

February 8, 2022
Toshiba Corporation

FOR IMMEDIATE RELEASE

Notice Regarding Presentation Materials for “Toshiba IR Day”

TOKYO—Toshiba Corporation (TOKYO: 6502) hereby releases the presentation materials for today’s session of “Toshiba IR Day,” the explanation of Toshiba’s business strategies held over yesterday and this afternoon.

#



Toshiba Group IR Day 2022

Business Strategy of Infrastructure Service Co.

February 8, 2022

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Toshiba Corporation

Forward-looking Statements and Other Cautionary

- This document has been prepared solely for the purposes of providing information regarding the strategic reorganization described herein (“Reorganization”) and does not constitute an offer to sell or a solicitation of an offer to buy any security of Toshiba Corporation ("Toshiba"), its subsidiaries or any other company in Japan, the United States or any other jurisdiction.
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- Since Toshiba group promotes business in various market environments in many countries and regions, its activities are subject to a number of risks and uncertainties which include, but are not limited to, those related to economic conditions, worldwide competition in the electronics business, customer demand, foreign currency exchange rates, tax and other regulations, geopolitical risk, and natural disasters. Toshiba therefore cautions readers that actual results may differ from those expressed or implied by any forward-looking statements. Please refer to the annual securities report (yuukashoken houkokusho) and the quarterly securities report (shihanki houkokusho) (both issued in Japanese only) for detailed information on Toshiba group's business risks.
- Unless otherwise noted, all figures are 12-month totals on a consolidated basis.
- Results in segments have been reclassified to reflect the current organizational structure, unless stated otherwise.
- Since Toshiba is not involved in the management of Kioxia Holdings Corporation (formerly Toshiba Memory Holdings; hereinafter "Kioxia") and is not provided with any forecasted business results for Kioxia, Toshiba group's forward-looking statements concerning financial conditions, results of operations, and cash flows do not include the impact of Kioxia.
- The execution of the Spin-off described in this document is subject to approval at Toshiba's general shareholders' meeting and the fulfillment of all review requirements of the relevant regulatory authorities.
- Depending on the applicable laws and regulations (including securities listing regulations and U.S. laws and regulations), developments in the application, revision and enforcement of various regulatory regimes including tax regulations, interpretations by the relevant authorities, further considerations in the future and other factors, the implementation of the Reorganization may take longer than expected and there may be changes in the structure of the reorganization.

Today's Agenda

- 01 Purpose and Vision
- 02 Business Structure Reform
- 03 Business Plan and Focus Business Areas
- 04 Technology Strategy

01

Purpose and Vision

The Essence of Toshiba

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.**



Our Purpose

We are Toshiba. We have an unwavering drive to make and do things that lead to a better world.

A planet that's safer and cleaner.
A society that's both sustainable and dynamic.
A life as comfortable as it is exciting.

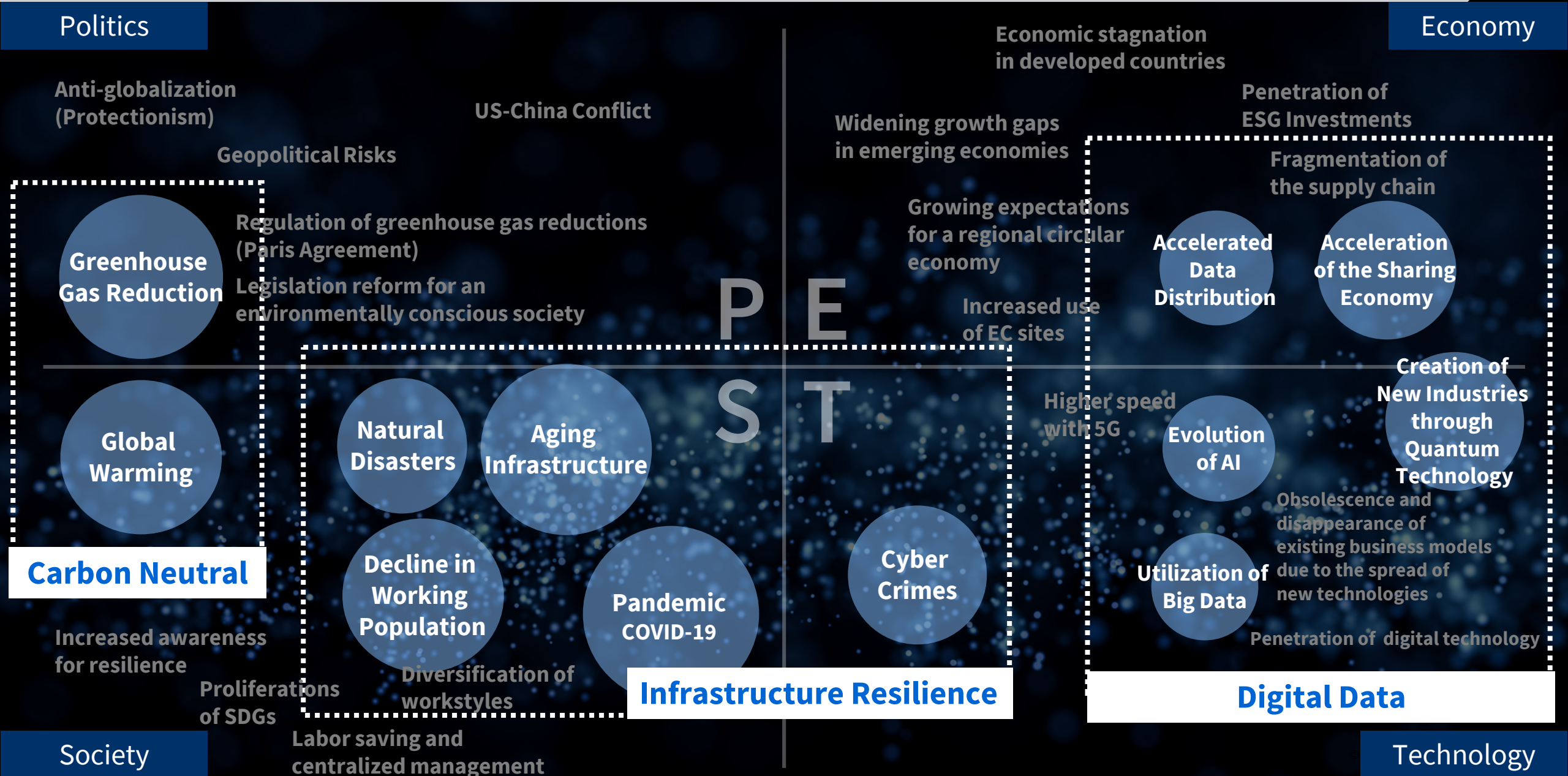
That's the future we believe in.
We see its possibilities, and work every day to deliver answers that will bring on a brilliant new day.

By combining the power of invention with our expertise and desire for a better world, we imagine things that have never been – and make them a reality.

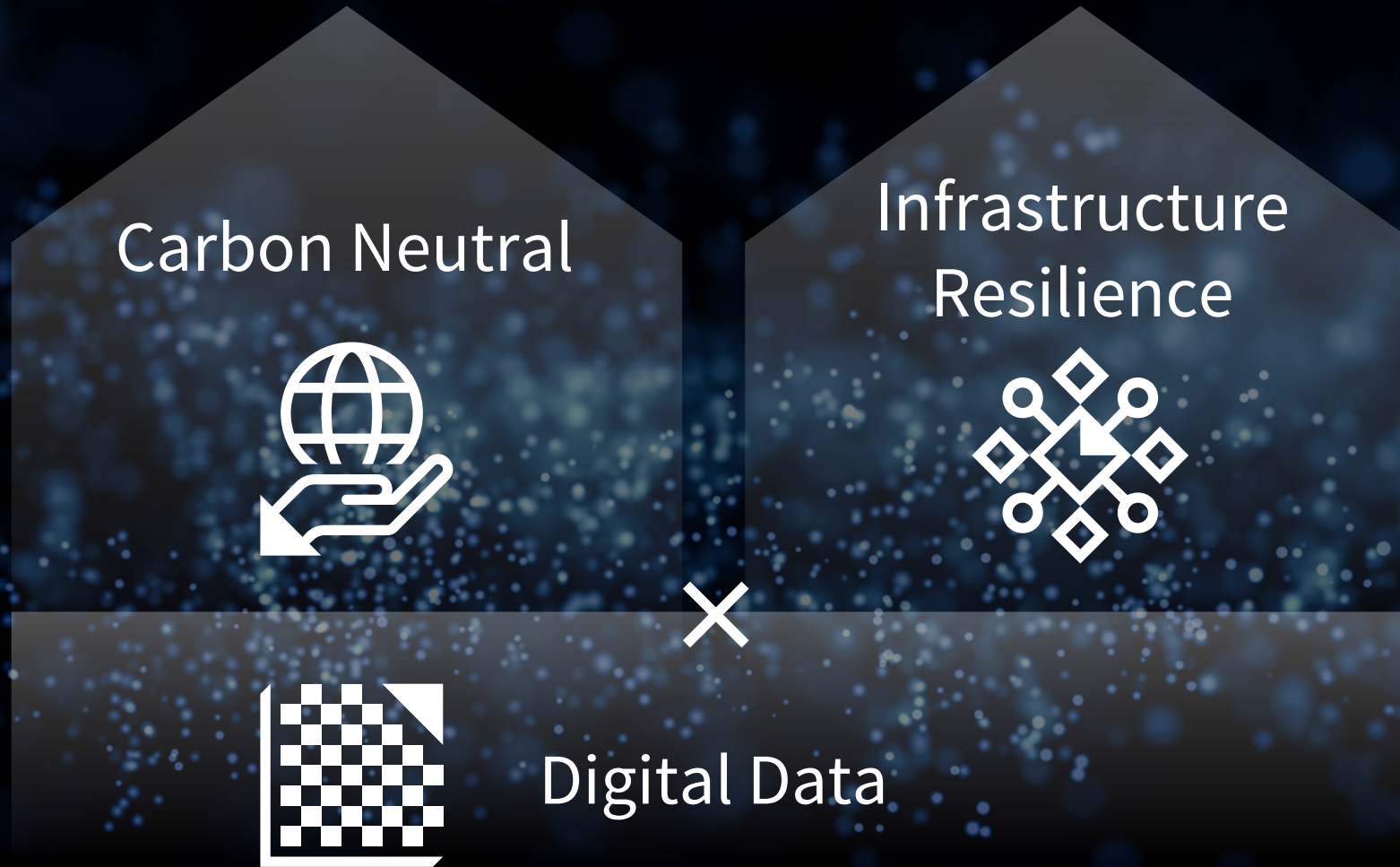
That is our potential. Working together, we inspire a belief in each other and our customers that no challenge is too great, and there's no promise we can't fulfill.

We turn on the promise of a new day.

Megatrends and Issues to be Solved



Our energy and social infrastructure business division will come together under Infrastructure Service Co., working to solve urgent social issues in an era of great change, with “× digital”



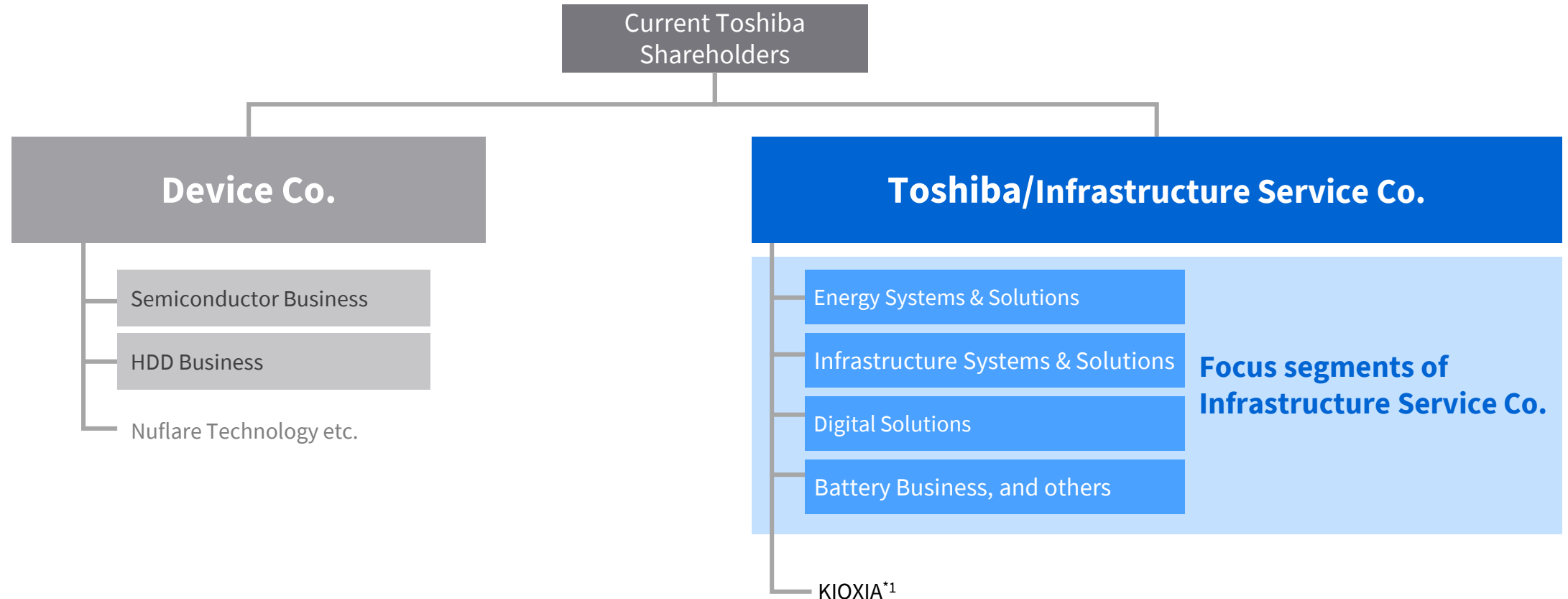
02

Business Structure Reform

Focus Segments of Infrastructure Service Co.

Sharpened attention on our strong businesses in infrastructure service field

New structure after the spin-off



*1 KIOXIA stands for Kioxia Holdings Corporation.

Purpose and Objectives of the Spin-off

The spin-off allows quick and agile management decisions and concentrated investment in focus areas

Management

Simplify the multi-layered decision-making process to enable quick and agile management decisions

Investment

Increase competitive advantage by concentrating investments in CAPEX, R&D, and digitization in infrastructure service business that have had low investment priorities while under conglomerates

Human Resources

Actively recruit and utilize human resources from inside and outside the company with specialized and advanced knowledge of the industry

Alliance Partnership

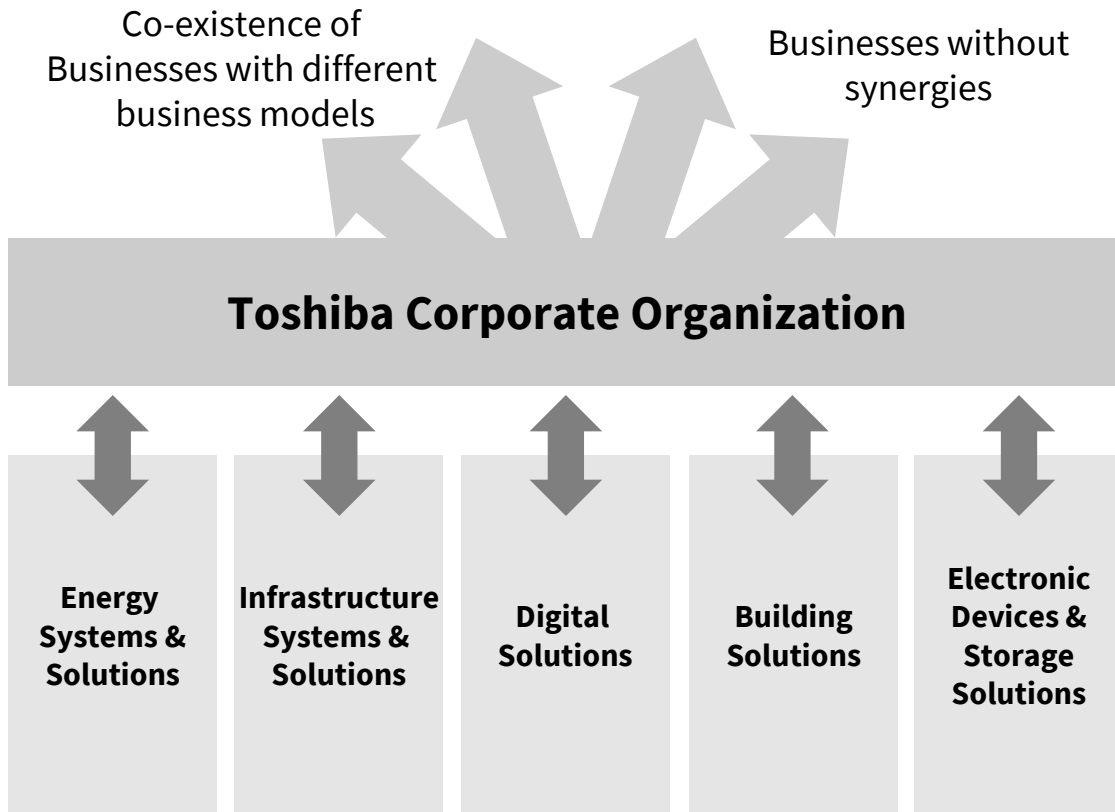
Provide new solutions by making use of the strong customer base and technical capabilities we have cultivated over many years, and through partnering with companies with unique strengths.

Business Structure Reform

Transform business structure to directly link with social issues and businesses

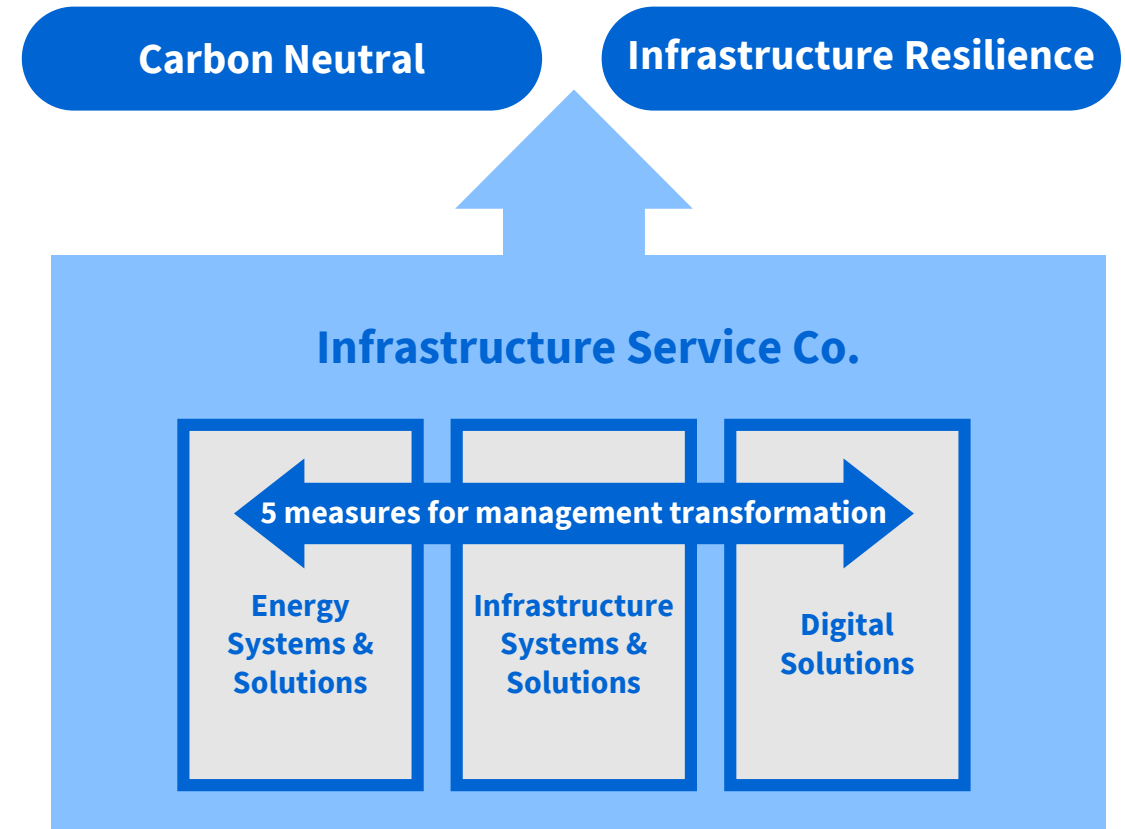
Toshiba Group Structure up to now

Conglomerate Discount



Infrastructure Service Co. Structure

Enhance corporate value with sustainable and profitable growth



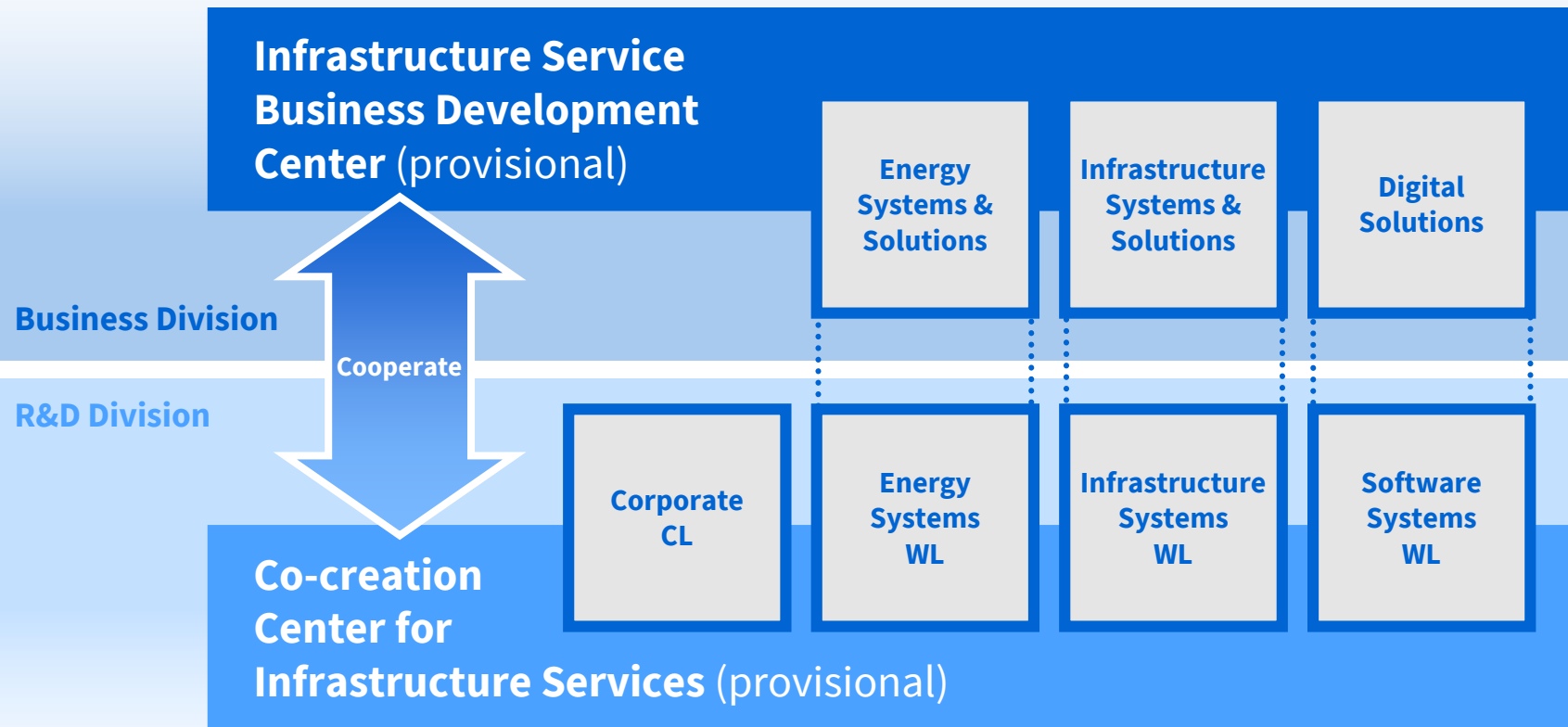
Measures for Business Structure Reform

Accomplish swift management reform through 5 measures

1	Cross-Sectional New Business Creation	● Establish a cross-sectional organization to create new businesses, to promote activities that are directly linked to expand business in carbon neutral and infrastructure resilience by making full use of research and technology assets
2	Sales Structure Reform	● Shift function of the sales force to propose solutions to the customer issues
3	IT & Digitization Investments	● Integrate information throughout the value chain to centralize management information and enhance management by introducing the next generation core system and digitizing design and manufacturing
4	Technical HR Development	● Increase professionals for driving and developing infrastructure services solution through human resource development and external talent recruitment
5	ESG	● Reduce greenhouse gas emission by 70% throughout the value chain as the mid-term target (by 2030)

1. Cross-sectional New Business Creation

Establish cross-sectional organization to commercialize new growth areas



CL: Corporate Lab
WL: Works Lab

Resource Consolidation



- Technology•Seeds
- Commercialization idea
- HR•Team

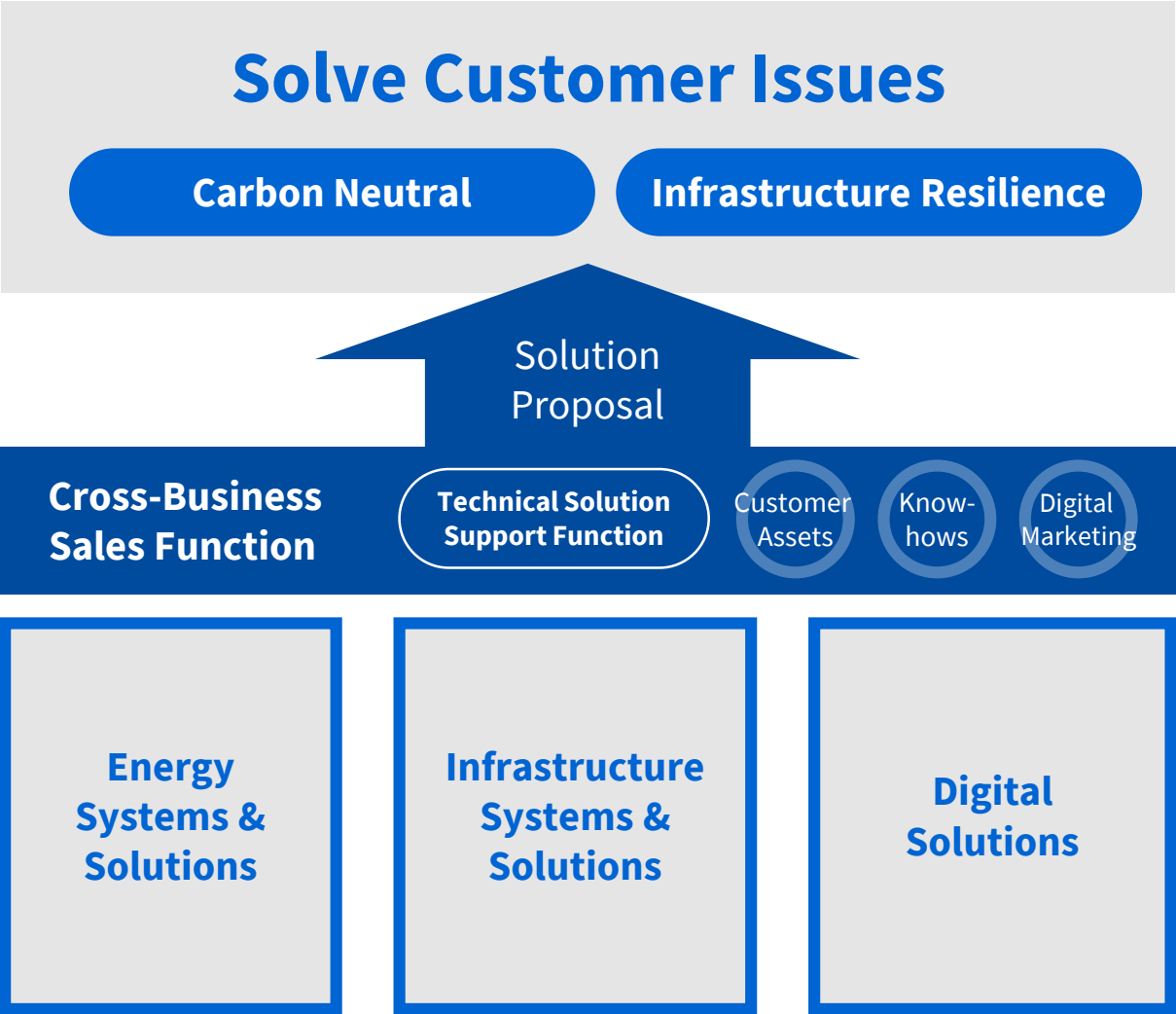
Commercialization

- Theme selection
- Commercialization, Business model creation
- Business planning, Review



2. Sales Structure Reform

Shift function of the sales force to propose solutions to the customer issues



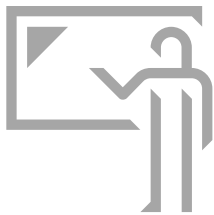
Sales Structure Reform



Enhance cross-business sales function by integrating **customer assets**, **solutions** and **know-hows** cultivated in each business division throughout Infrastructure Service Co.



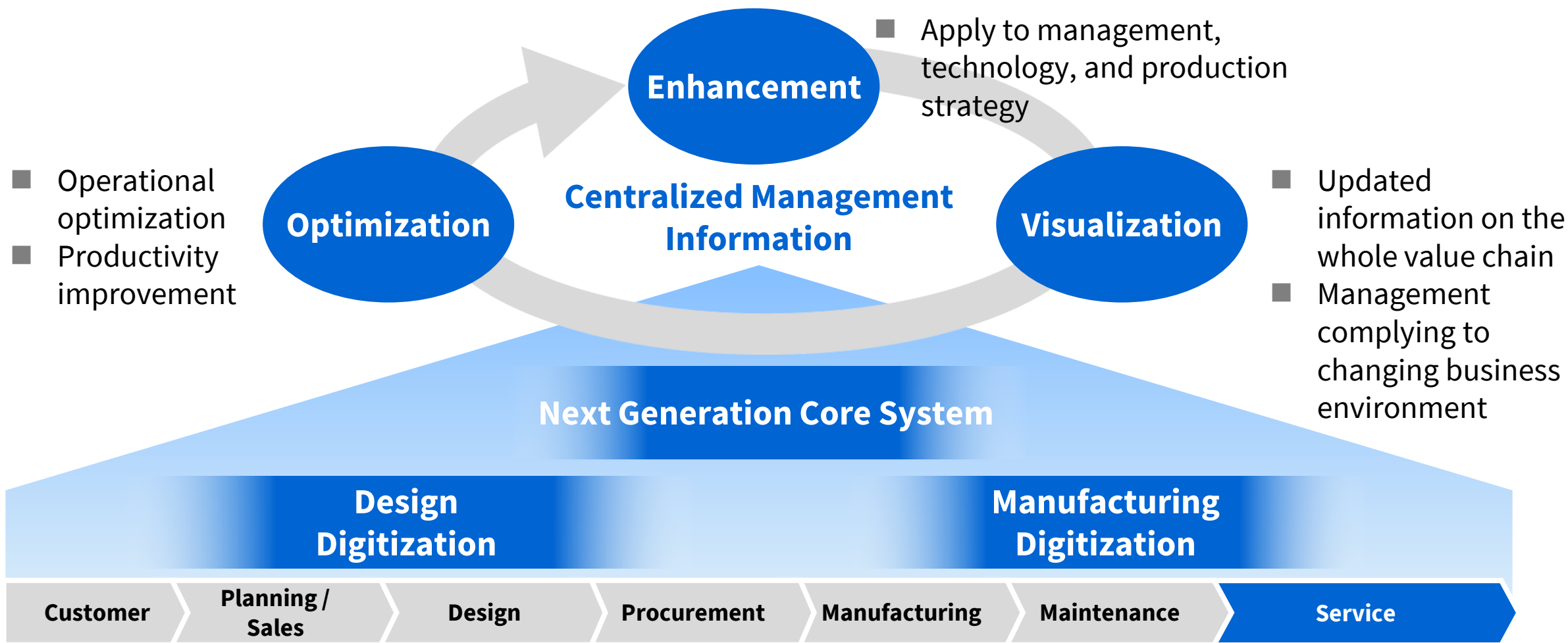
Establish a sales team for key accounts to **propose cross-sectional solutions**



Shift to **solution proposal-based sales** to solve customer issues by **allocating technical resources to sales functions**

3. IT & Digitization Investments

By introducing next generation core system and digitizing design and manufacturing, we will integrate information throughout the value chain to centralize management information and enhance overall strategy



4. Technical HR Development

Enhance technology capabilities and resources for driving infrastructure services and developing solutions to solve social and customer issues

Engineer mapping

Visualize composition of technical resources, to seek for human resource allocation strategy linked to the business strategy

Engineer Expertise Areas (image)		55 Areas of Business & Products				
		Energy Plants	Railway Systems	Power Device	ICT Systems	...
44 Academic Areas	Mechanical					
	Electrical					
	Chemical					
	AI / IT					
	⋮					

Specialization Areas (image)

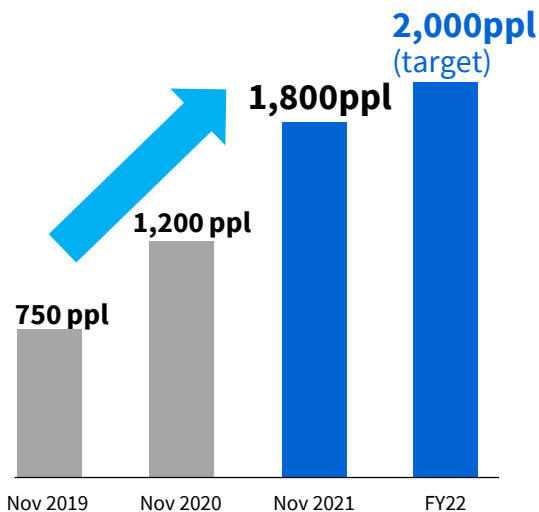
Expand specialized resources to promote infrastructure services

Human Resource Development

- Provide **IT education to improve skills** for all employees
- Established an **online and practical AI education system**, to develop **AI human resources in different category type**

Retaining talents

- Apply “**Professional Employee System**” to secure highly skilled resources, especially in advanced technology area as AI



AI related Human Resource Plan in Toshiba Group

5. ESG: Addressing Climate Change

Achieve carbon neutrality throughout our entire value chain by FY2050

Target to be achieved by FY2030



Scope1, 2

Emissions generated from Toshiba Group’s own business activities



Emissions from Toshiba Group’s business activities

Greenhouse gas emission

Reduce **70%***

Scope3

Indirect emissions outside of Toshiba Group’s business activities



Use-phase emissions of “products and services associated with power supply” sold

Greenhouse gas emission

Reduce **80%***



Uses-phase emissions of “products and services associated with power consumption” sold

Greenhouse gas emission

Reduce **14%***



Obtained SBT Certification

We have obtained SBT (Science Based Targets) certification for our FY2030 targets. In the future, we will aim to obtain renewal certification in accordance with the new certification standards of SBT.

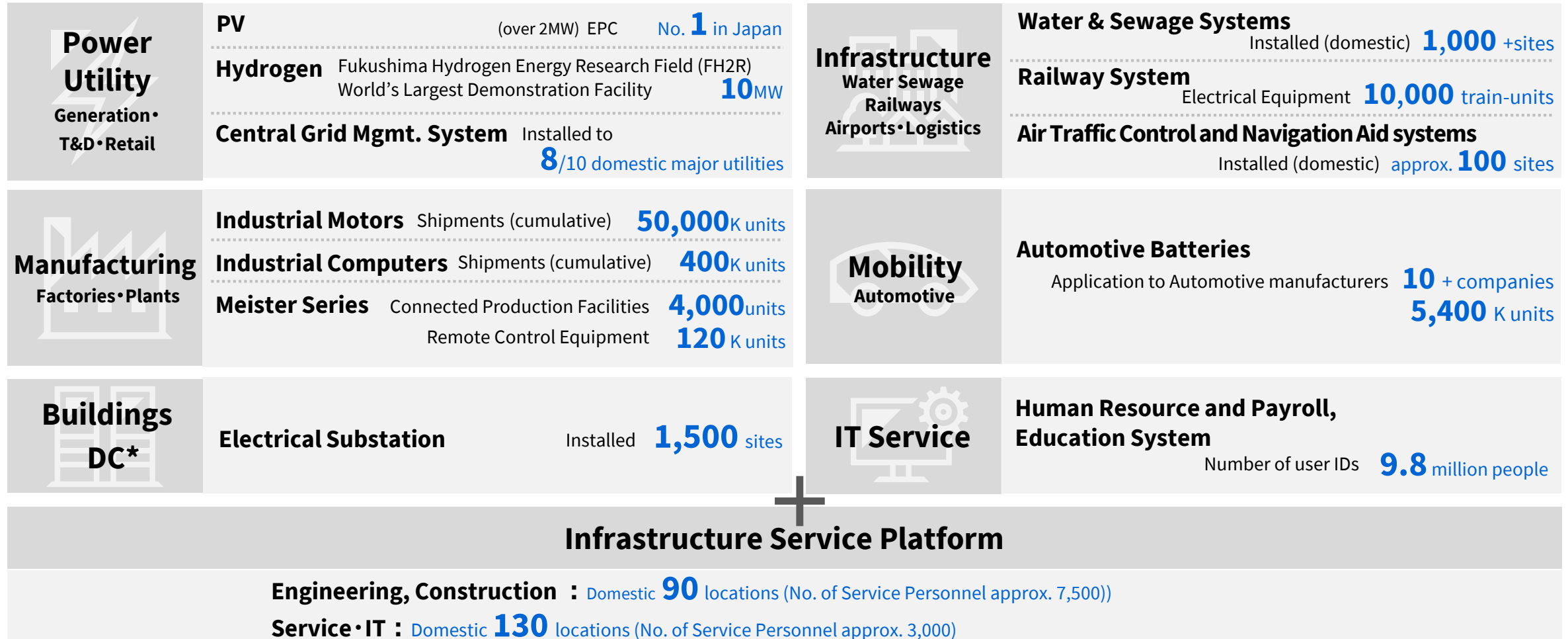
* Base year is 2019

03

Business Plan and Focus Business Areas

Strength of the Infrastructure Service Co.

Enhance infrastructure service with strong domestic & global customer base and track records



Targeted Markets

Substantial growth is expected in targeted market of infrastructure services

**Power
Utility**
Generation•T&D•
Retail

CAPEX
2020
4.0 Trillion yen
CAGR ~4%

**Manu-
facturing**
Factories•Plants

CAPEX
2020
5.6 Trillion yen
CAGR ~6%

**Buildings
DC**

CAPEX + Power Service Procurement
2020
2.9 Trillion yen
CAGR ~10%

**Infra-
Structure**
Water sewerage•
Railways•
Airports•Logistics

CAPEX
2020
2.9 Trillion yen
CAGR ~6%

Mobility
Automotive

Battery Storages + Motors
2020
5.3 Trillion yen
(in Japan 0.7 Trillion yen)
CAGR ~7%

**IT
Service**

CAPEX
2020
1.3 Trillion yen
CAGR ~9%

Infrastructure Service Co. Mid-term Business Plan^{*1}

FY30 Target: Net Sales 2.5 T-yen, ROS 10%, Operating Income 250 bil. yen

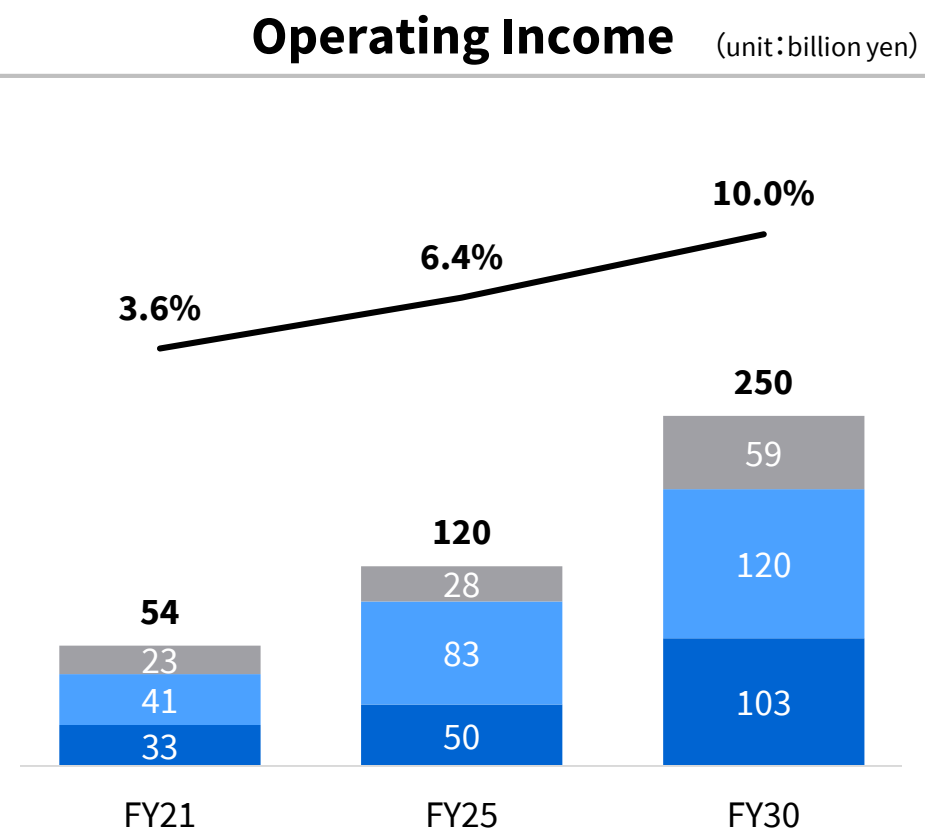
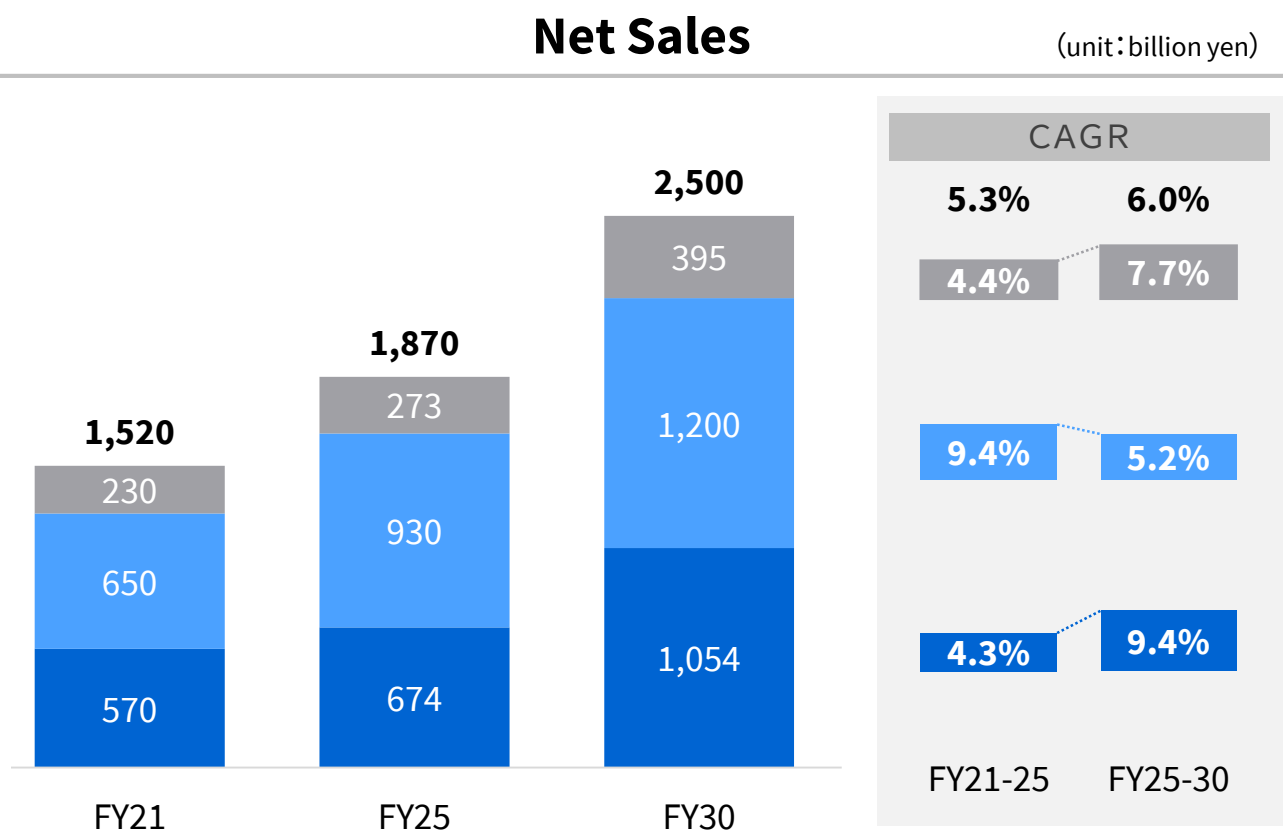
	FY21 Forecast	FY22 Plan	FY23 Plan	FY 25 Plan	FY 30 Target
Net Sales	1.52 T-yen	1.54 T-yen	1.61 T-yen	1.87 T-yen	2.50 T-yen
Operating Income (ROS%)	54 bil. yen (3.6%)	65 bil. yen (4.2%)	90 bil. yen (5.6%)	120 bil. yen (6.4%)	250 bil. yen (10.0%)
EBITDA ^{*2}	104 bil. yen	122 bil. yen	159 bil. yen	198 bil. yen	
ROIC ^{*3}	8 %	8 %	9 %	12 %	
FCF ^{*4}	19 bil. yen	2 bil. yen	10 bil.yen	98 bil. yen	

^{*1} incl. Energy Systems & Solutions, Infrastructure Systems & Solutions, Digital Solutions and Battery and others. Figures are initial Pro forma based on the assumptions of separating corporate functions, and will be revised during detailed review process. ^{*2} EBITDA = Operating income + Depreciation

^{*3} ROIC = (Net income - Non-controlling interest - Interest expense × (1 - tax rate)) / (Net interest - bearing debt + Net assets) ^{*4} Free Cash Flow

Mid-term Business Plan per Segments

Energy and digital businesses will drive the growth up to 2030



Infrastructure
Energy
Digital

Infrastructure
Energy
Infrastructure Service Co. Total ROS
Digital

* Total number of bar chart includes businesses other than Energy/Infrastructure/Digital, common fee, and inter-company eliminations etc.

Investments

	Investments (FY21 to FY25 total)	Growth Initiatives	
CAPEX	400 Billion yen	Carbon neutral response	Perovskite PSC facilities, Wind Power Nasel Assembly, Hydrogen Feasibility Study Project
		SCiB™ rechargeable batteries	Increase production of electrodes, cells, modules, and packline
R&D	390 Billion yen	Carbon neutral response	Balancing group forecasting/optimization technology, wind analysis technology and hydrogen production
		Infrastructure resilience response	Water sewerage monitoring PF ^{*1} , weather data analysis, development of cyber security solutions
		Digital service	QKD, IoT-data platform, Meister series
M&A	124 Billion yen	Carbon neutral response	Minority investment to renewable energy generation development / operation / resale model, expansion of energy matching and hydrogen business
Total	914 Billion yen	(Investments : FY16 to FY20 total 631 Billion yen)	

*1 Platform

Capital Allocation Policy

Enhance corporate value by improving profitability and growth investments

Financial Management Policy

- Enhance profitability and concentrate investments to growth areas
- For growth areas, actively consider partnerships and alliances with external companies, and utilize programmatic M&A

Financial Leverage

- Use leverage for growth investments to reduce capital costs. Expand leverage up to 50% debt-equity ratio and 150% net-debt/EBITDA by FY25, maintaining it as our discipline.

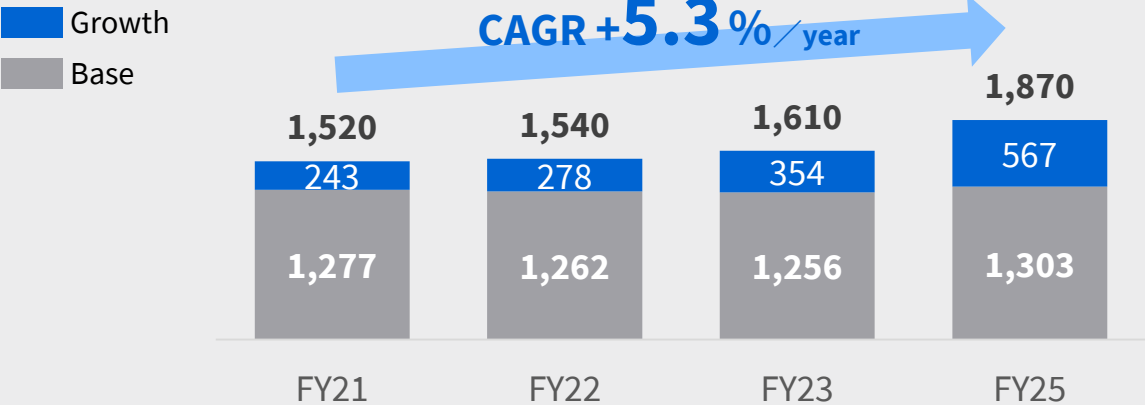
Shareholder Return

- Aim for an average consolidated dividend payout ratio of at least 30%.
- Capital in excess of appropriate level of capital will be used to provide shareholder returns including share repurchase.

Infrastructure Service Co. Basic Figures*1

Net Sales

(unit: billion yen)



Business Areas

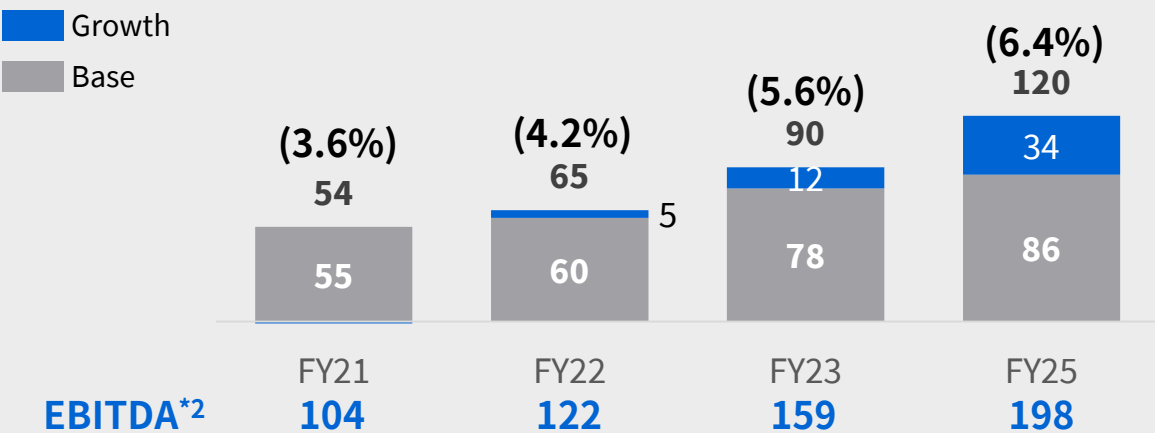
Base Businesses

- Power Systems, Grid, Social Systems, Railway Systems, System integration

Growth Businesses

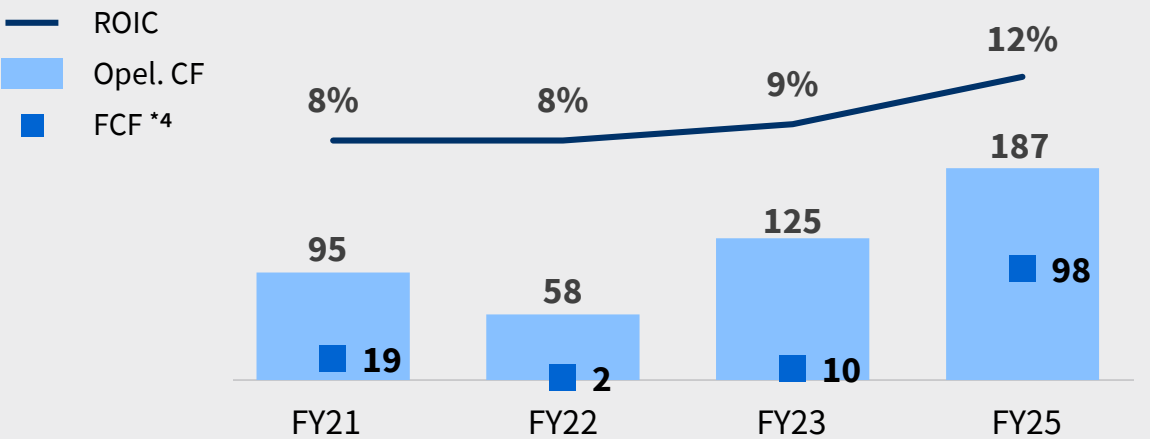
- Renewable energy, Solutions etc.

Operating Income(ROS) (unit: billion yen)



ROIC*3 Cash Flow

(unit: billion yen)

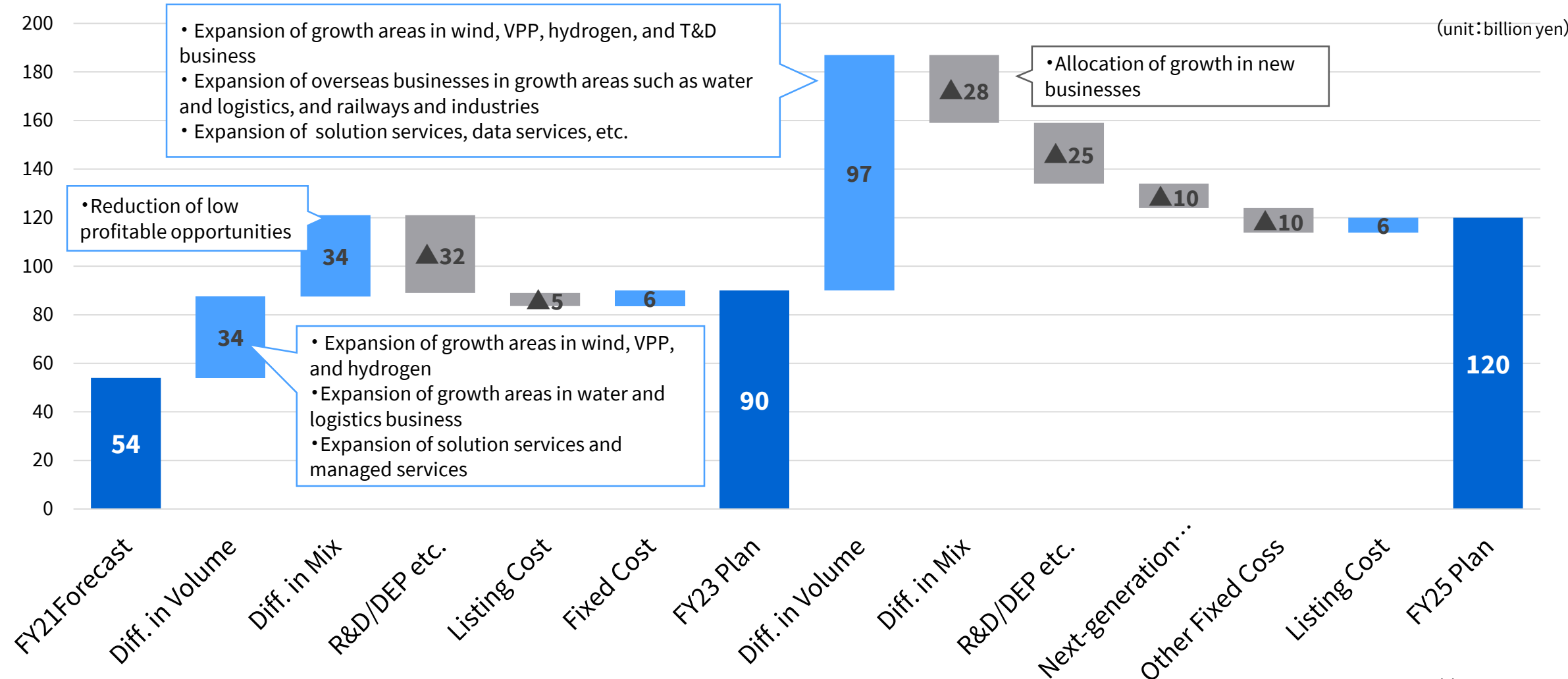


*1 Figures are initial Pro forma based on the assumptions of separating corporate functions, and will be revised during detailed review process *2 EBITDA = Operating income + Depreciation

*3 ROIC = (Net income - Non-controlling interest - Interest expense × (1 - tax rate)) / (Net interest - bearing debt + Net assets) *4 Free Cash Flow

Infrastructure Service Co. Operating Income Analysis

Business expansion in renewable energy related business and solutions businesses drive the increase in profitability



Segment Structure

1

Energy Systems & Solutions
Power Generation Systems
Transmission & Distribution Systems
Others

2

Infrastructure Systems & Solutions
Public Infrastructure
Railways and Industrial Systems

3

Digital Solutions
Digital

4

Others
Battery etc.

Segment Structure

1

Energy Systems & Solutions
Power Generation Systems
Transmission & Distribution Systems
Others

2

Infrastructure Systems & Solutions
Public Infrastructure
Railways and Industrial Systems

3

Digital Solutions
Digital

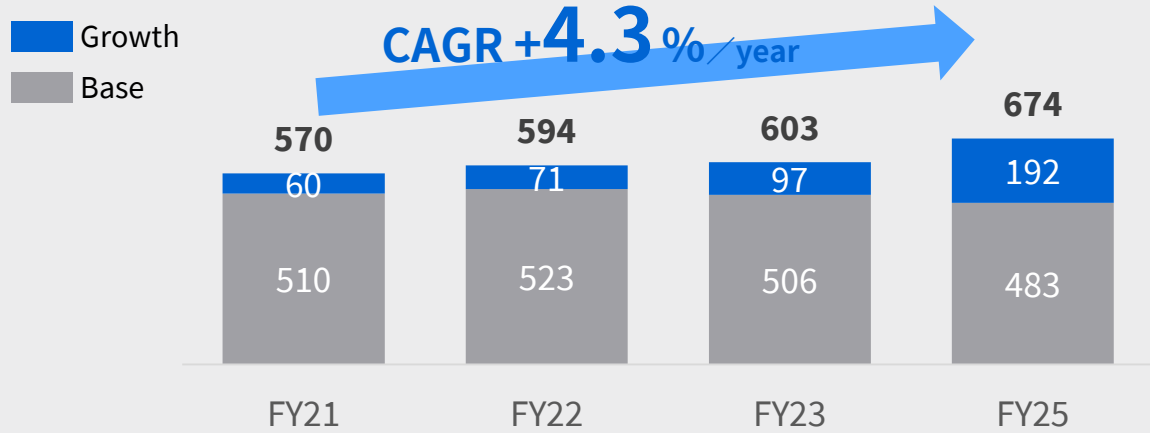
4

Others
Battery etc.

Energy Systems & Solutions

Net Sales

(unit: billion yen)



Business Areas

Base Businesses

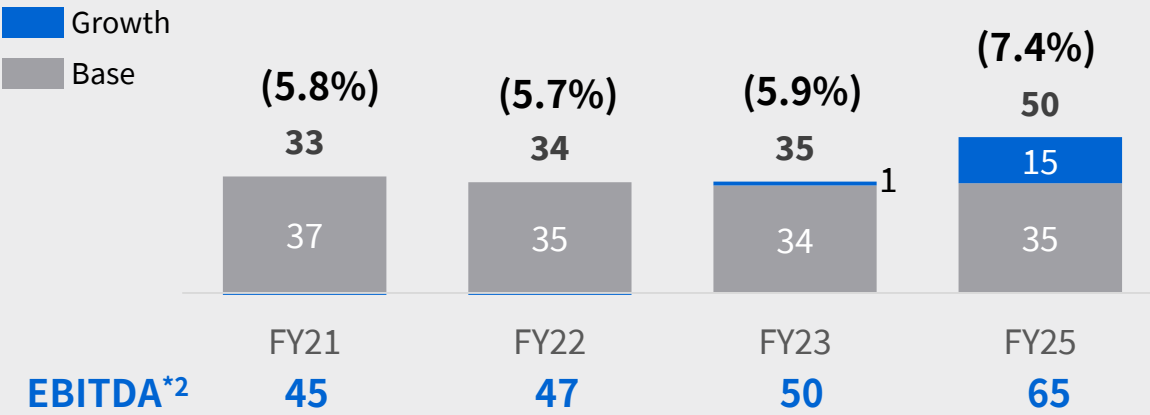
- Power Generation Systems (Nuclear, Thermal, Hydro), Grid

Growth Businesses

- CCU/S^{*1}, Renewable energy (PV, Wind), VPP, Hydrogen Solutions

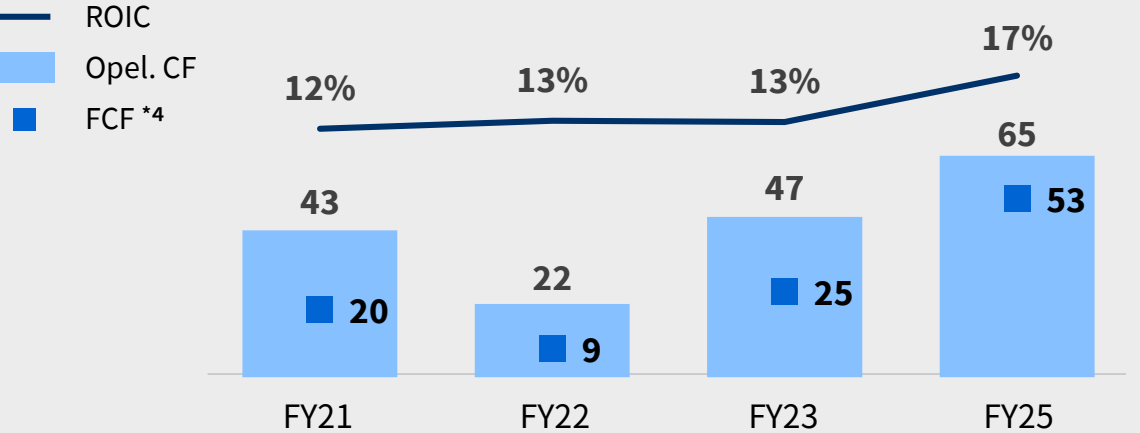
Operating Income(ROS)

(unit: billion yen)



ROIC^{*3} Cash Flow

(unit: billion yen)



*1 CCU/S: Carbon dioxide Capture, Utilization and Storage *2 EBITDA = Operating income + Depreciation

*3 ROIC= Profit (loss) before tax × (1-tax rate)/(Net interest - bearing debt + Net assets) *4 Free Cash Flow

Energy Systems & Solutions : Breakdown by Businesses

(unit: billion yen)

Power Generation Systems	FY21	FY22	FY23	FY25
Net Sales	380	388	375	362
Operating Income	29	31	26	26
EBITDA	36	38	34	34

Transmission & Distribution Systems (T&D)	FY21	FY22	FY23	FY25
Net Sales	195	214	235	312
Operating Income	9	13	16	27
EBITDA	12	17	22	34

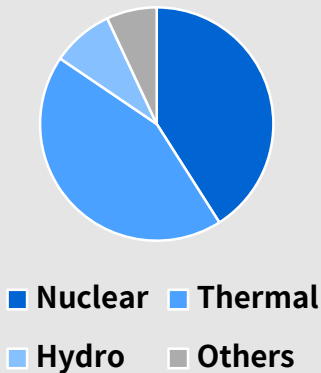
Others	FY21	FY22	FY23	FY25
Net Sales	▲5	▲9	▲7	0
Operating Income	▲5	▲9	▲7	▲3
EBITDA	▲3	▲9	▲6	▲3

Utilizing capability in engineering & project management to expand areas of services

Market Environment

- Steady demand for restarting and decommissioning of domestic nuclear power plants / the reprocessing plant. Domestic nuclear new build is uncertain.
- Decarbonization will accelerate. Demand stays strong for service business on thermal power used for power adjustment, and on hydro

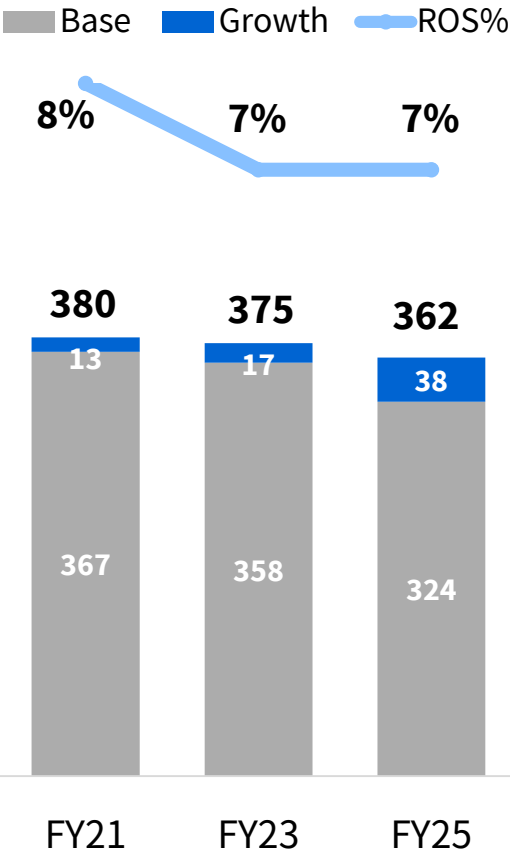
Business Composition



Priority Measures

- Provide service solutions that make use of advanced capabilities in engineering and project management
 - Order backlog : over 1 trillion yen
 - Ratio of service business in thermal power business : around 50% (FY20)
- Transform overseas subsidiaries to overseas service base
- Promote CPS service business through EtaPRO^{*1}
- Response to environmental issues: CCU/S, Hydro (incl. pumped storage)

Net Sales / ROS% (unit: billion yen)



*1: EtaPRO LLC provides plant monitoring software for power generation companies

Lead market creation with world-class technology

Focus Area



CCU/S*1

Separates, captures, utilizes, and stores CO₂ from a wide range of emission sources

Market trends

With increasing demand to achieve carbon neutrality, the market for CCU/S, which can significantly reduce CO₂ emissions, is expected to expand rapidly

Growth Strategy

Establish market advantage through industry knowledge and technology cultivated over many years

- Technology development capability gained through pilot plants and by CCU/S technology (high-efficiency, modularization, absorbent) with market advantage
- Respond to growing markets as group as a whole based on industry knowledge cultivated over many years on the industrial sector and thermal plants

Technology Advantage

Enhance CCU/S with “post-combustion capture technology”, even for existing facilities

Applicable to exhausted gas from any combustion apparatus

- Widely available in the general industrial field due to “**Post-combustion capture**” with chemical absorption

Demonstration of high CO₂ recovery performance

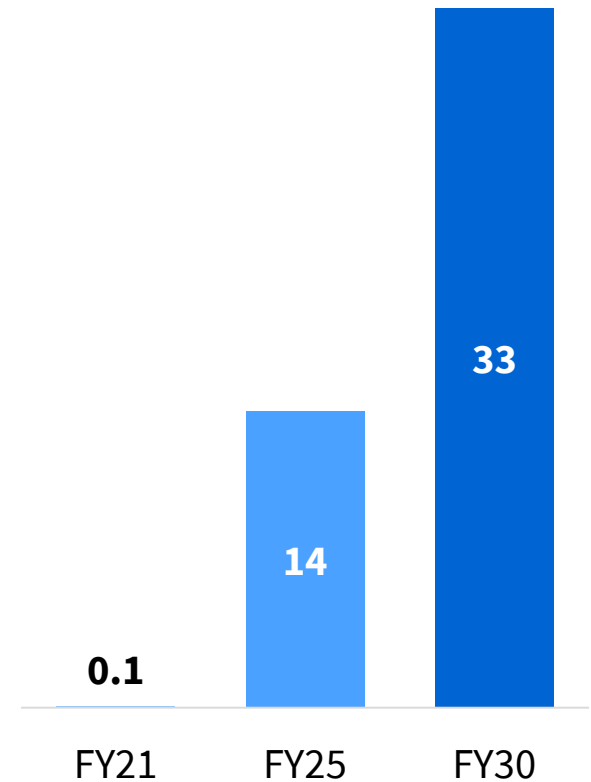
(at Mikawa Power Plant of SIGMA POWER Ariake Corporation)

- **Recover most of CO₂ in exhausted gas from combustion**
- **Japan’s largest CO₂ recovery capacity of more than 600t per day**
- Demonstration of soundness of heat cycle*2 and decrease of amine emissions to the atmosphere to one tenth



Demonstration plant at Mikawa Power Plant of SIGMA POWER Ariake Corporation, completed in October, 2020

Net Sales (unit: billion yen)



*1: CCU/S: Carbon dioxide Capture, Utilization and Storage

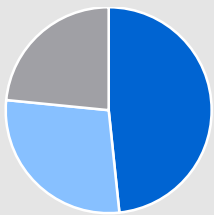
*2: The facility requires heat and utilizes extracted steam from turbine

Provide technologies and products in wide range covering renewable energy development, T&D, and energy management and matching

Market Environment

- Along with the acceleration in global-wide carbon neutrality initiatives, installation of large-scale renewable energy, stabilization and efficient operation of grid, and introduction of new technologies for DX and environmentally viable equipment are expected to progress

Business Composition



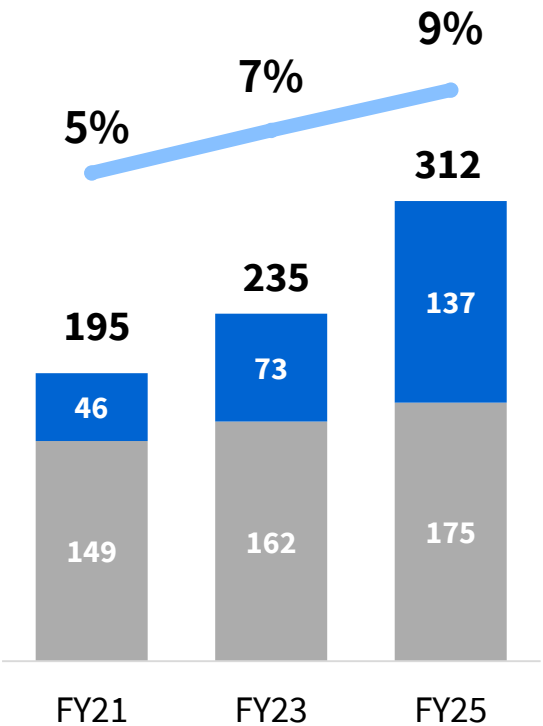
■ Grid domestic
■ Grid overseas
■ Renewable Energy

Priority Measures

- Introduce next-generation PV to the market
- Enter offshore wind business
- Launch energy aggregation business (VPP) in full-scale
- Introduce large-scale DC / AC power facility to strengthen the grid
- Develop equipment using alternative gas to accommodate environmental regulations
- Capture domestic renewal demand to support resilience
- For overseas business, focus in India, the Middle East and Asian markets

Net Sales / ROS% (unit: billion yen)

■ Base ■ Growth — ROS%



Leading the market through accumulated experience and new technology

Focus Area



Next-generation PV
Aim to install PV in new locations as buildings, mobility, etc.

Renewable energy producers
Local municipalities
General industry



Toshiba Group
Design
Procurement
Construction
Operation
Maintenance

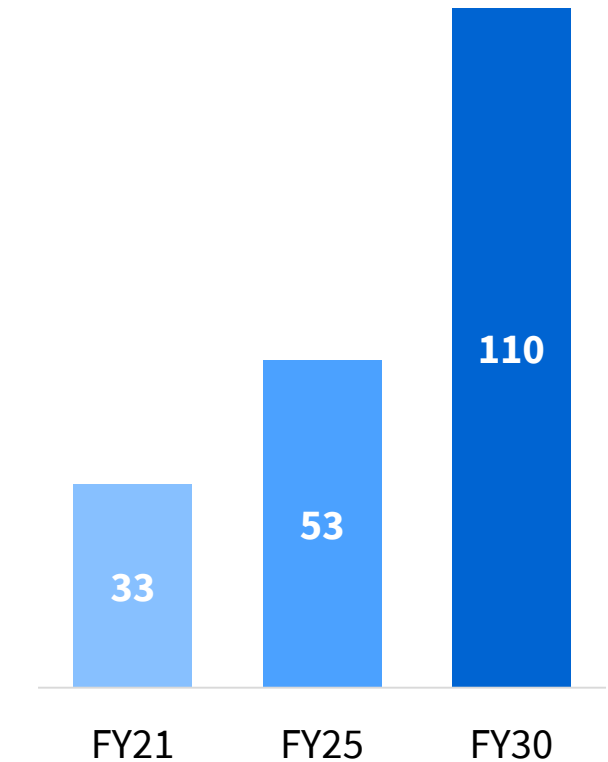
Growth Strategy

Abundant experience and one-stop solution

- Customer stock gained by having Japan's top share in mega-solar installations*¹
- Provide integrated solutions from EPC to O&M



Net Sales (unit: billion yen)



Technology Advantage

The world's highest efficiency by two types of PV cells based on our unique technologies

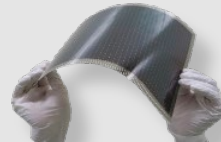
Film-Based Perovskite type*²

Low Cost x Lightweight x Flexible

Improve efficiency and productivity through one-step forming based on meniscus coating technology

Large area film type module efficiency: **15.1%** (current)

Power generation cost target: **20 yen/kWh** (2025)



Cu₂O tandem type*³

High efficiency x Lightweight

Control impurities in Cu₂O layer and form electricity-generating layer with high purity

Tandem cell efficiency (estimated): **27.4%** (current)

Target: **30% or more** (2025 and beyond)

⇒ **Contribution to realizing no-plug charging EVs**



*¹ : EPC operators with capacity of 2MW or more, that started operation before May 2019 (Source: RTS Corporation)

*² : Perovskite Solar Cell: Large-area film solar cell will the world's highest power conversion efficiency (Source: in-company search September 2021)

*³ : Press Release on December 22nd 2021, <https://www.global.toshiba/ww/technology/corporate/rdc/rd/topics/21/2112-02.html>

Collaborating with GE to enter offshore wind market in Japan

Focus Area



Offshore Wind
Response required to significantly growing market to meet goals set by the government

Goals set by the Japanese government

- Introduce 10GW of offshore wind by 2030
- Introduce 30-45GW of offshore wind (including floating offshore wind turbines) by 2040

Growth Strategy

Enter into new market through partnering strategy

- Promote domestic production through partnership with GE, the world-class manufacturer*1
- Build an offshore wind power generation system supply chain in Japan



Windmill components

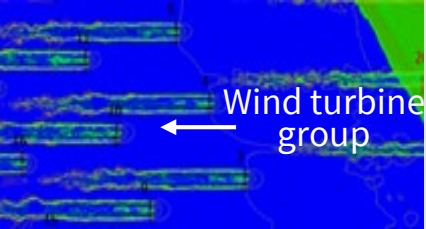
Technology Advantage

Maximizing the value of offshore wind farm by advanced analysis technologies



Wind Direction

Modelling



Wind turbine group

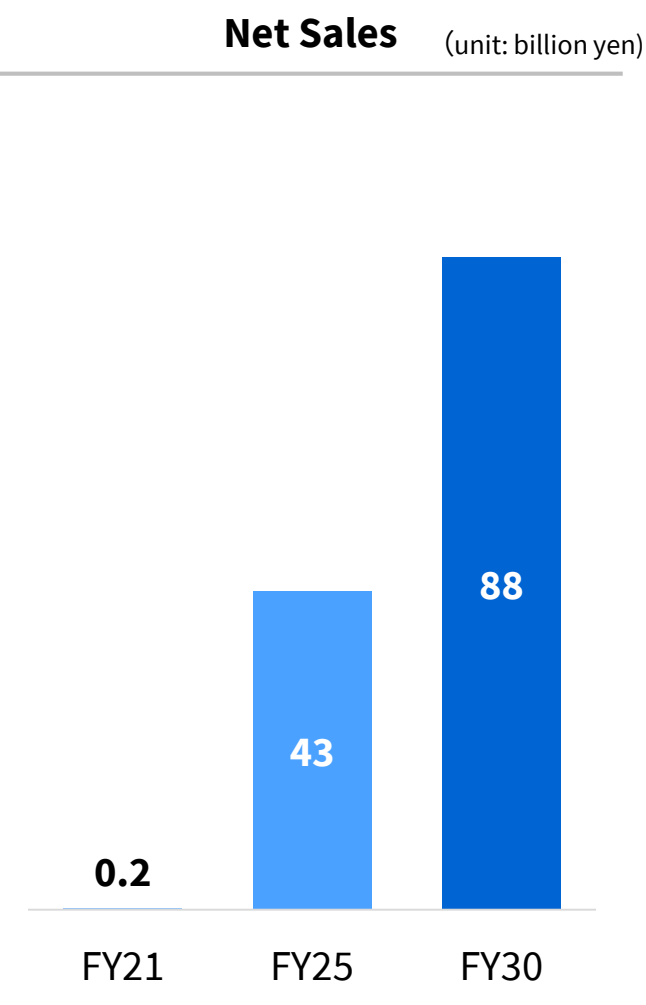
Wind condition analysis of offshore wind farm

Analysis technologies cultivated in onshore wind experiences

Reflection of wind turbine wakes and sea surface temperature effects, mutual impact evaluation of wind turbine group

Promotion of joint research*2

Establishment of method to optimize introduction and operation of wind farms by open innovation



*1 : Press Release on May 11th 2021, https://www.toshiba-energy.com/en/info/info2021_0511_02.htm

*2 : Press Release on April 19th 2021, https://www.toshiba-energy.com/en/info/info2021_0419.htm

Develop the market with Next Kraftwerke, the world's largest VPP operator, and its technologies

Focus Area



VPP

Providing services to support risk avoidance and trading operations

Aggregators
Renewable
energy generators
Consumers



Toshiba Group

Growth Strategy

Develop the market together with the world's leader in the industry

- Proceed development by establishing JV with Next Kraftwerke of Germany, the world's largest VPP operator
- Develop overseas business utilizing the commercial distribution network, technologies and knowhows of both companies

Technology Advantage

Providing optimized operation by integrating unique weather prediction, high accurate demand and power generation forecasting

- Power generation forecast
- Electricity market trading strategy

Renewable energy power generation Balancing Group*1

Renewable power supply

Carbon neutral power supply

Energy storage

In-house power supply

Other company power supply

Dashboard



Energy matching

Platform
TOSHIBA SPINEX
for Energy

- Demand forecast & demand response
- Optimal power generation planning (at demand side)

Demand Balancing Group

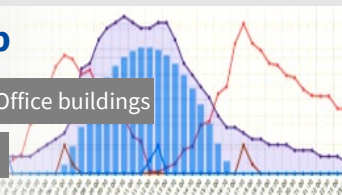
Process factory

Logistics companies

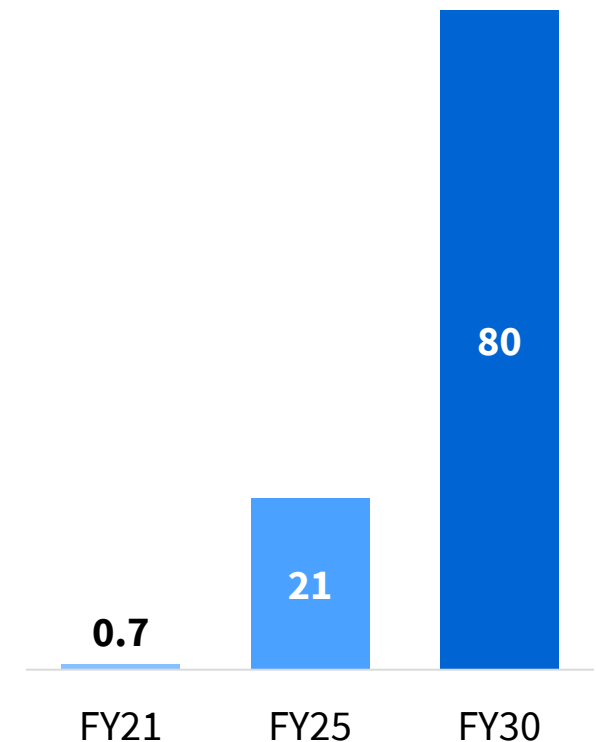
Office buildings

External system data

Regions



Net Sales (unit: billion yen)



*1 : Balancing Group: A group of businesses that settles the imbalance between plans and results

Lead the renewable energy surplus P2G*1 market in Japan

Focus Area



Hydrogen System
Realize competitive
hydrogen manufacturing
price in P2G market

Market trends

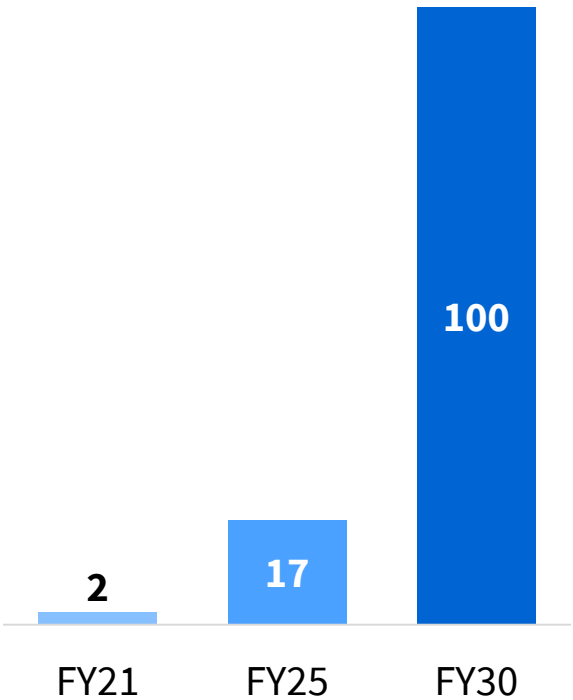
- Power surplus due to the increase in renewable energy power supply
- Europe has preceded in social implementation of P2G utilizing renewable energy surplus
- Full-scale introduction expected in 2030 in Japan

Growth Strategy

**Build a competitive advantage based on
solid track record and technical capabilities**

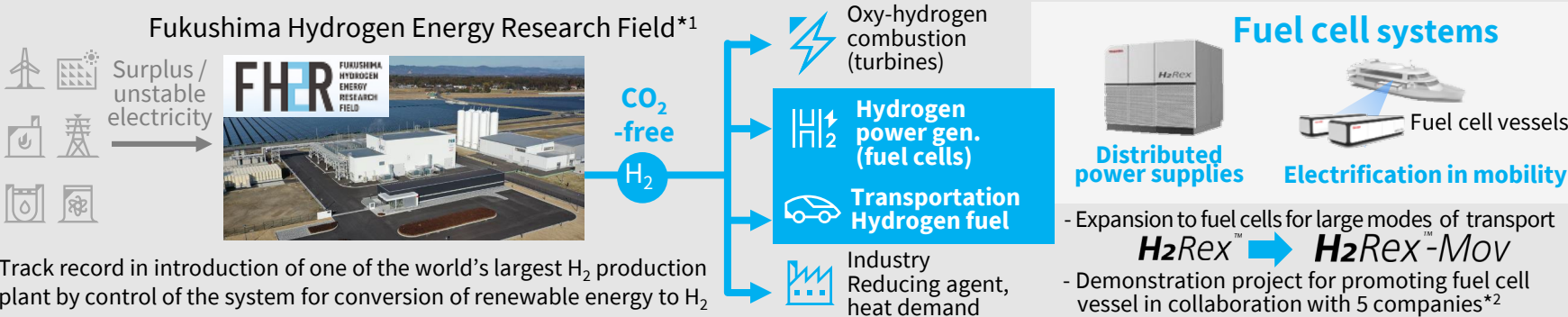
- Lead the P2G market by taking advantage of the overwhelming superiority in Japan, building onto FH2R demonstration results
- In water electrolyzers essential for CO₂ free hydrogen production, secure competitive advantage with SOEC core technology, and enter global market including Europe

Net Sales (unit: billion yen)



Technology Advantage

Providing a new way of energy storage and utilization by green hydrogen production



*1: This project is being implemented as part of the NEDO "Hydrogen Society Building Technology Development Project / Hydrogen Energy System Technology Development."

*2: Press Release on September 1st 2020, https://www.toshiba-energy.com/en/info/info2020_0901.htm, NEDO subsidized project: "Demonstration project for practical use of ships equipped with high-power fuel cells"

Segment Structure

1

Energy Systems & Solutions
Power Generation Systems
Transmission & Distribution Systems
Others

2

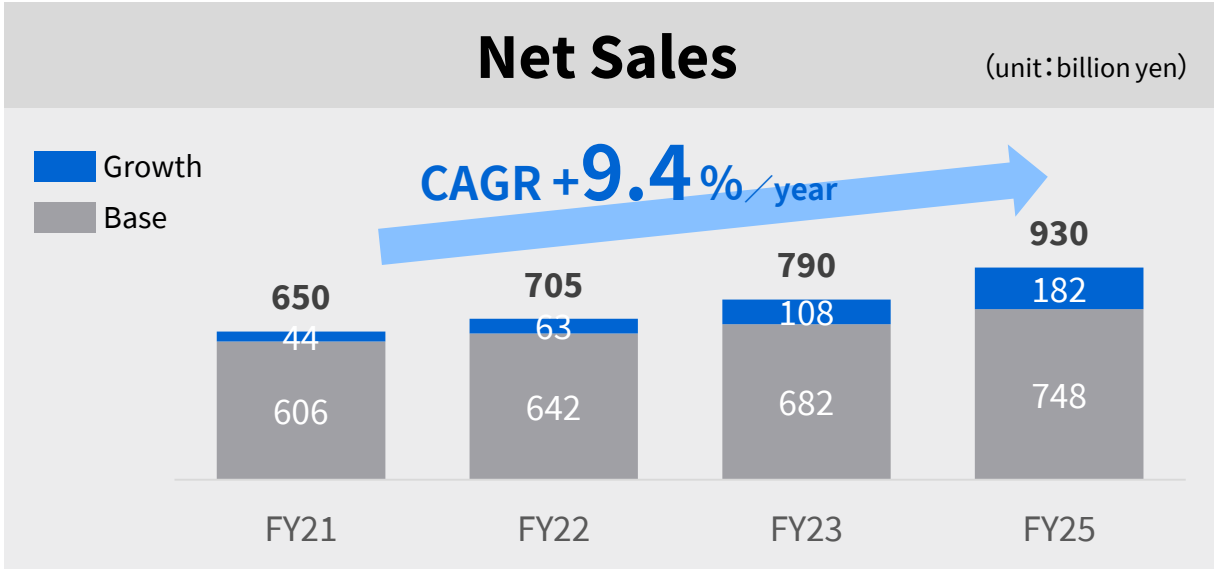
Infrastructure Systems & Solutions
Public Infrastructure
Railways and Industrial Systems

3

Digital Solutions
Digital

4

Others
Battery etc.



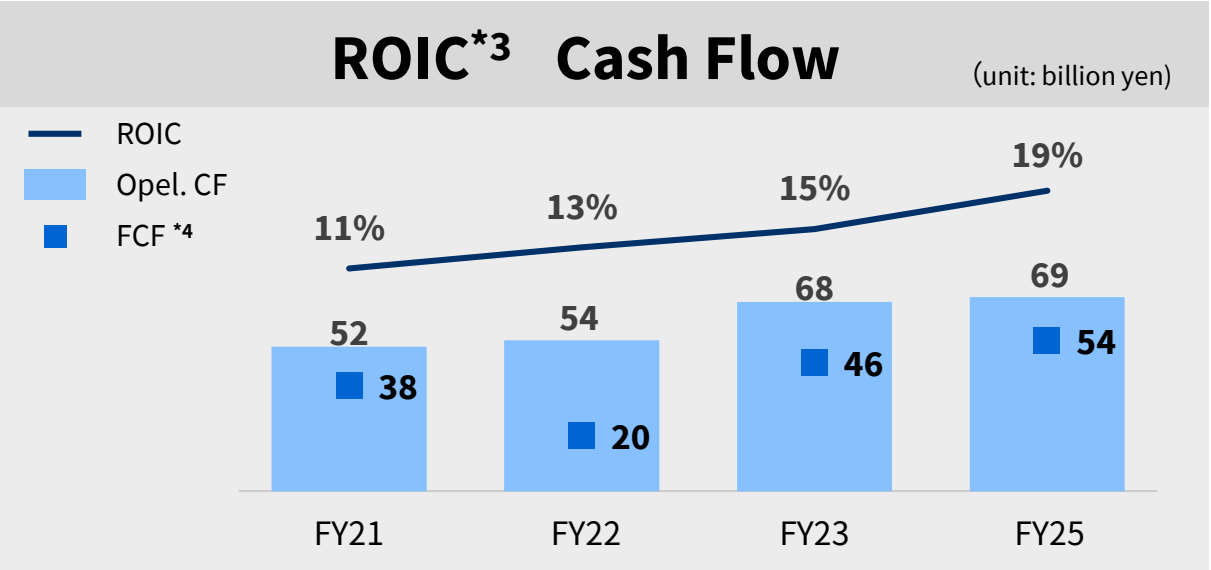
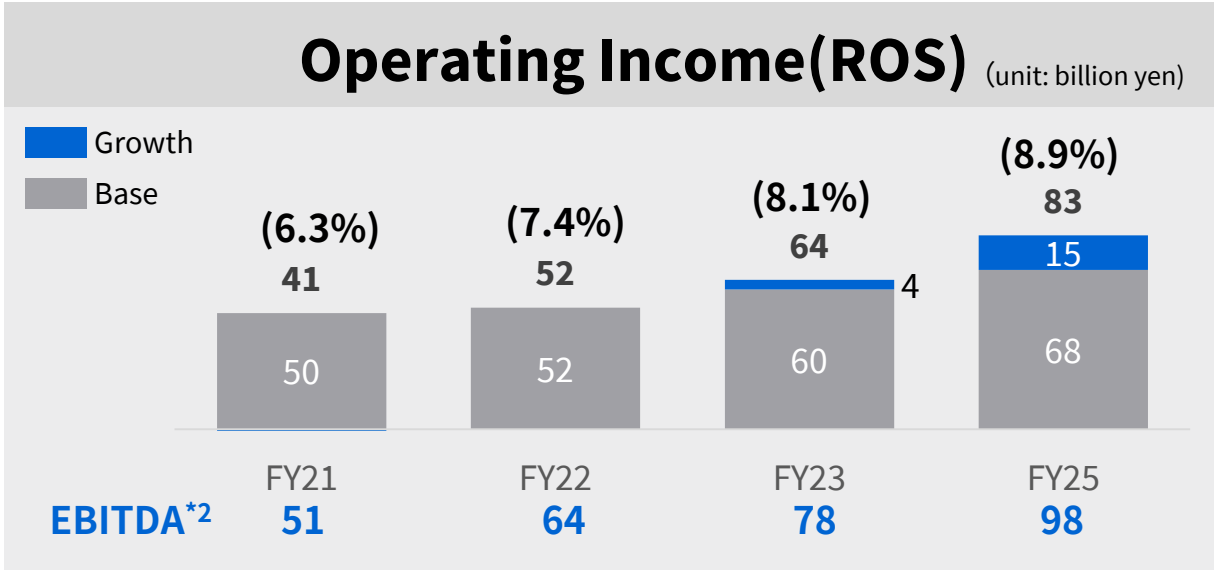
Business Areas

Base Businesses

- Social Systems, Defense and Electronics Systems, Railway Systems, Industrial Motor Systems

Growth Businesses

- PPP*1 in Water business, Logistics Solutions, Railway and Transportation Solutions, Factory Automation Solutions



*1 Public-Private Partnership *2 EBITDA = Operating income + Depreciation
*3 ROIC= Profit (loss) before tax × (1-tax rate)/(Net interest - bearing debt + Net assets) *4 Free Cash Flow

Infrastructure Systems and Solutions : Breakdown by Businesses

unit: billion yen

Public Infrastructure	FY21	FY22	FY23	FY25
Net Sales	400	440	480	510
Operating Income	41	38	44	52
EBITDA	45	43	50	58

Railways and Industrial Systems	FY21	FY22	FY23	FY25
Net Sales	310	350	400	500
Operating Income	0	14	20	31
EBITDA	6	21	28	41

Other	FY21	FY22	FY23	FY25
Net Sales	▲60	▲85	▲90	▲80

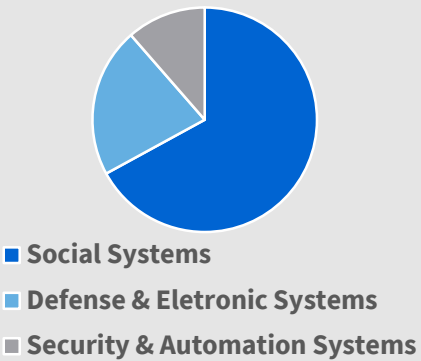
Infrastructure : Public Infrastructure

Strengthen service and new business development through organic growth and programmatic M&A

Market Environment

- Increase in need for collaboration between public and private sector responding to aging infrastructure and lack of financial resources
- Increase in demand for national resilience due to the increase in natural disasters, energy conservation, and renewable energy
- Increase in need for labor saving and automation to respond to decreasing workforce, and increasing logistics requirement from the expansion of E-Commerce

Business Composition



Priority Measures

【Social Systems】

- Enhance service business in the base business
- Expand PPP business through stronger partnership and utilizing M&A

【Defense & Electronic Systems】

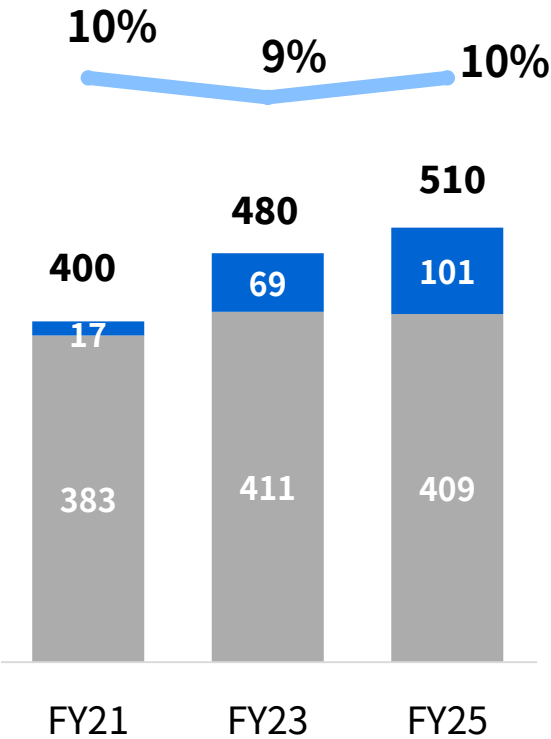
- Expand the business base by differentiating core technologies in defense radars and sensors
- Develop new businesses in MP-PAWR(*1) and counter drones

【Security & Automation Systems】

- Develop new security solution business within the Base business area
- Expand logistics solution business

Net Sales / ROS% (unit: billion yen)

Base Growth ROS%



*1 MP-PAWR: Multi Parameter Phased Array Weather Radar

Making facility operations more stable and efficient through public-private partnership and helping to provide services that are safe, secure, and sustainable

Focus Area



PPP*1 Business

Local Municipality

- Planning
- Toll planning
- Fund raising

Toshiba Group

- Facility design & construction
- Repairs & renovations
- O&M
- Operation management

Growth Strategy

Acquiring Track Record and Operation know-how + Solution Development

- Business participation via SPC*2 investment & with major partnerships
- Develop IoT solutions for water & sewerage automated operation and maintenance efficiency

Optimize & Digitize Facility Management

Optimization	Automated Plant Operation
Visualization	Safe Automation
MonitorAnalyze	Early detection of abnormalities

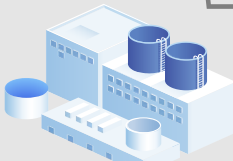
Operate multiple plants together for “wide-coverage and joint ownership”

Technology Advantage

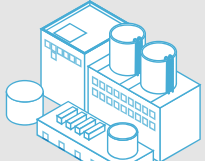
Visualization of response models utilizing IoT realizes high efficiency and expertise transfer in plant operations

Automation optimization solutions

Real Plant



Virtual Plant

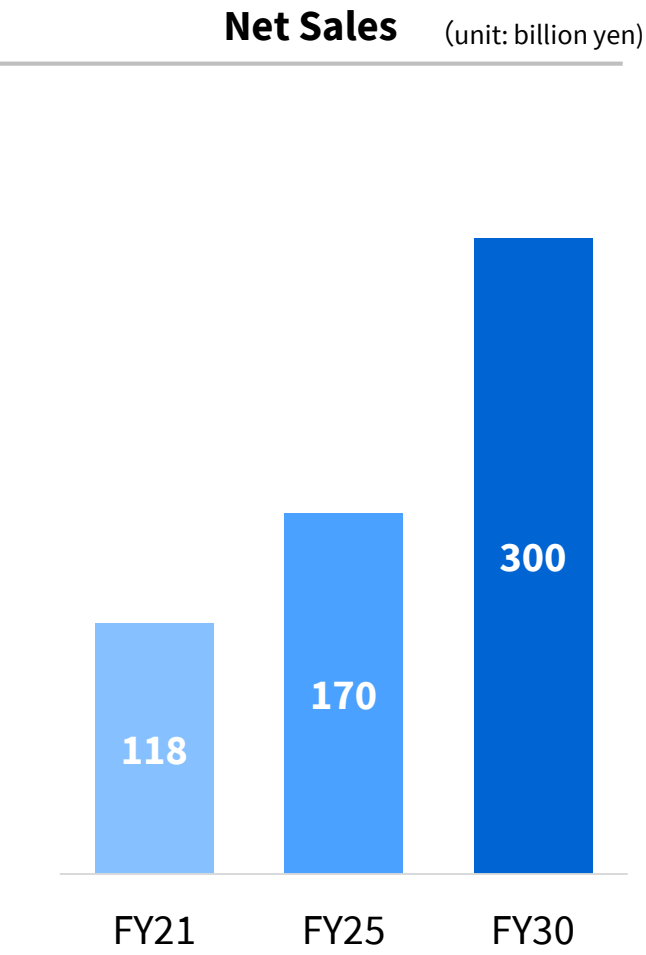


- Purified water quality estimation
- Control optimization

Information (decision-making support) / Automatic operation

Measurement + Past data

physical & chemical model + AI



Contribute to e-commerce business expansion and products diversification by optimizing the operation of people and robots in warehouses

Focus Area



Logistic Solutions Business

- Flexible and scalable accommodation to the situation dynamically changing purchase volumes and product diversity
- Optimize collaborative operation which utilizing capability of both human and robots through warehouse operation management system

Growth Strategy

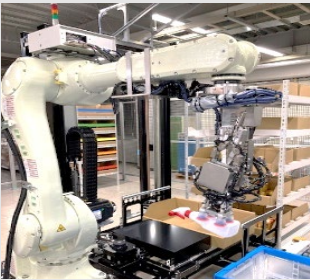
Flexible, Scalable Logistics Warehouse Automation + Solutions deployment in Japan and overseas

- Strengthen value chains and acquire sales channels & customer base in overseas through external alliances



Technology Advantage

Picking robots that can flexibly handle a wide variety of packages



World Top-tier^{*1} completion rate **75%^{*2}** (without pre-registration)

- Modelless Recognition: BiSeg™
- Teaching free AI for operation planning
- Hybrid robot hand (suction + pinching) (commercialized in 2023)

WES^{*3} to optimize operation with workers and robots (Warehouse operation management system)

Order process optimization
Shelf transfer robot operation planning

Warehouse Process modelling

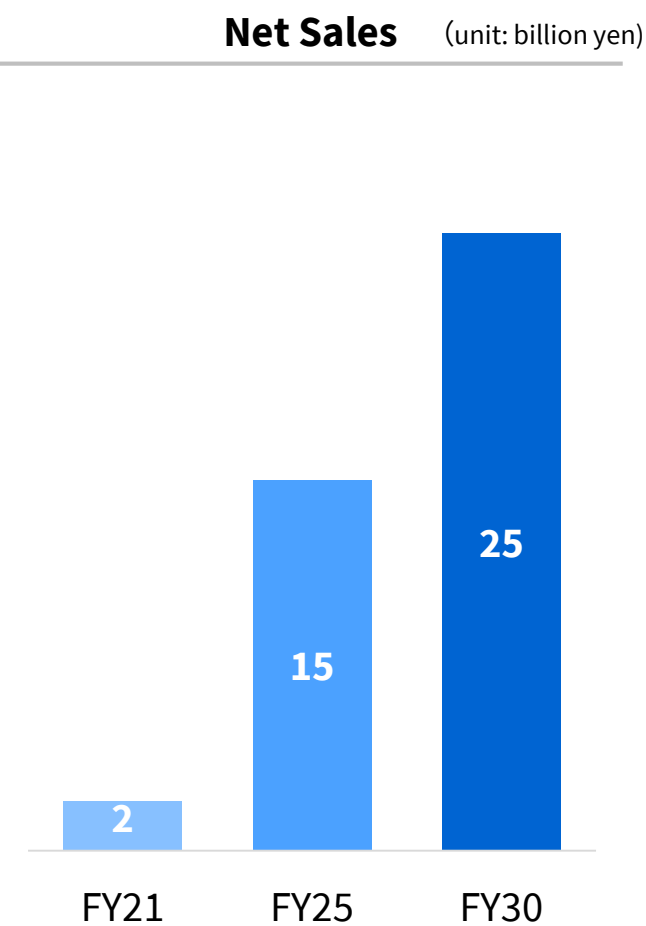
Mathematical optimization

+

AI

Condition forecasting

Real-time simulation



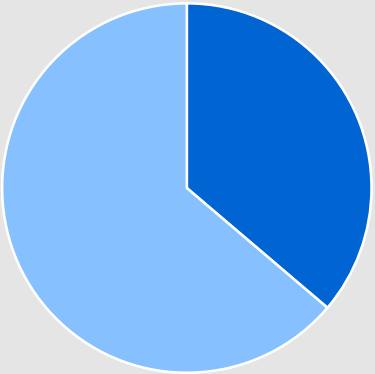
*1 : Toshiba survey as of December 2021 *2 : Study results of typical 31 packages for assuming 5,000 packages in the target warehouse *3 : Warehouse Execution System

Focus on technology differentiation and return to a growth track

Market Environment

- **Impact from COVID continued:** decrease in use of railways from spread of remote work, and decrease in factory utilization rate from lack of semiconductors
- **Decarbonization:** energy saving initiatives in railways, increase in automated vehicles (EV / HEV)

Business Composition



Priority Measures

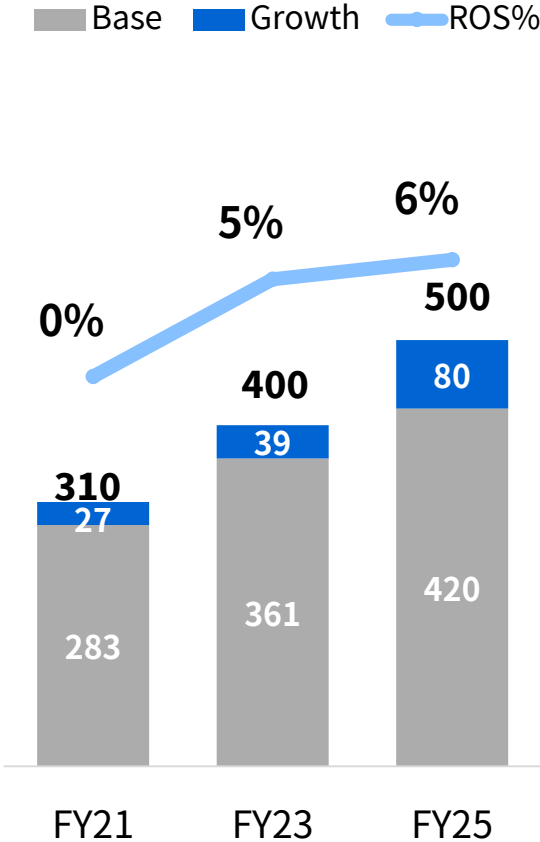
【Railways Systems】

- Expand base business of electrical products for vehicles in domestic and overseas market
- Contribute to increase efficiency and save energy of railway operators through Traction Energy Storage System (TESS) and IoT maintenance services
- Establish hybrid locomotive business

【Industrial Systems】

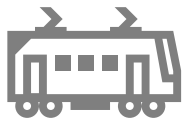
- Expand high-efficiency automotive motors business for HEVs, PHEVs and Premium EVs
- Increase sales of Permanent Magnets (PM) motors and PM-driven inverters for industrial use
- Increase sales of cloud controllers for factories (Factory Automation Solutions)
- Develop and commercialize power distribution equipment for renewable energy market

Net Sales / ROS% (unit: billion yen)



Co-create with railway operators to achieve carbon neutral through energy management using storage battery

Focus Area



Railway Energy Management Business

Railway Companies
Safety
Environmental
Comfortability
Toughness
Lifecycle cost optimization



Toshiba Group
Energy saving
Maintenance vehicles
Digitizing transportation plan
Support operation management

Growth Strategy

Co-create with railway operators to achieve carbon neutral

- Toshiba’s original Traction Energy Storage System (TESS) efficiently stores surplus power and supplies it to accelerated trains
- Co-create solutions for reducing environmental impact of railway operators through stabilizing overhead wire voltage, peak cutting power, saving energy, supplying emergency driving power. etc.

Technology Advantage

Provide energy-saving, resilient electricity system with On-board/ground equipment & SCiB™

On-board equipment
Realize energy saving and power failure operation mode by introducing storage battery in rolling stocks



Battery for power failure operation mode with regenerative energy function

Permanent Magnet Synchronous Motor (PMSM)

Ground equipment
Realize power failure operation mode in blackout with cooperation of several TESS*1

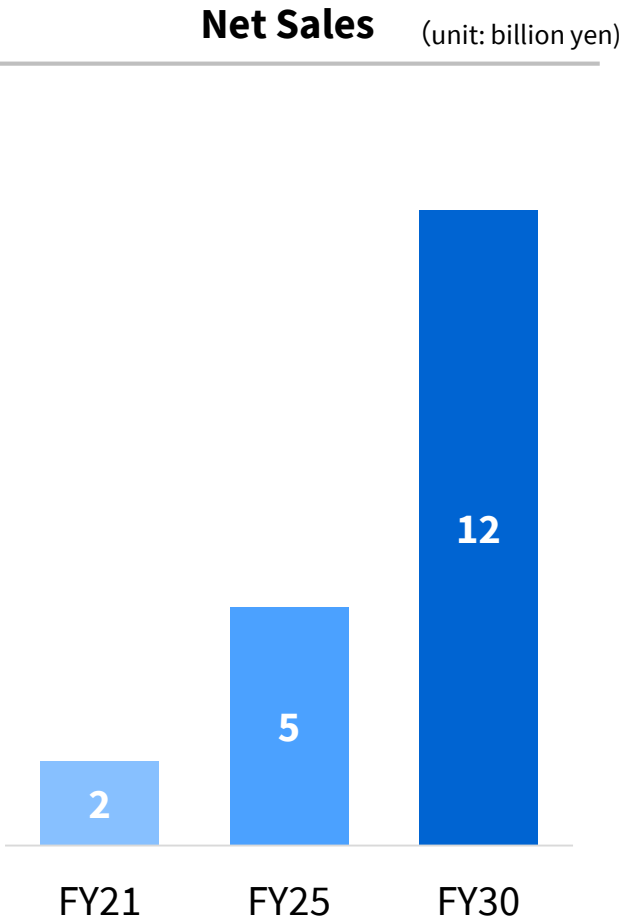


Charging
deceleration (regenerate energy)

Discharging
Acceleration

Energy Saving
Carbon Neutral

Resilient Infrastructure



*1: Traction Energy Storage System

Contribute to labor-saving and power-saving needs through shifting from hardware sales to a service business



Instrumentation Cloud Service Business

Focus Area

Capture new market that needs automation due to labor shortages, and need for remote O&M in restricted areas

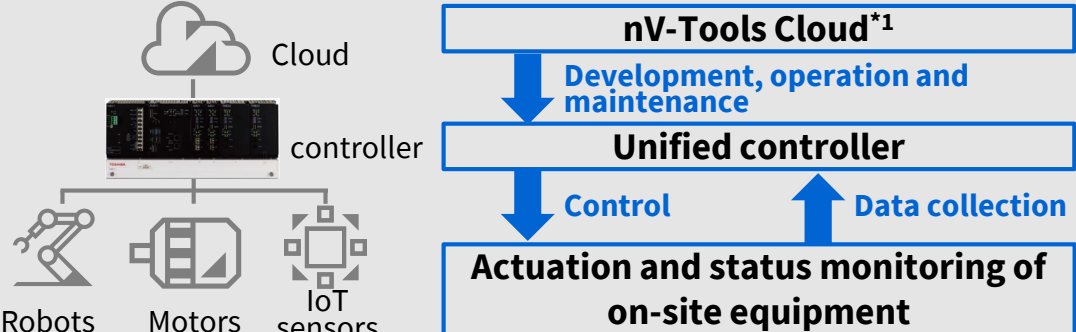
Growth Strategy

Enter a new business area with cloud software controller to provide platform for instrumentation

- Provide subscription-based services to the untapped market in need for automation, which will reduce initial installation costs
- Flexibly respond to customer needs by providing value added services such as simulators, a function to manage system-per-client, and failure prediction applications

Technology Advantage

Contribute to on-site equipment control and advanced data utilization



Cloud

controller

Robots

Motors

IoT sensors

nV-Tools Cloud^{*1}

Development, operation and maintenance

Unified controller

Control

Data collection

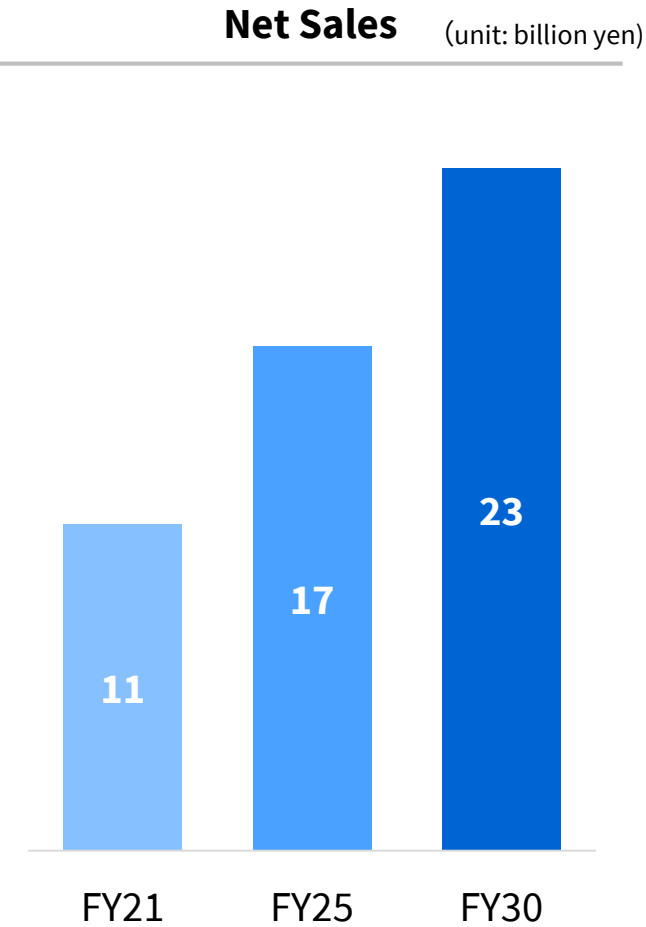
Actuation and status monitoring of on-site equipment



Realize remote performance of development, operation and maintenance work, to allow telework response and asset reduction



Timely data analysis and analysis result reflection for equipment control



^{*1} : Press release on October 20th 2021, <https://www.toshiba.co.jp/infrastructure/news/20211020.htm> (in Japanese)

Segment Structure

1

Energy Systems & Solutions
Power Generation Systems
Transmission & Distribution Systems
Others

2

Infrastructure Systems & Solutions
Public Infrastructure
Railways and Industrial Systems

3

Digital Solutions
Digital

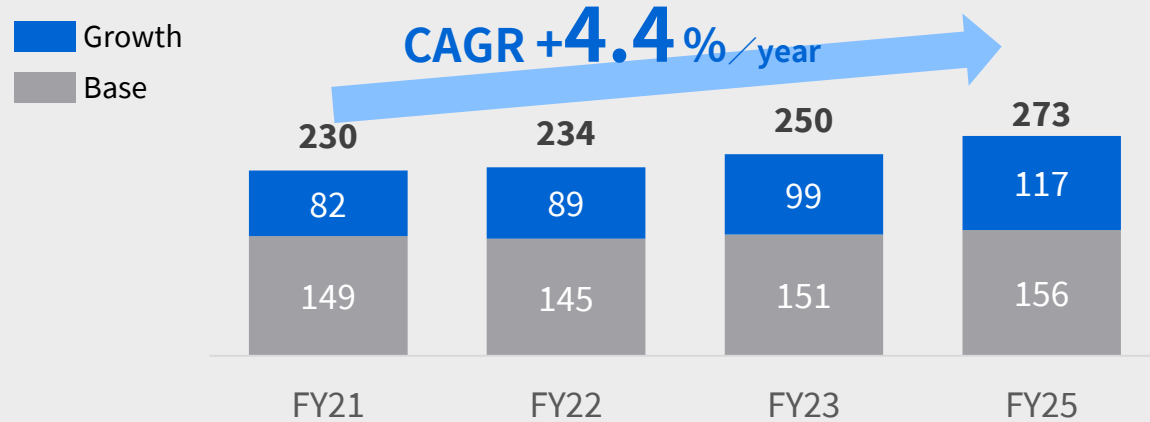
4

Others
Battery etc.

Digital Solutions

Net Sales

(unit: billion yen)



Business Areas

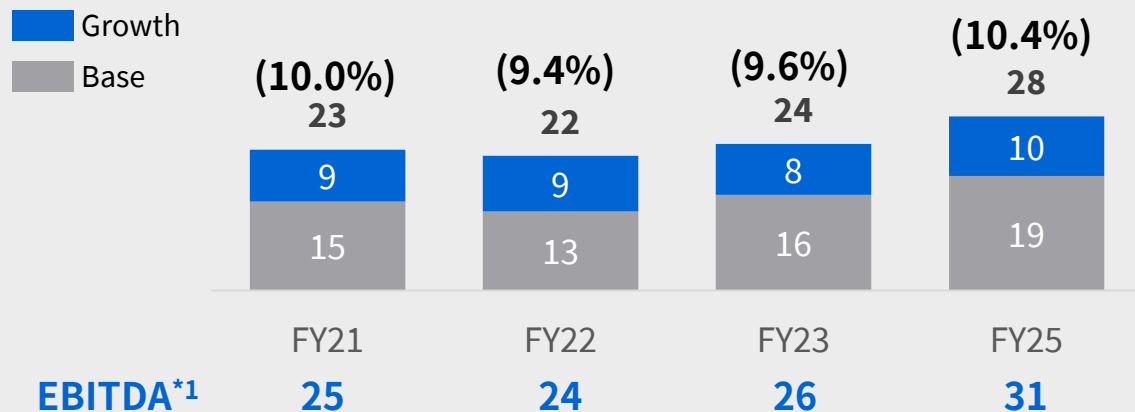
Base Businesses

- System Integration business, Embedded business

Growth Businesses

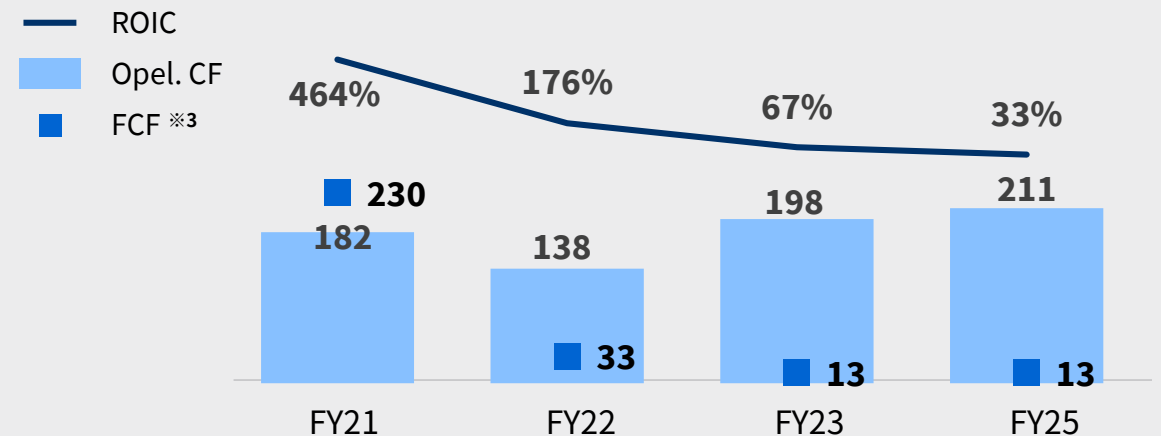
- Managed Services business, Quantum Key Distribution (QKD), Solution Businesses (Smart factories etc.)

Operating Income(ROS) (unit: billion yen)



ROIC*2 Cash Flow (unit: billion yen)

(unit: billion yen)



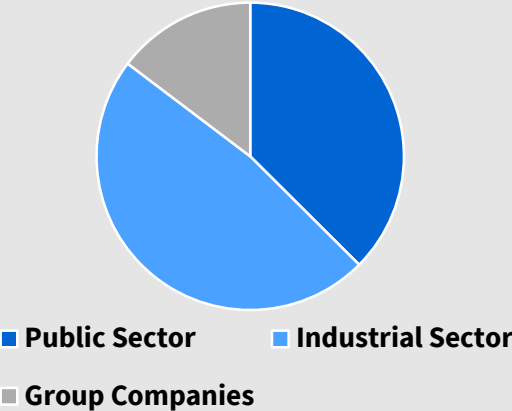
*1 EBITDA = Operating income + Depreciation *2 ROIC= Profit (loss) before tax × (1-tax rate)/(Net interest - bearing debt + Net assets) *3 Free Cash Flow

Expand solution services and managed services by leveraging industry knowledge

Market Environment

- In the domestic IT services market, investments increased due to demand for renewal of existing systems and DX (digital transformation) initiatives by companies.

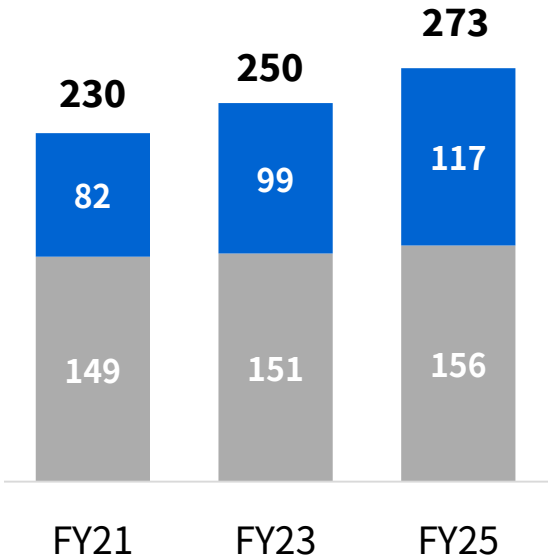
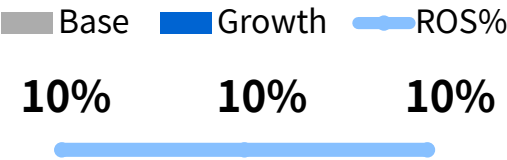
Business Composition



Priority Measures

- Develop solution services by leveraging industry knowledge in the infrastructure service area. In addition, strengthen and expand managed services through capturing operation needs
- In cooperation with partners, develop data services to utilize the accumulated data through infrastructure services
- Capture needs for embedded development mainly in the automotive industry
- Launch smart manufacturing solution business
- Launch Quantum Key Distribution (QKD) business

Net Sales / ROS% (unit: billion yen)



Based on manufacturing knowledge of Toshiba, digitize entire factory from control to cloud.

Focus Area



Smart Factory Business

In-house Practice

Shift to smart factories
Various Manufacturing forms
Manufacturing Engineering center
Carbon neutrality

- New market development in cloud based production control
- Energy optimization and contribution to carbon neutrality through production activities



Toshiba Group

Digital Twin
Software Controller
Asset Administration
Shell
AI

Growth Strategy

Build ecosystems for industries & factory use

- Make catalogues of IoT tools practiced within Toshiba Group, and deploy through partners
- Create combinations of industrial use components and digital solutions
- Deploy AI services and data services on the ecosystem built with equipment manufacturer
- Deploy 40 some solutions, 85 partners

Technology Advantage

Factory IoT Platform for combining multiple factories



Own factory Partner company Group company

Quick application of open-information model “Asset Administration Shell”^{*1}

Remote Observation

Visualization

Calculation

AI-based

Asset IoT cloud services

Asset IoT Cloud Service for Equipment Manufacturers

Asset IoT Cloud Service for Factories

Asset Administration Shell

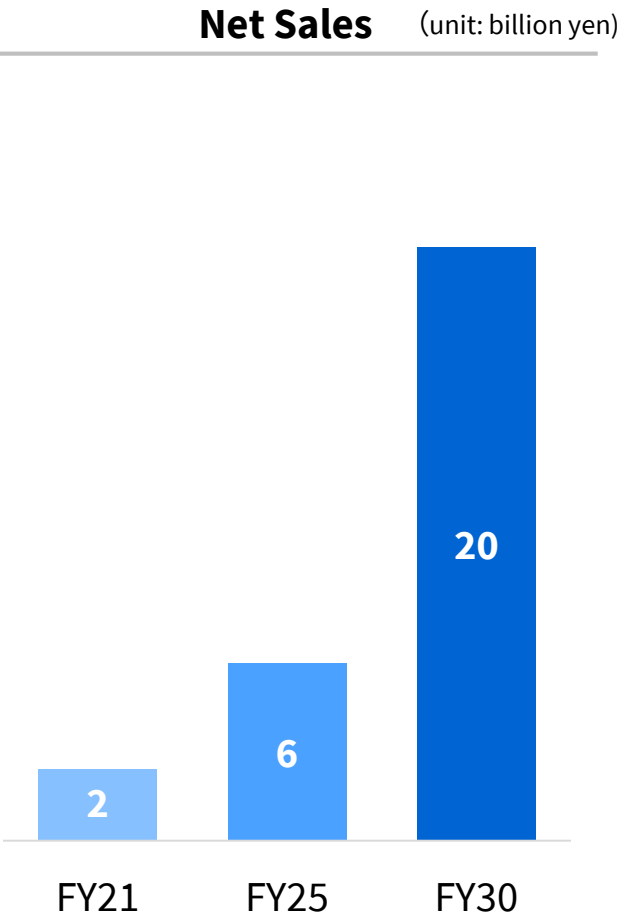
Toshiba Assets

Workers

Other companies' Assets

Manufacturing data platform

Integrated management of production plan, actual data and quality data, which are combined online, for own factory and partners.



*1 : Standard of asset data management with interoperability, advocated by Industrie 4.0

Contribute to safe and secure infrastructure by promoting the development of a service platform for quantum cryptographic communication

Focus Area



Providing platforms that deliver secure end-to-end cryptographic communication

Growth Strategy

Build a service platform for quantum cryptographic communication that theoretically impossible to eavesdrop

- Construct a QKD service platform for easier use of quantum cryptographic communications and global deployment
- Realize recurring model in QKD service provision to build globally open ecosystem
- Participate Q-STAR^{*1}, Quantum ICT Forum, Chicago Quantum Exchange and promote global collaboration in the United States, Singapore, and the United Kingdom

Technology Advantage

Achieve world's best performance and leadership in R&D, demonstration and standardization

Commercialized in 2021

World's fastest speed in key distribution

300kb/s

* in long distance case @10dB loss

World's longest distance in key distribution

120km

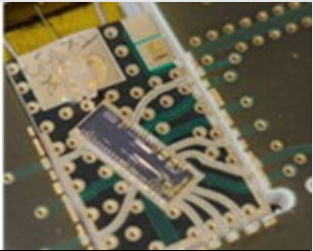
* in long distance case

Achieved longer distance

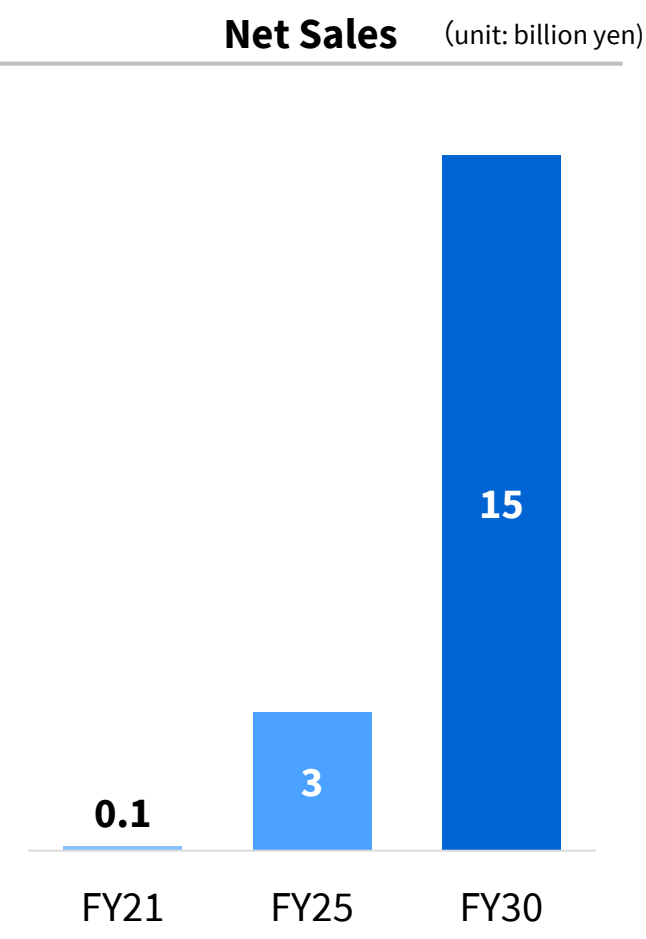
Twin field QKD^{*2} that demonstrated world's longest communication distance, over 600km

Achieved miniaturization

World's first chip-based quantum key distribution system^{*3}



Quantum Transmission chip



Segment Structure

1

Energy Systems & Solutions
Power Generation Systems
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Others

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Digital Solutions
Digital

4

Others
Battery etc.

Concentrate on energy and infrastructure area requiring a heavy duty use that can be realized with SCiB™ substantial characteristics

Focus Area



SCiB™

Realize High Power (Rapid charging) x High Reliability (Long life•safety)

Market Trends

Increase in demand for rechargeable batteries to respond to automation and renewable energy penetration in the field of Energy, Social Infrastructure, Railway, Automobiles

Growth Strategy

Develop the infrastructure business and create new value chains with alliances

- Gain a high market share in the heavy-duty market for energy and infrastructure with the strengths of rapid charging, high input / output, long life, and safety.
- Accelerate development of next-generation cells with new materials and processes (higher power and higher energy)
- Develop packing solution to system and services
- Expanded production lines, mainly at the Yokohama Battery Operations

Technology Advantage

New Generation cell technology and highly accurate diagnosis for further development of SCiB™

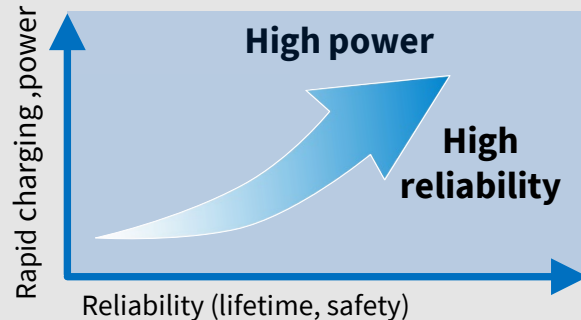
Cell technology to improve power performance

NTO^{*1} anode

High energy and power performance

Skin-Coated Electrode

Electrode and separator integrated



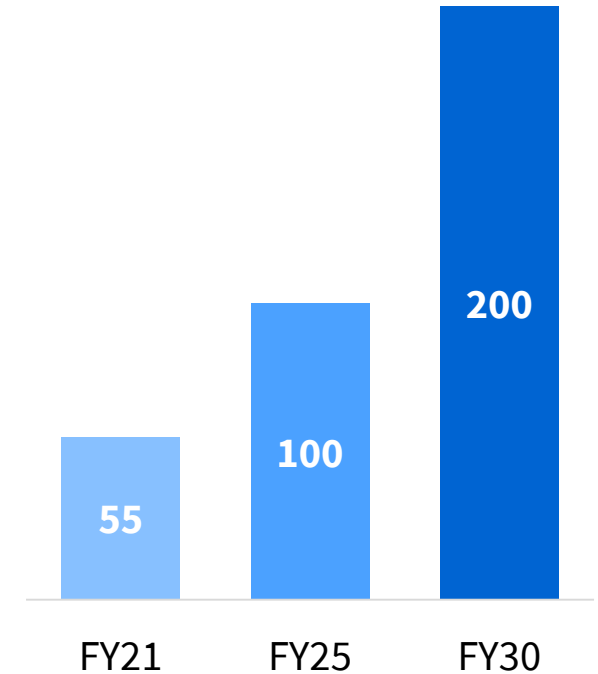
Diagnosis method for high reliability

Accurate nondestructive diagnosis to battery lifetime

Line-up of diagnosis methods

⇒ Lease & reuse applications

Net Sales (unit: billion yen)



*1 : Niobium-Titanium Oxide

04

Technology Strategy

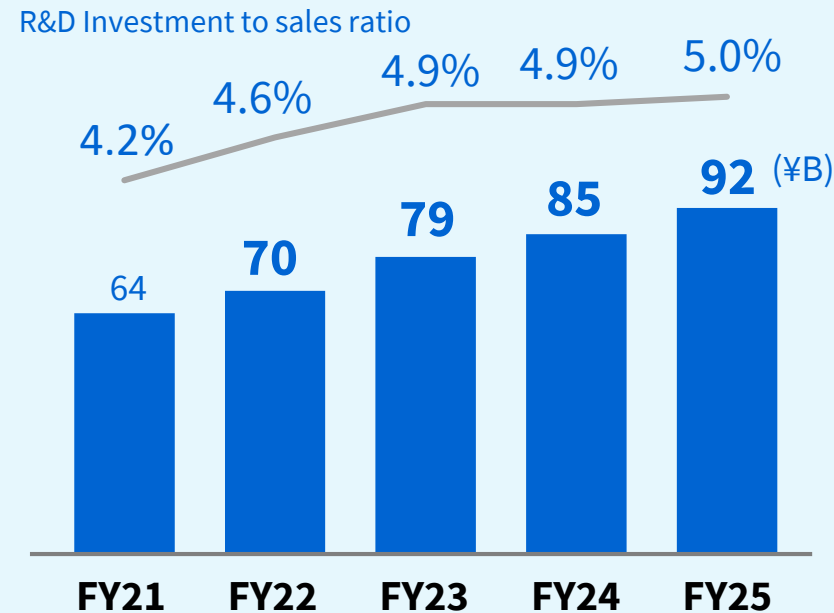
Further Emphasis on Growth Areas : R&D Investment

Increase ratio to sales and strengthen competitiveness of growth areas in energy and infrastructure businesses

Energy X Digital

- Solar
(perovskite, Cu₂O Tandem type solar cells)
- Wind
- VPP,
Energy Management/Matching
- Hydrogen based solutions
(P2G^{*1}, Fuel cell system, P2C^{*2})
- CCU/S^{*3}

Infrastructure Service Co. R&D Investments



Infrastructure X Digital

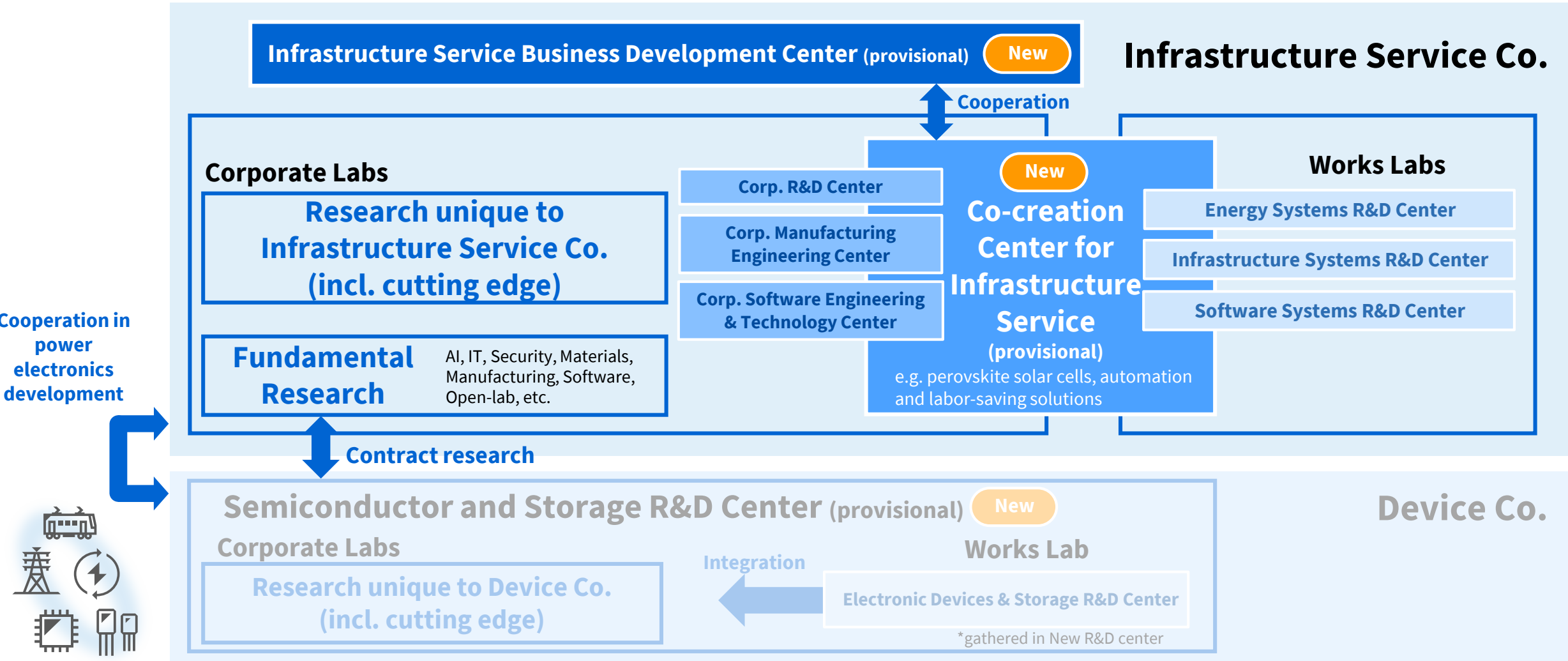
- Water supply & sewerage systems
- Logistics solutions
(Intelligent robotics)
- Railway transport solutions
- Factory automation solutions
- Smart manufacturing
- Quantum key distribution (QKD)

● **Fundamental : AI, Cyber-security, Digital manufacturing**

● **Cutting-edge**

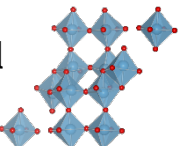
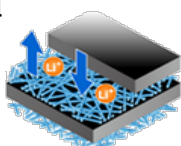
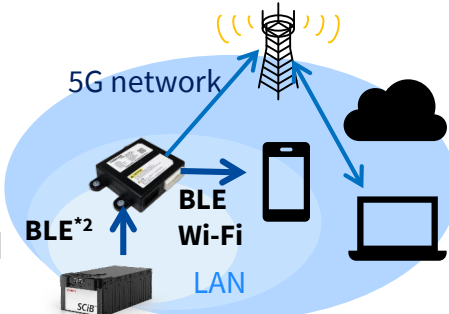
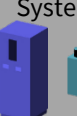
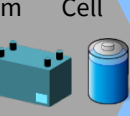
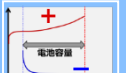
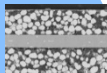
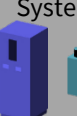
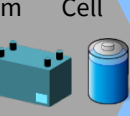
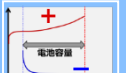
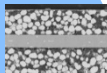
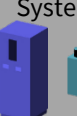
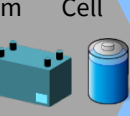
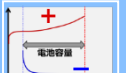
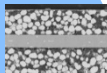
Post Spin-off R&D Structure

- 1) Maintain an R&D function that covers the value chain, from fundamentals to commercialization in Infrastructure Service Co.
- 2) Establish new co-creation center to promote R&D that will drive commercialization in growth areas



Fundamental Technologies that Support Our Growth : SCiB™

Develop the infrastructure business and create new value chains with alliances

Cell technology Drive evolution by new materials and processes	High-energy NTO^{*1} anode - About 1.5 times energy density with prototype cell (compared with current 20Ah cell)  High-power Skin-Coated Electrode - Power increase by 20% with prototype cell (compared with current 10Ah cell) 	 SCiB™ 20Ah-HP cell (a new line) 26Ah cell (under development)  For AGVs and robots  AGVs (Automated guided vehicles)												
Solutions for battery packs Increase reliability Expand installation uses	Control wiring-free module • Wire-free wireless technology • Expansion of installation flexibility • Higher efficiency installation and maintenance work 	 For industrial and stationary  For mobility  For railway  Railways  Battery energy storage systems for compensation of variations in power output and reduction of grid frequency variations												
Systems and Services Realize a circular economy	Accurate nondestructive diagnosis for battery lifetime • Diagnosis introduced by parts • Can be applied to batteries other than SCiB™ → expansion to lease/reuse business Scope of the diagnosis <table><tr><th colspan="2">Current</th><th colspan="2">Toshiba Method</th></tr><tr><th>System</th><th>Cell</th><th>Internal State</th><th>Electrode Material</th></tr><tr><td></td><td></td><td></td><td></td></tr></table> Low ← Difficulty → High <td>  Gulf Crane  Construction Vehicle  Electric Bus  Electric Ferry Expand alliances Create new value chains </td>	Current		Toshiba Method		System	Cell	Internal State	Electrode Material					 Gulf Crane  Construction Vehicle  Electric Bus  Electric Ferry Expand alliances Create new value chains
Current		Toshiba Method												
System	Cell	Internal State	Electrode Material											
														

Promote group collaboration

Expand infrastructure service business

Expand infrastructure service business
Promote group collaboration

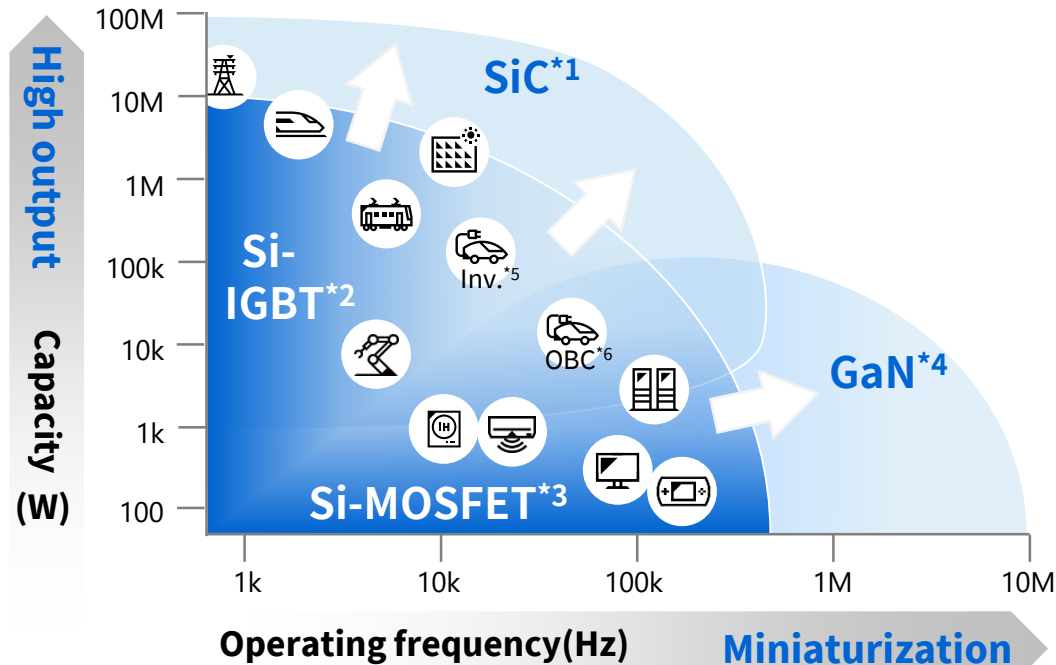
*1 : Niobium Titanium Oxide *2 : Bluetooth Low Energy

Fundamental Technologies that Support Our Growth : Power Electronics

Focus on energy saving solutions through competitive power semiconductors and system control technologies

Power Electronics

Covering numerous applications in energy and infrastructure systems



1: Silicon Carbide (semiconductor material) *2: Insulated Gate Bipolar Transistor *3: Metal Oxide Semiconductor Field Effect Transistor *4: Gallium Nitride (semiconductor material) *5: Inverter *6: On Board Charger *7: Variable voltage variable frequency control *8: Injection Enhanced Gate Transistor

Railway drive systems that realize energy-savings



SiC module



Permanent Magnet Synchronous Motor (PMSM)



VVVF^{*7} inverter with all-SiC devices



Battery for power failure operation mode with regenerate energy function

HVDC (high voltage direct current) that expands the electricity network



New Hokkaido-Honshu line
Started operation
March 2019

Voltage Sourced Converter

First application in Japan



Press Pack IEGT^{*8}



Hida-shinano frequency conversion
Started operation
March, 2021

Line Commutated Converter

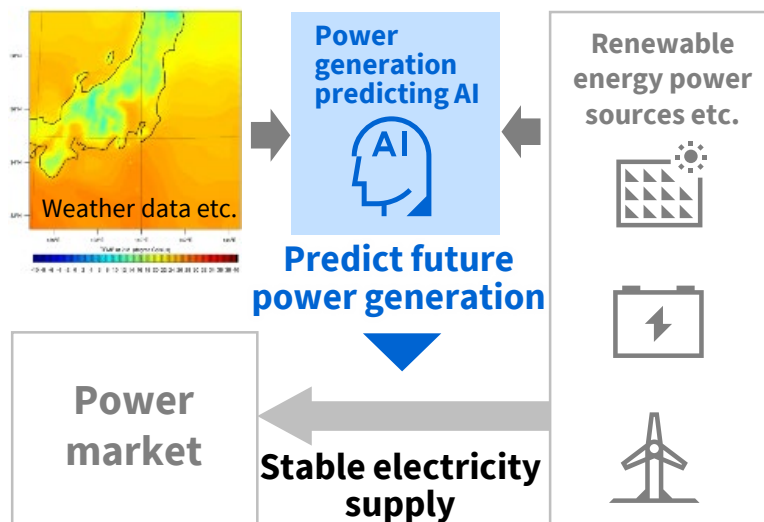
Connecting different frequency grids

Fundamental Technologies that Support Our Growth : AI

Realize stable power supply, reliable infrastructure operations,
improve usability of transport systems with AI

Power generation prediction

Realize stable electricity supply by predicting future power generation accurately



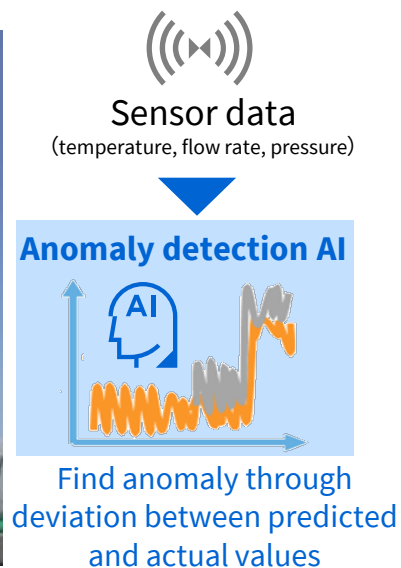
Promote commercialization of results of
Ministry of Economy, Trade and Industry
National Project^{*1}

Anomaly detection

Reduce monitoring loads by detecting signs
of anomaly with world-class performance^{*2}

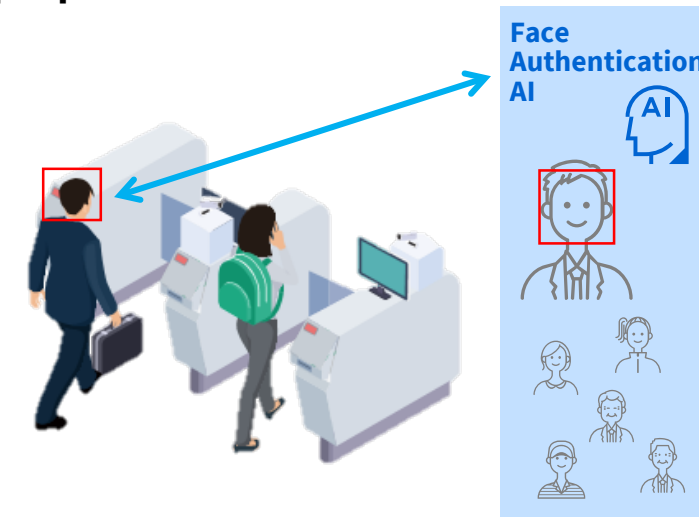


Demonstration experiment at Mikawa power plant
operated by SIGMA POWER Ariake Corporation



Face recognition

Realize contactless payment by identifying
faces accurately from images on millions of
people^{*3}



Considering application of commercialized
face authentication service^{*4} in public
transport systems

^{*1}: Subsidy for costs of next gen. technology construction demonstration utilizing distributed energy resources such as storage batteries (renewable energy aggregation demonstration project out of aggregation technology demonstration projects for renewable energy power generation, etc.)

^{*2}: Based on in-house research at the time of paper submission (Sep 2021) - S. Naito et al., "Anomaly Detection for Multivariate Time Series on Large-scale Fluid Handling Plant Using Two-stage Autoencoder.", ICDM LITSA 2021.

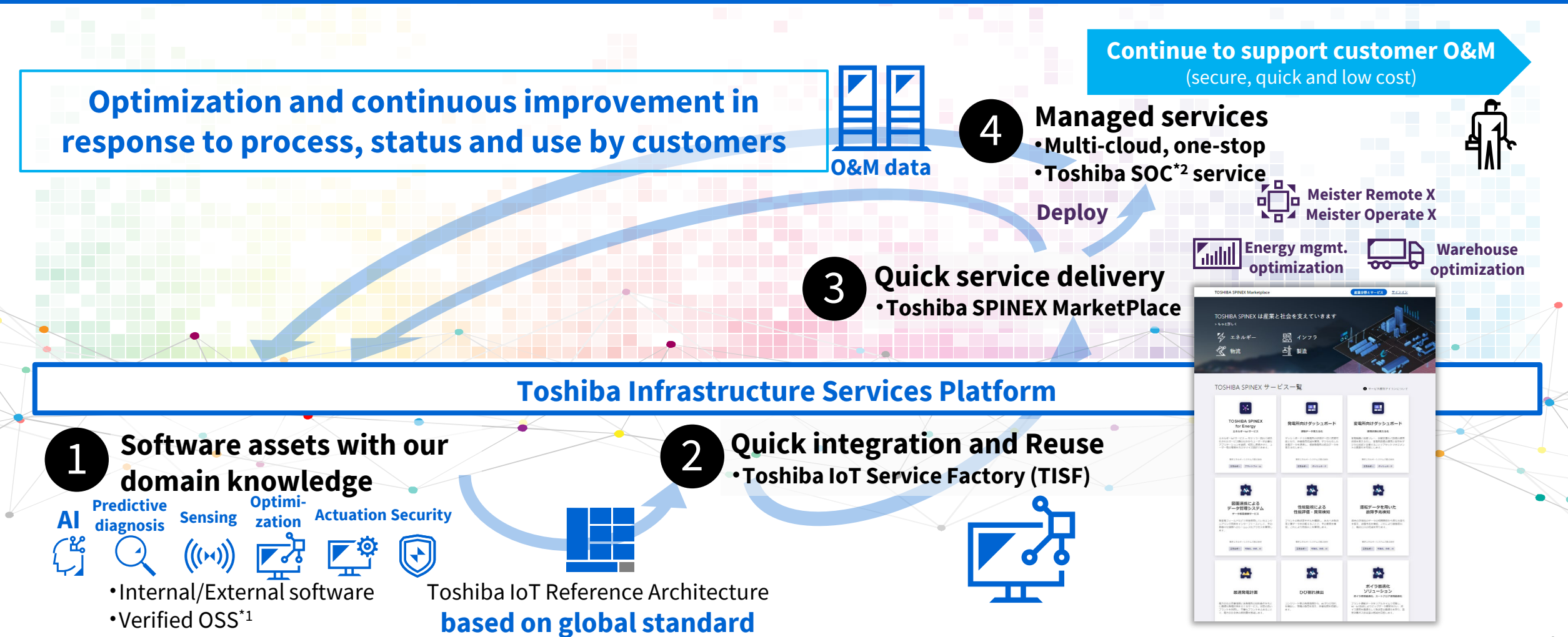
^{*3}: Face Recognition Vendor Test Ongoing by National Institute of Standards and Technology, <https://www.global.toshiba/jp/technology/corporate/rdc/rd/topics/21/2111-02.html> (in Japanese)

^{*4}: Toshiba launches online identity verification service using world-leading face recognition AI technology, <https://www.global.toshiba/jp/company/digitalsolution/news/2021/1130.html> (in Japanese)

Fundamental Technologies that Support Our Growth : Digital Platform

“x Digital” enhanced by Toshiba Infrastructure Services Platform

A shared infrastructure services platform that connects with various services, assets and systems



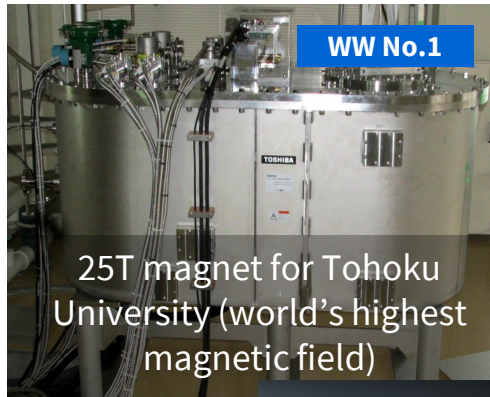
*1 : Open Source Software *2 : Security Operation Center

Cutting-Edge Technologies for Further Growth

Support infrastructure security and safety with cutting-edge technologies

Superconductivity technology

He-free cooling technology*¹ with conductive cooling realizes magnet coils with the world's highest performance



25T magnet for Tohoku University (world's highest magnetic field)

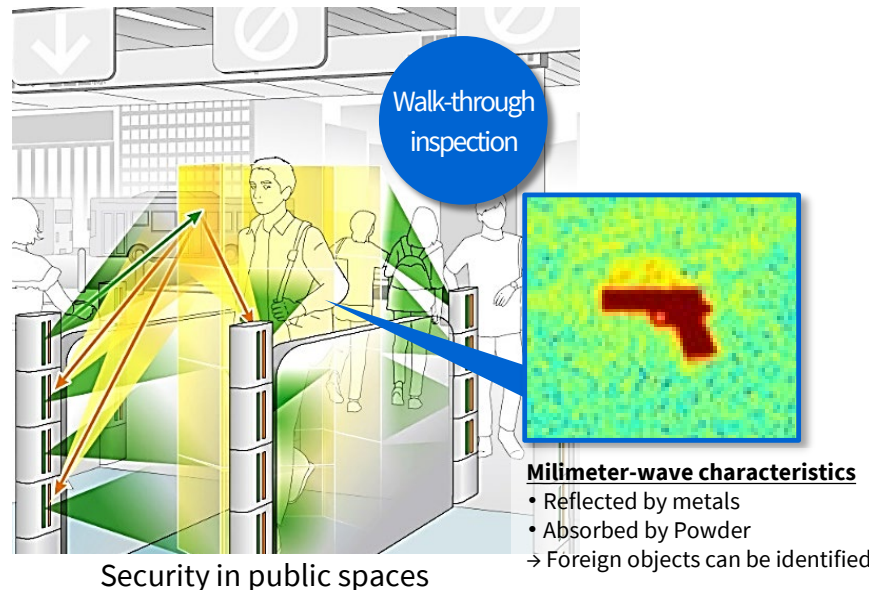


Small superconducting rotary electric machine

Expand business of He-free magnet for semiconductor industry
Promote development of small superconducting rotary electric machines

Millimeter-wave Imaging

Instantly detect foreign objects with a millimeter-wave radar equipped with high-performance amplifier and antenna



Detect dangerous materials hidden under clothes in walk-through inspections

Simulated Bifurcation Machine™

Realize high performance computation by applying a quasi-quantum tunneling effect; 10 times faster than the previous algorithm*²



Provide similar performance to a quantum computer for instant judgment

WW First

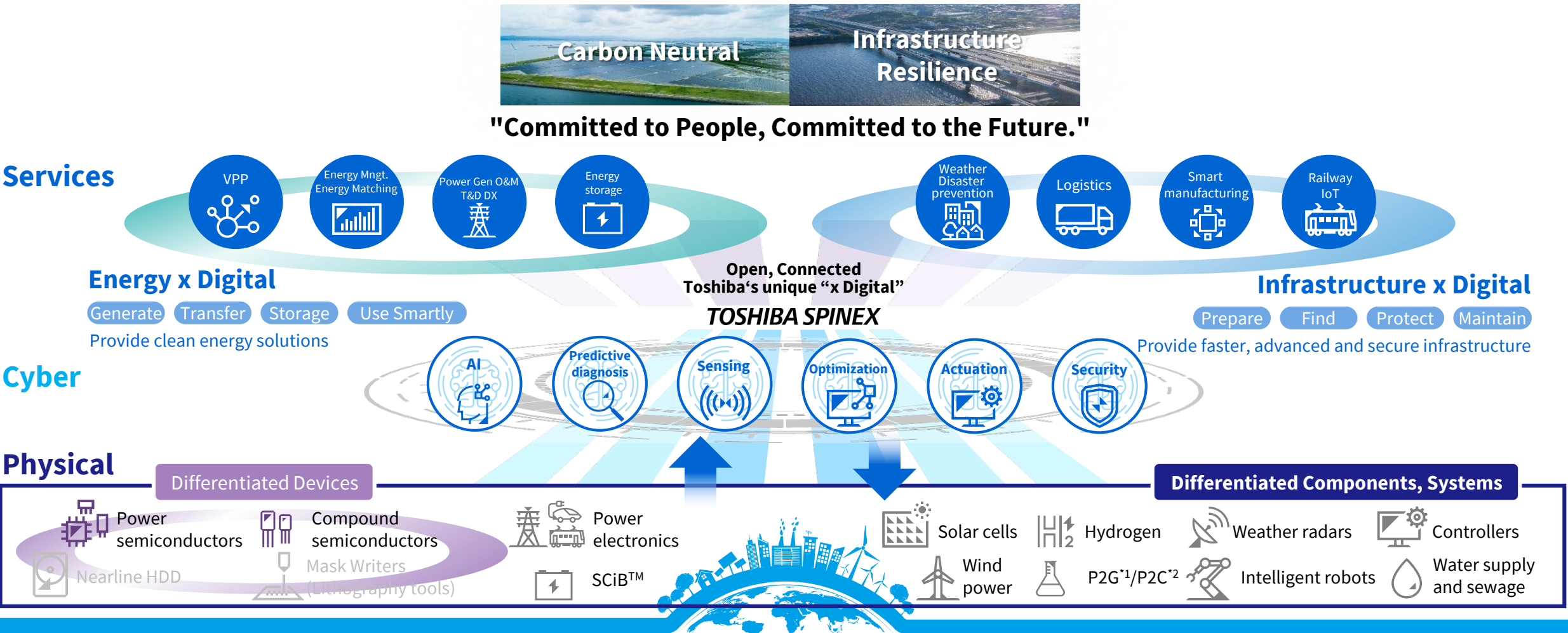
Validate effectiveness of a quasi-quantum computing applied to high-speed, high-frequency stock market trading

*1 : Ichimura Prize in Industry for Distinguished Achievement (2019) Minister of Education, Culture, Sports, Science and Technology, Science and Technology Award Science and Technology Category (2020)

*2 : Goto et al. Science Advances 2021 (Comparison with Toshiba's previous one reported in 1999)

Infrastructure Service Co. Technology Policy

Contribute to solving social and customer issues with “x digital”, guided by the Basic Commitment of the Toshiba Group "Committed to People, Committed to the Future."



*1 : Power to Gas *2 : Power to Chemicals

Summary

Summary

**Reform business structure to contribute to solving social issues
through our business activities**

Reform business structure to integrated infrastructure service company

Contribute to realization of carbon neutrality and infrastructure resilience

Grow business through concentrated investment in focused business area



**Achieve sustainable and profitable growth,
and enhance corporate value**

TOSHIBA