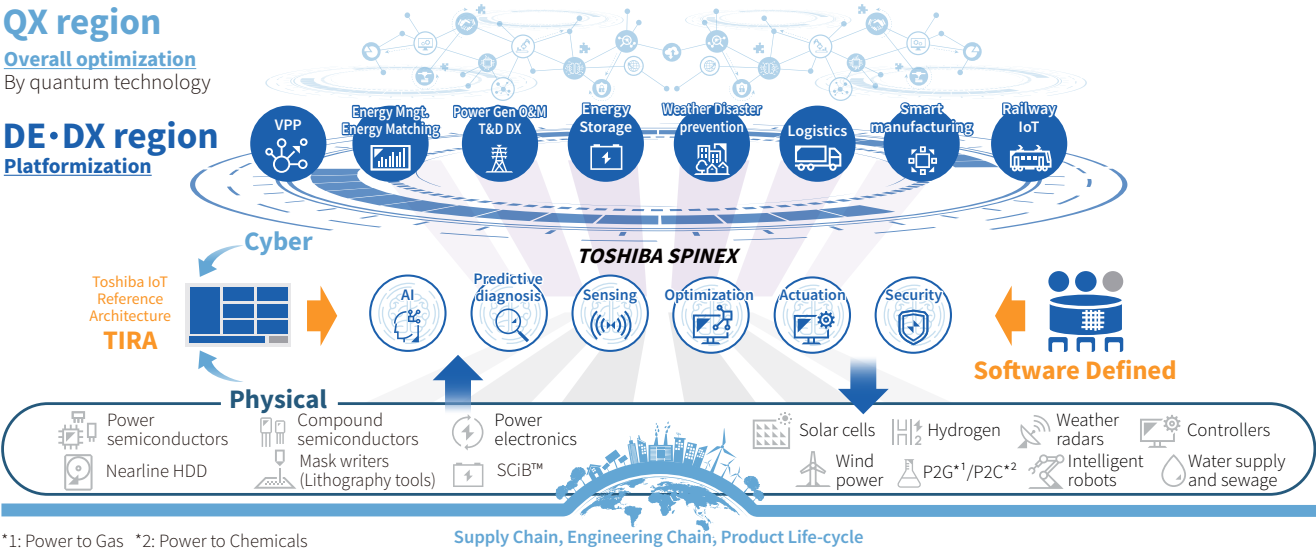
Toshiba’s strength is its technological diversity. We will maintain this strength and improve corporate value over the medium- to long-term.

Toshiba Group Technology Strategy

Toshiba Group Technology Policy

Under the Basic Commitment of Toshiba Group, “Committed to People, Committed to the Future,” we will create products, solutions, and services that are supported by our solid technological capabilities to realize a carbon-neutral and carbon-negative society and a safe and secure social infrastructure. By getting the most out of our technological diversity, one of Toshiba Group’s strengths, we will create and develop strong core physical technologies while appropriately motivating and training technical personnel who are the source of our technological capabilities. Furthermore, we will continue to create value for our customers through new products, solutions, and services by promoting digitalization (DE, DX, and QX) based on the idea of “Software Defined.”

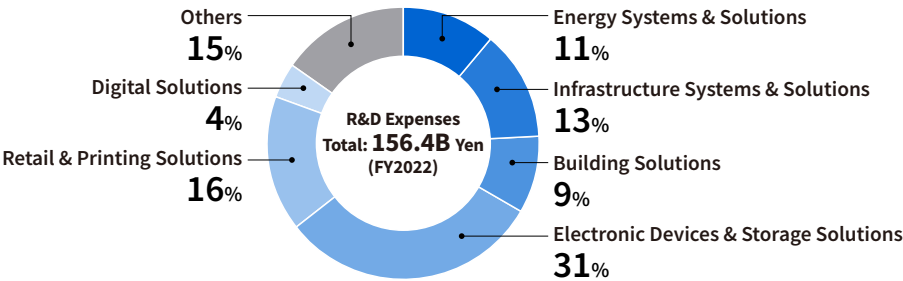
Toshiba Group Technology Policy



In FY2022, we spent R&D expenses of 156.4 billion yen, approximately 5% of net sales. Based on its business strategy, Toshiba Group concentrates its investment on focus business domains including Energy Systems & Solutions, Infrastructure Systems & Solutions, Building Solutions, Retail & Printing Solutions, Electronic Devices & Storage Solutions, and Digital Solutions. At the same time, the Group invests in R&D with an awareness of development efficiency and time frames. The Group classifies R&D investments into three major categories (existing business domains, peripheral domains of existing business, and new domains/fundamental) based on the time frame and role until commercialization. We have defined KPIs that measure the progress of R&D in these categories and their return on investment (ROI) to monitor and evaluate their annual changes and visualize such progress and ROI. We also use such KPIs to make decisions on strengthening, continuing, downsizing, or discontinuing R&D for each theme.

Specifically, in the short-term (by around 2025), the Toshiba Group will strengthen the development of SCiB™ rechargeable battery and power semiconductors, for which we plan facility expansion in order to meet strong demand. In the medium-term (by around 2028), the Group will, using its infrastructure assets, expand the digital service business, including next-generation solar cells, virtual power plants, smart manufacturing, millimeter wave-based detection of potentially dangerous items, quantum key distribution (QKD), and security services for social infrastructure, based on the idea of Software Defined. Lastly, in the long-term (by around 2030), we will focus on high-temperature superconductivity technology, Power to Chemicals, quantum Internet, and other technologies to achieve true carbon neutrality and carbon negativity and to realize quantum transformation (QX). We will also focus on research and development of advanced technologies such as liposomes in the precision medicine field.

Breakdown of R&D Expenses in FY2022



Breakdown of R&D expenses for FY2022 and initiatives to visualize ROI in R&D

Monitor changes over years by introducing KPIs in each target group			
R&D investment	Objectives	KPI ▶ Monitoring and evaluation of annual changes	
Existing business domains	Develop products and services necessary to maintain and grow existing business	• ROI in R&D • Business growth	Period ROI Annual ROI CAGR
Peripheral domains of existing business	Develop innovative products and services in existing and peripheral business domains	$\text{Period ROI} = \frac{\sum \text{Operating profit (sum of total period)}}{\sum \text{R\&D investment (sum of total period)}}$ $\text{Annual ROI} = \frac{\text{Operating profit (every fiscal year)}}{\text{Annual R\&D investment (every fiscal year)}}$	
New domains/Fundamental	Do R&D from a medium- to long-term standpoint to develop products and services in new domains and create and contribute to future businesses Themes that provide overarching support for product and service development and engineering reforms in various fields including AI, production, and manufacturing technology	• Benchmarking • Consistency with the roadmap in product development	✓ Evaluation based on megatrends and business strategy ✓ Progress level (business contribution) ✓ Technology readiness level Annual ROI Period ROI Tech readiness

Toshiba Group Technology Strategy

Toshiba Group R&D Structure

Toshiba R&D divisions are composed of Toshiba’s corporate R&D organizations at headquarters and group companies’ R&D and design and engineering divisions. We pursue research and development together with these technology divisions. The corporate R&D organizations take a medium- to long-term approach to enhance fundamental technology, do research on new business domains, and work on innovative and advance research and development. The group companies’ R&D organizations and technology and engineering divisions support fundamental technologies of our business domains, and develop new products and differentiated technology in line with our business plans. We strive to commercialize products and mass-produce products that satisfy our customers’ needs. The close cooperation between these divisions enables us to deliver products to the market.

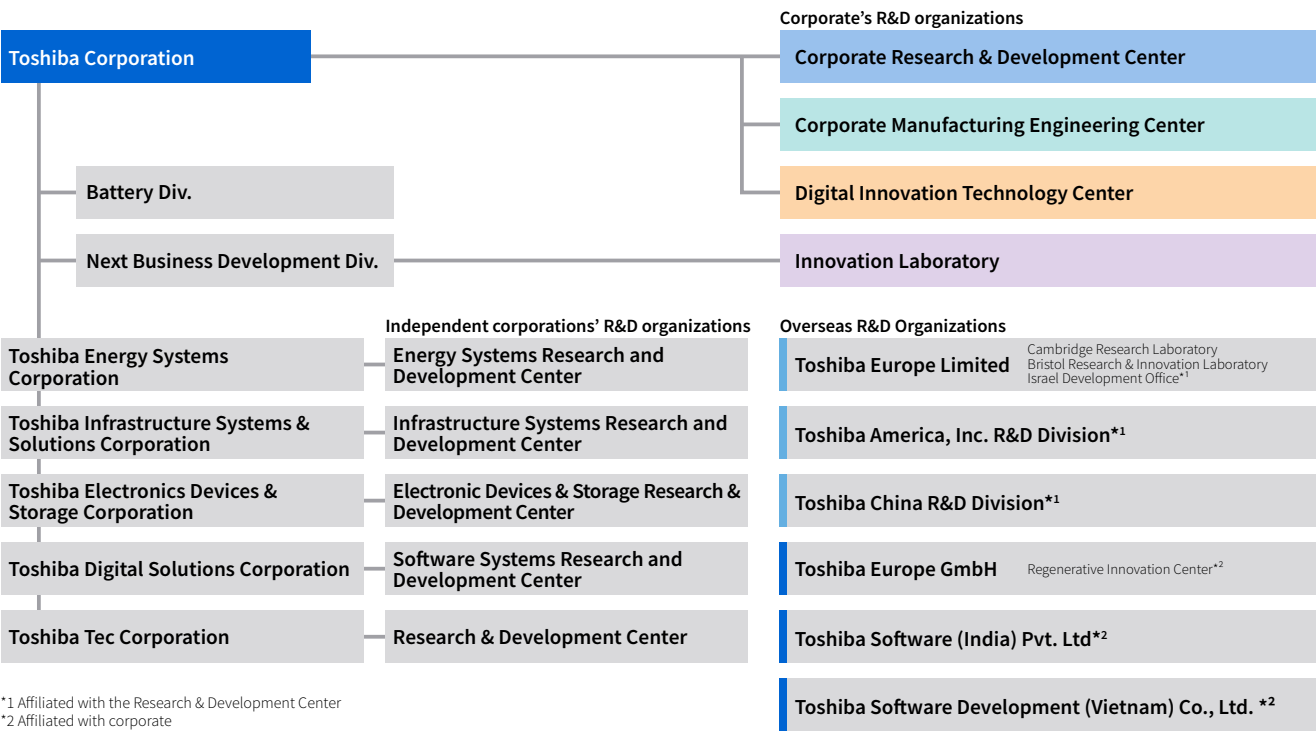
In FY2023, the Toshiba Group merged the Corporate Software Engineering & Technology Center with the Software Systems Research & Development Center, which used to serve as a works lab of Toshiba Digital Solutions, and reorganized it into the Digital Innovation Technology Center in order to promote DE and DX while strengthening and expanding its data services. The center aims to develop fundamental technologies to improve productivity and quality of software development in the Toshiba Group and to strengthen its software design, development, and quality capabilities. In addition, we have established the Next Business Development Division and the Innovation Laboratory, specialized organizations to promote the creation and commercialization of new products and services across the Group. We have built an R&D structure that brings together technical personnel across organizations for each theme to strengthen and accelerate development.

Toshiba has built research and development sites not only in Japan but also in the United States, Europe, India, Vietnam, Israel, among others. These sites work together organically across borders to conduct a wide array of cutting-edge research and development.

In September 2023, we established a new technology center, Regenerative Innovation Centre, in Düsseldorf, Germany. The center will be the home of a pioneering technology hub in Europe, focused on technological development and social implementation related to carbon neutral circular economy. Together with partners, it will promote advanced technology development, social demonstration, standardization, and other activities.

In order to boost our global competitiveness, we are improving our capability to respond swiftly to changes in the market, in our research and development as well. Particularly in Asian countries, where markets are expanding, we are working to locally operate not only manufacturing sites, but also engineering sites and development sites. We will create products and services that will appeal to the global market.

Toshiba Group R&D Organization



Toshiba Group’s Strength in Technology

Through a good track record in productization and systematization mainly in the energy/social infrastructure field over 145 years, Toshiba Group has cultivated research and development ability to generate “1” from “0” leveraging “technological diversity,” a new combination of these core technologies, as well as combined strength in engineering ability to structure devices, components, and systems meeting social and customer needs as solutions. Rather than simply a single technology creating a single product, a combination of various technologies that we have amassed in processes of research and development has been creating new products and services.

Today, we are creating technologies with high potential one after another by grasping the needs of society from the development conception phase, in addition to a new combination of core technologies in multiple areas.

For example, Toshiba Energy Systems & Solutions Corporation has developed the world’s first prototype of a lightweight, compact, high-power superconducting motor with a maximum output of 2 MW, bringing together the superconductivity technology and manufacturing technology for high-speed rotating machines it has cultivated over many years. It is necessary to explore not only carbon-free fuel, but also systems to achieve total carbon neutrality in the industry of large mobility vehicles such as aviation as a whole; thus, the industry needs to develop lightweight and high-powered motors for propulsion systems. The motor is less than one-tenth the weight and size of an equivalent conventional motor, making it possible to replace fossil-fuel-driven engines with motors, thereby contributing to zero-emissions for various types of large mobility vehicles. In recognition of its future potential, our superconducting motor was awarded the Grand Prix in the Total Solutions category of the CEATEC AWARD 2022.

Superconductivity Commercialized products including silicon single-crystal pullers, expanded into other market sectors using core technologies Silicon single-crystal puller Delivered more than 500 units Superconducting motor World's first Core Techs: Superconducting coils × Refrigerators	NTO*1 Anode Batteries Start sample cells delivery (FY2023) PoC demonstrations with fast charging for commercial EVs Large laminated cell Core Techs: SCiB™ × Nb*2 (material)	Millimeter-wave Imaging Security gate application demonstration (FY2023) Detects dangerous objects hidden under clothes in walk-through inspections at public areas, buildings, etc. Core Techs: Radar × Signal Processing
Biodegradable liposome Started paid PoC (FY2023), collaborated with CiRA Foundation Gene (DNA) Lipid Biodegradable liposome Selective uptake in specific cell types Nucleus Core Techs: Material design × MI*3 (AI)	MEMS Sensors Considering commercialization with strategic customers/partners Hydrogen/CO₂ gas sensors High-speed detection of gas emissions and leakage Sensor chip Gyro sensors Small size, accurate sensing Core Techs: Semiconductor × MEMS	Film-Based Perovskite PV Developing the technology based on GI fund project*4 Accelerating product development through projects across research and business divisions Lightweight and flexible: can be installed where current products cannot be installed Core Techs: Coating × Nanomaterials

*1 Niobium titanium oxide *2 Niobium *3 Materials Informatics *4 Green Innovation Fund projects

Changing the Value of High-quality Technology
—Initiatives for Linking Technology to Products, Systems, and Services—

To link high-quality, potential technologies to products, solutions, and services without failure to solve social issues, Toshiba is promoting demonstration experiments in collaboration with our business partners. Here are some of such initiatives and R&D cases that actually led to the creation of new services.

Toshiba Improves the Accuracy of Forecasting the Amount of Renewable Energy Generation and Achieved Approximately 70% Reduction of Imbalance Amount by Utilizing Storage Batteries

Toshiba Energy Systems & Solutions Corporation was selected as the consortium leader of “FY2022 Renewable Energy Aggregation Demonstration Project”^{*1}, publicly facilitated by the Ministry of Economy, Trade and Industry, and developed new method to forecast the amount of renewable energy power generation. An average of approximately 70% reduction of imbalance^{*2} amount was achieved with the control method that utilizes storage batteries while reflecting the real-time actual amount of renewable energy generation. Toshiba will continue to develop optimal control technologies using renewable energy power generation forecast and storage batteries, and through the renewable energy aggregation business, contribute to realization of a stable and efficient power system that utilizes renewable energy, thereby addressing climate changes.

^{*1} The official name of the project is “FY2022 Subsidy for Demonstration Project for Establishing Next-Generation Technologies Using Distributed Energy Resources such as Storage Batteries (Renewable Energy Aggregation Demonstration Project within the Renewable Energy Generation Aggregation Technology Demonstration Project).”
^{*2} Imbalance is the difference between the amount of electricity demanded (used) and the amount of electricity supplied that occurs when a renewable energy power generator is unable to achieve the same amount of electricity as planned and actual simultaneously.

Toshiba Links Quantum Security and Personal Authentication, Successfully Delivering Secure Personalized Healthcare Use Case

Together with the Tohoku University Tohoku Medical Megabank Organization, Tohoku University Hospital, and the National Institute of Information and Communications Technology, Toshiba has demonstrated the world’s first^{*1} personalized healthcare^{*2} system that stores genome data, collected from many individuals, in multiple locations and utilizes them for medical treatment and healthcare using an information theoretically secure method based on the quantum key distribution (QKD) link, the secret sharing system and personal authentication technology. This system is theoretically secure against the threat of store now and decrypt later attacks, prevents data leaks, falsification, and loss of genome data. In this system, data decryption and reconstruction^{*3} are performed by using personal authentication and individual consent. The system is expected to contribute to the realization and spread of personalized healthcare.

A part of this work was performed for Council for Science, Technology and Innovation (CSTI), Cross-ministerial Strategic Innovation Promotion Program (SIP), “Photonics and Quantum Technology for Society 5.0” (Funding agency: QST).

^{*1} Toshiba’s research as of December 8, 2022
^{*2} Health risk management optimized for individuals by analyzing personal genome data together with environmental factors such as lifestyle habit, and calculating the risks of contracting diseases for each individual
^{*3} Reconstruction refers to the decryption of data encrypted with quantum cryptography, whereas restoration refers to the restoration of the original data by combining multiple secret shared data fragments.



QKD system

Toshiba Launches “Weather Data Service” to Analyze Weather Observation Data Using Its Proprietary Method

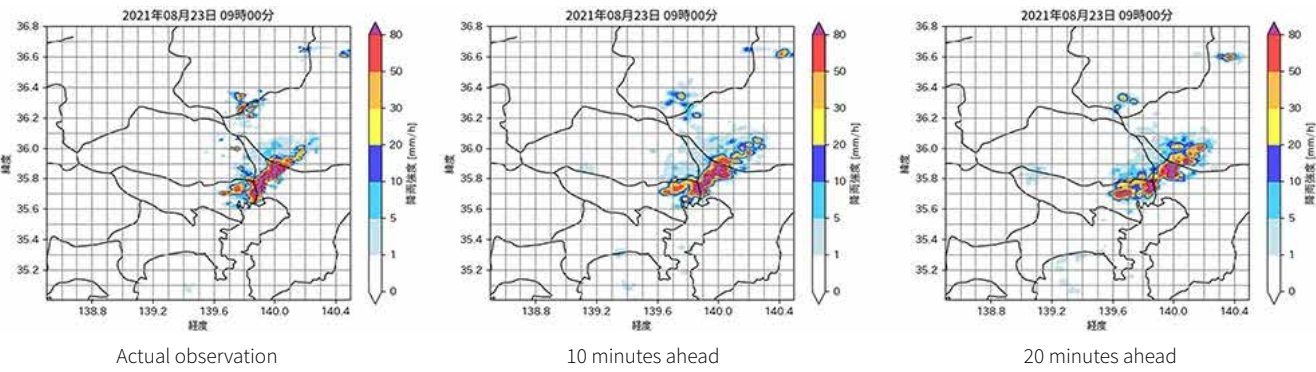
Toshiba Digital Solutions Corporation has begun offering the Weather Data Service, a solution to analyze observation data received from weather radars with high accuracy and in real time.

Since delivering weather radar systems in 1955, Toshiba Group has been contributing to a safe and secure lifestyle by providing weather radar and weather observation systems that process information from observation data. Toshiba has also been working to resolve problems in flooding. For example, we conducted a demonstration experiment^{*1} with a local government in August 2022 on the effectiveness of local government officials’ operations for measures against flood damage.

As a first step, we began offering the Rainfall Forecasting Service on May 29, 2023, which provides highly accurate forecasts of localized heavy rain. It uses Toshiba’s proprietary analysis method based on VIL-NC^{*2} to analyze weather radar observation data in real time to accurately forecast signs and the amount of localized heavy rainfall up to 30 minutes ahead. We will contribute to the prevention and mitigation of damage from natural disasters by providing the service to private companies and local governments that support social infrastructure.

In addition to the Rainfall Forecasting Service, which we just launched, we plan to release the Particle Classification Service, a solution to classify precipitation particle into rain, snow, and hail in real time, and the Gust Detection Service, which detects a position of wind gust over a wide area^{*3}.

Comparison between short-time rainfall forecast and actual observation

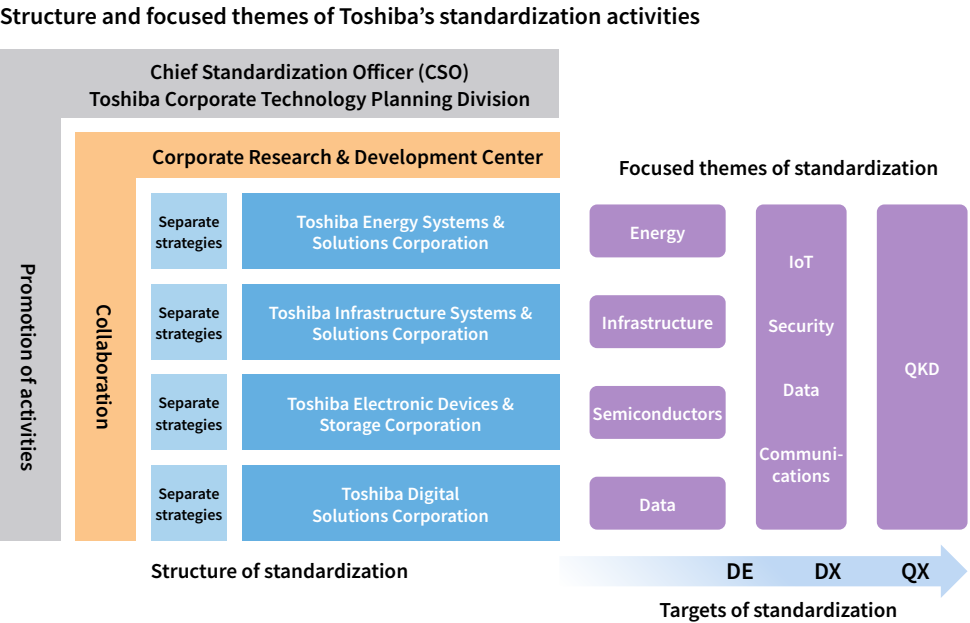


^{*1} News release dated August 18, 2022
“Toshiba to Launch a Demonstration Experiment on the Effectiveness of Flood Damage Countermeasures Based on Highly-accurate, Real-time Rainfall and Flooding Forecasts During Torrential Rains”
^{*2} VIL-NC stands for vertically integrated liquid water content–NowCast.
A rainfall forecasting algorithm developed by the National Research Institute for Earth Science and Disaster Resilience for use with weather radar
^{*3} The Particle Classification Service and the Gust Detection Service are currently under development and planned to be released in the future.

Toshiba Group’s Standardization and Rule-making Activities

To ensure that the Toshiba Group’s technologies are implemented in society, it is important to conduct rule-making activities including those for standardization to create a market where such technologies are accepted and to have commercialization strategies for individual products incorporating those technologies. Standardization in this section refers to activities on international standardization in general, not only those for international standards, JIS and other national standards, and regional de jure standards but also so-called forum standards developed by industry associations, forums, consortiums, and other entities.

The Toshiba Group’s standardization activities are conducted under a system in which the Corporate Technology Planning Division serves as the hub for the standardization activities, while individual activities are performed by divisions including the Corporate Research & Development Center and four independent corporations, under the supervision of the Chief Standardization Officer (CSO), who is responsible for group-wide standardization. To effectively combine the business strategies of the entire Group with standardization strategies, the Corporate Technology Planning Division collects and shares related information, formulates strategies with business divisions, and streamlines standardization-related operations. A total of approximately 1,000 people throughout the Toshiba Group are engaged in standardization activities.

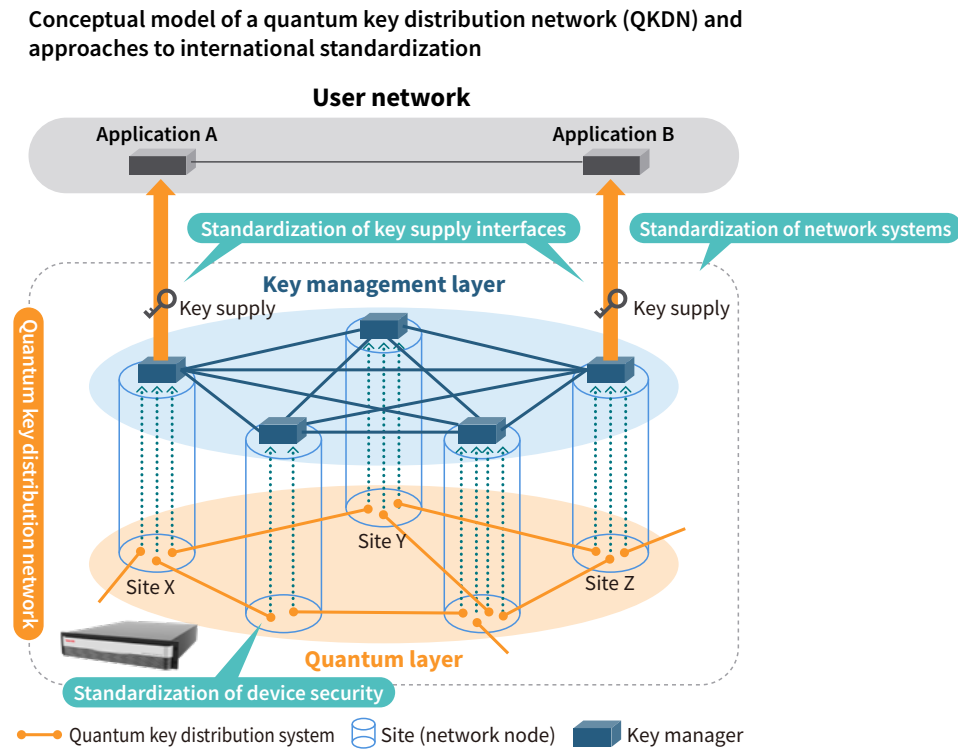


The Toshiba Group has been working on many standardization activities since its founding. In particular, Toshiba has focused on activities at the International Electrotechnical Commission (IEC), an international standards organization in the electrical field. As far back as 1906, Ichisuke Fujioka, Toshiba’s founder, participated in a preparatory meeting for the establishment of the IEC, and in 2002, Seiichi Takayanagi, former Senior Executive Vice President, was appointed as IEC President. Currently, Naoto Nishida, Toshiba’s Fellow, is a member of the IEC Board, the main executive body of the IEC.

Among the outstanding standardization activities of the IEC are those of the Technical Committee for Electrical Energy Storage Systems (TC 120). The Toshiba Group contributed to the establishment of the committee and has produced international secretaries to promote its activities. The Group is expanding activities not only in its existing business areas but also in the area of digitization (DE → DX → QX), which is one of its management policies. Examples of those activities include the standardization of the IoT reference architecture in the Industrial Internet Consortium (IIC), participation in the IEC’s Subcommittee for “Classes, Properties and Identification of products—Common Data Dictionary (CDD)” (SC 3D), which is deeply involved in the digitization of Carbon Footprint of Products (CFP), and the standardization of QKD, which is described later in this report. The Toshiba Group will continue to promote standardization activities as one of its driving forces for business development.

International QKD Standardization Activities

As the importance of secure cryptographic communication is expected to increase in the future information society, hopes are high for quantum key distribution (QKD), an information-theoretically secure encrypted communication technology using the principles of quantum mechanics, which even quantum computers’ overwhelming computational capabilities cannot break. Toshiba is leading the world in researching and developing unique technologies for accelerating and stabilizing QKD. At the same time, we are working on international standardization of quantum key distribution networks (QKDNs), which are essential technologies for the real-world deployment of QKD.



The standardization of QKDN systems is primarily being led by the International Telecommunication Union Telecommunication Standardization Sector (ITU-T). The National Institute of Information and Communications Technology (NICT), NEC Corporation, and Toshiba jointly proposed the QKDN system configuration shown in the figure above. Based on this, in 2019, the ITU-T published its ITU-T Y.3800 recommendation. With regard to the standardization of key supply interfaces, the European Telecommunications Standards Institute (ETSI) published the ETSI GS QKD 014 standard in 2019, to which Toshiba contributed. For the standardization of device security, two initiatives were undertaken separately by JTC1, a joint technical committee of the International Organization for Standardization (ISO) and IEC, and ETSI. Participating in both initiatives, Toshiba contributed to the publication of ETSI GS QKD 016 and ISO/IEC 23837.

Intellectual Property

Intellectual Property Strategy

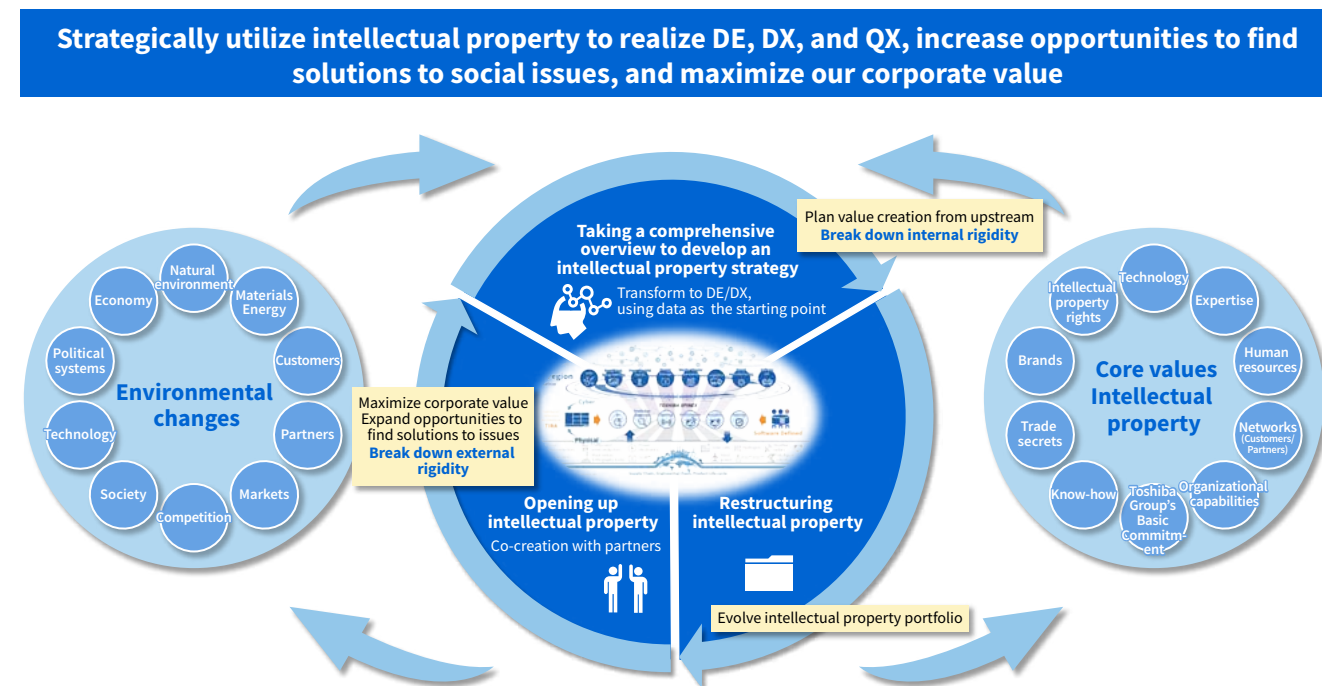
Toshiba Group aims to strategically utilize intellectual property to realize DE, DX, and QX, increase opportunities to find solutions to social issues, and maximize our corporate value. We are promoting a cycle of “taking a comprehensive overview to develop an intellectual property strategy,” “restructuring intellectual property,” and “opening up intellectual property.”

“Taking a comprehensive overview to develop an intellectual property strategy” is the most important step. From the upstream stage of developing a business concept, we take a comprehensive overview of the situation from various perspectives, including a variety of environmental changes, the core values of the Company (intellectual assets), and business strategies, and consider how to use intellectual property and how to link it to business values. In considering these things, we also break down our internal rigidity by adopting a business concept based on the transformation to DE and DX, and the utilization of data.

“Restructuring intellectual property” is a step to organize intellectual property items such as patents, data, and know-how when implementing the envisioned intellectual property strategy. After identifying and organizing the intellectual property items that we have, we can acquire any intellectual property items that we are lacking to maximize our intellectual property portfolio. This allows us to improve the quality of our intellectual assets. Since it is essential to manage confidential information regarding data and know-how, we are also committed to ensuring thorough management of the Company’s confidential information so as to prevent leaks.

“Opening up intellectual property” is the step of co-creation with partners by utilizing intellectual property. Even social issues that cannot be solved by the Company alone can be solved through co-creation with partners. For this reason, we will break down external rigidity by promoting co-creation with partners using intellectual property as the starting point, and this will lead to an increase in opportunities to find solutions to social issues and the maximization of our corporate value.

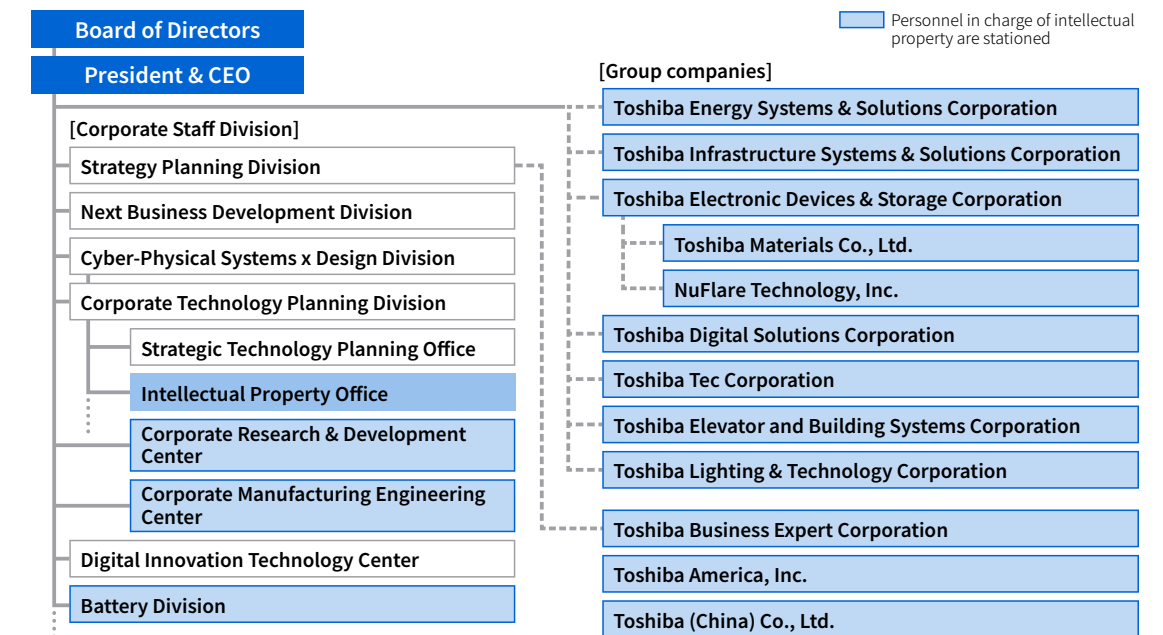
Toshiba Group’s intellectual property strategy



Promotion Structure of Intellectual Property Strategy

The organizational structure of the Intellectual Property Division is composed of the corporate staff division's Intellectual Property Office, and the intellectual property divisions at our individual laboratories and key Group companies. The corporate staff division's Intellectual Property Office is responsible for, related to intellectual property across Toshiba Group, formulating and promoting strategy and measures, handling contracts and disputes, managing patent information and deals with matters related to intellectual property right laws, such as the Copyright Law. Meanwhile, the intellectual property divisions of research laboratories and Group companies formulate intellectual property strategies in their respective development and business domains and work to build and utilize an optimal intellectual property portfolio. We have intellectual property officers located in both the United States and China to help promote out intellectual property strategy globally.

With regard to management resource allocation, including investment in intellectual property, and the execution of strategies relating to our business portfolio, each of our Executive Officers report to the Board of Directors on the status of their respective initiatives, whereupon they receive supervision and advice.



Intellectual Property

Education on Intellectual Property

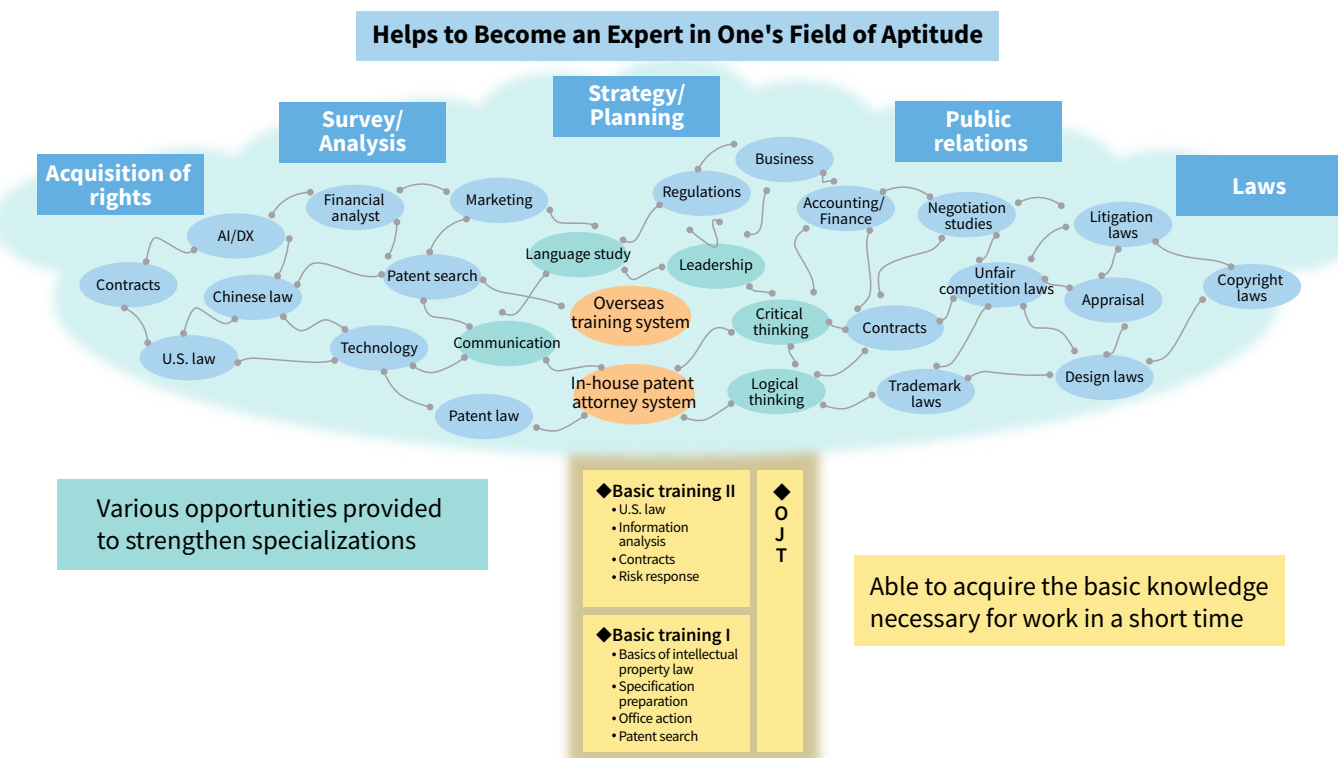
Toshiba Group provides its employees in Japan with e-learning type training each year for the purpose of refreshing their awareness of the Standards of Conduct regarding intellectual property rights and, primarily, for alerting them to copyright issues. The participation rate in FY2022 was 99.6%.

Newly hired employees are provided with general training on intellectual property rights as part of the Corporate Entry Program (CEP), which is followed by level-specific education/training programs in line with each business division.

We have established a basic training program for intellectual property officers with the education covering areas such as knowledge-acquisition of both domestic and overseas intellectual property rights, preparation of patent specification documents, practical training with office action, and on-the-job training, so that they will be able to put their training into practice in two years.

In addition, we provide education at our overseas subsidiaries that is appropriate for each region. For example, our Chinese subsidiaries provide copyright training on the proper use of software, and our U.S. subsidiaries provide intellectual property training targeting both newly hired and existing employees.

Conceptual diagram of human resources development



In addition, we provide copyright education on such topics as proper use of software at our overseas subsidiaries in China, South Korea, Hong Kong, and Taiwan. For example, our U.S. subsidiaries provide education programs appropriate for the region, such as intellectual property education, for all employees using LMS (Learning Management System).

Toshiba Group Patent Conference

Toshiba Group holds the Toshiba Group Patent Conference each year, where it awards particularly outstanding inventions with “Excellent Invention Award.”

In FY2022, we held an awards ceremony for the first time in four years, where we granted 5 Business Contribution Prizes to commemorate inventions that had made significant contributions to the Company's business, and 4 Future Value Creation Prizes in commemoration of inventions which we expect will contribute to business or provide value to society in future.



Representatives of the award winners



CEO message

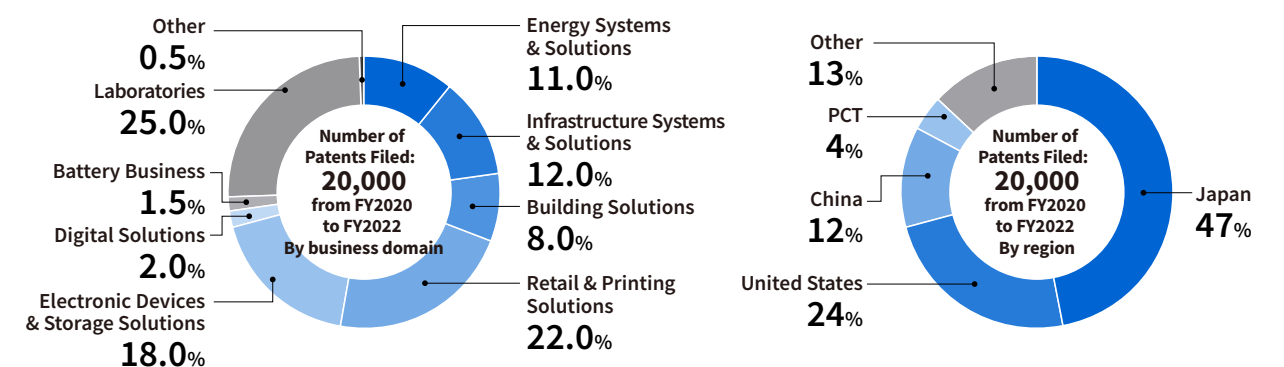
The final stage of the conference also featured a special lecture from a guest lecturer and a number of webinars themed around the topic of how intellectual properties extend across multiple sectors with the aim of cultivating an intellectual property mindset and discovering new aspects of intellectual property activities. Moving forward, we will continue to provide an environment that facilitates employees to create inventions, and will strive to improve employees' motivation for invention.

Global Patent Portfolio

Reflecting our global expansion, more than half of our patent applications are filed with foreign countries, particularly in the United States and China. We select and file for patent items in each business domain so that we can create an optimal portfolio based on our intellectual property strategy.

The number of patent applications we have made this past three years is as detailed below:

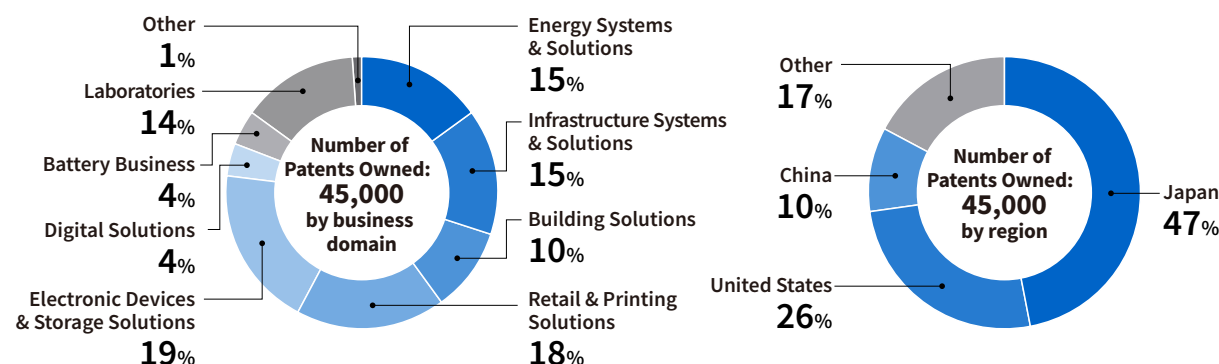
Number and Breakdown of Patents Filed (from April 2020 to March 2023)



Intellectual Property

Each year, we evaluate all of our registered patents owned, and create an optimal portfolio based on such evaluation results for each business domain. The status of patents owned as of March 2023 is as follows.

Number and Breakdown of Patents Owned (as of March 2023)

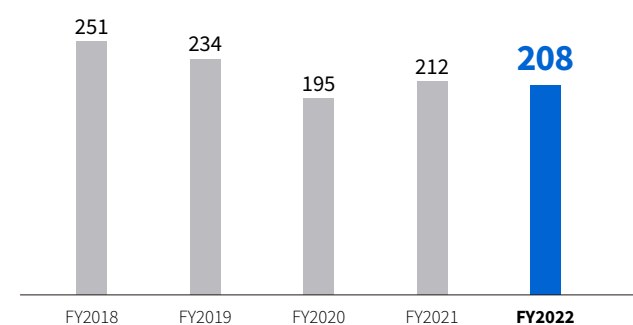


Protection of Toshiba Brand

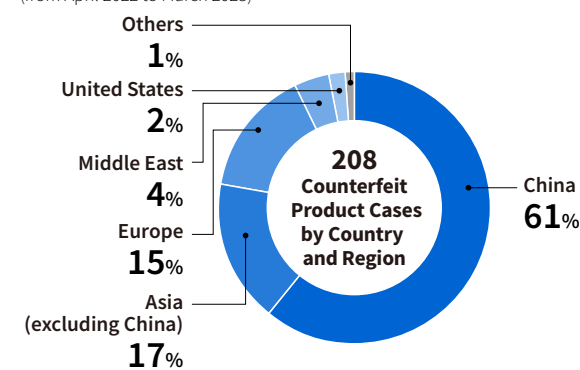
The Toshiba brand symbolizes the value of Toshiba Group as a corporation, and the value of the products or services that we offer. In order to ensure the protection of the Toshiba brand, we manage trademark rights and remove counterfeit products.

Failure to take action against counterfeits of Toshiba products would pose not only the risk of damage to Toshiba's brand value and public confidence, but also the risk of purchasing counterfeit products that do not meet the quality expectations of customers who mistake them for genuine products, as well as an increased risk of an accident occurring. For this reason, we strive to eradicate counterfeit products, collaborating with domestic and overseas anti-counterfeit organizations, and are actively appealing to local bodies such as government agencies for more stringent control.

Trends in Incidents of Counterfeit Products up to FY2022 (Cases)



Breakdown of Counterfeit Product Cases Responded by Region (from April 2022 to March 2023)



Evaluation by External Parties

Toshiba Group's diverse state-of-the-art technologies and its brand are highly appreciated. Prominent awards received include the following:

Selected for Clarivate Top 100 Global Innovators™ 2023

Clarivate, a global information services company, has selected Toshiba for 12 years running as one of the Clarivate Top 100 Global Innovators™, a list of the best 100 innovative companies and institutions around the world, based on Clarivate's patent data analyses.



Winner of FY2022 National Commendation for Invention – The Invention Prize Invention of weather radar having interference avoidance function of wireless LAN (Patent No. JP6383134)

An invention related to weather radars developed to avoid interference from Wireless LAN (WLAN) received the FY2022 National Commendation for Invention – The Invention Prize.

This invention relates to a weather radar that avoids radio wave interference from WLAN and achieves accurate weather observation.

WLANs are equipped with DFS (Dynamic Frequency Selection) to avoid radio wave interference to weather radars, etc. However, DFS does not work with older types of wireless LANs, thereby affecting weather observations. Therefore, we invented a weather radar that can avoid radio wave interference by transmitting a special pulse pattern to activate the DFS on the WLAN side when a signal from a WLAN is detected.

Toshiba delivered a weather radar equipped with this function to the Ministry of Internal Affairs and Communications in 2021. This invention has contributed to frequency sharing among the 5 GHz band (C band) weather radar and 5 GHz WLAN.

Utilize **High-Sensitivity Reception Function** of Weather Radar Vulnerable to Interference for Interference Detection with Reverse Thinking Idea of **“Bidirectional Detection”** Born Through Incorporate Synergy in Both Fields of Wireless Chip and Radar

