TOSHIBA

Toshiba Group IR Day 2022

Business Strategy of Infrastructure Service Co.

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Mamoru Hatazawa
Corporate Senior Executive Vice President
Hideaki Ishii
Corporate Senior Vice President and CTO

Toshiba Corporation

Good afternoon. Thank you for joining us today.

I'm Mamoru Hatazawa, Toshiba's Corporate Senior Executive Vice President.
Today, I will be providing an overview of the business strategy of Infrastructure Service Co.

I am joined by Hideaki Ishii, our Chief Technology Officer, who discuss the technology strategy in greater detail.

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.
- This document has been translated from the Japanese-language original document for reference purposes only. In the event of any conflict or discrepancy between this document and the Japanese-language original, the Japanese-language original shall prevail in all respects.
- This document contains forward-looking statements and prospects concerning the future plans, strategies, and performance of Toshiba group.
- These statements are not historical facts; rather, they are based on assumptions and judgments formed by the management of Toshiba group in light of currently available information. They include items which have not been finalized at this point and future plans which have yet to be confirmed or require further consideration.
- 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.

First, please take a moment to review this slide on our forward-looking statements.

Today's Agenda

01 Purpose and Vision

02 Business Structure Reform

03 Business Plan and Focus Business Areas

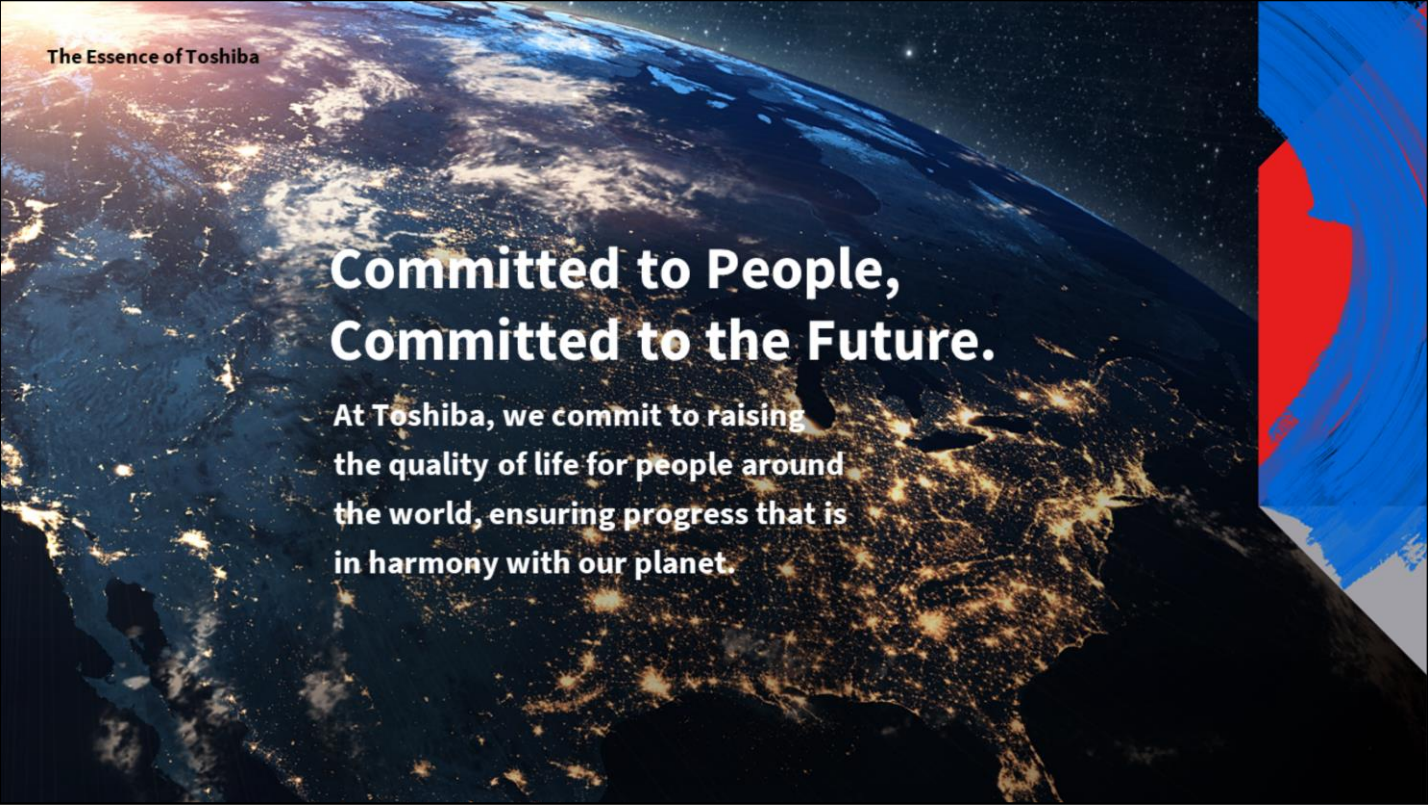
04 Technology Strategy

This is today's agenda.

01

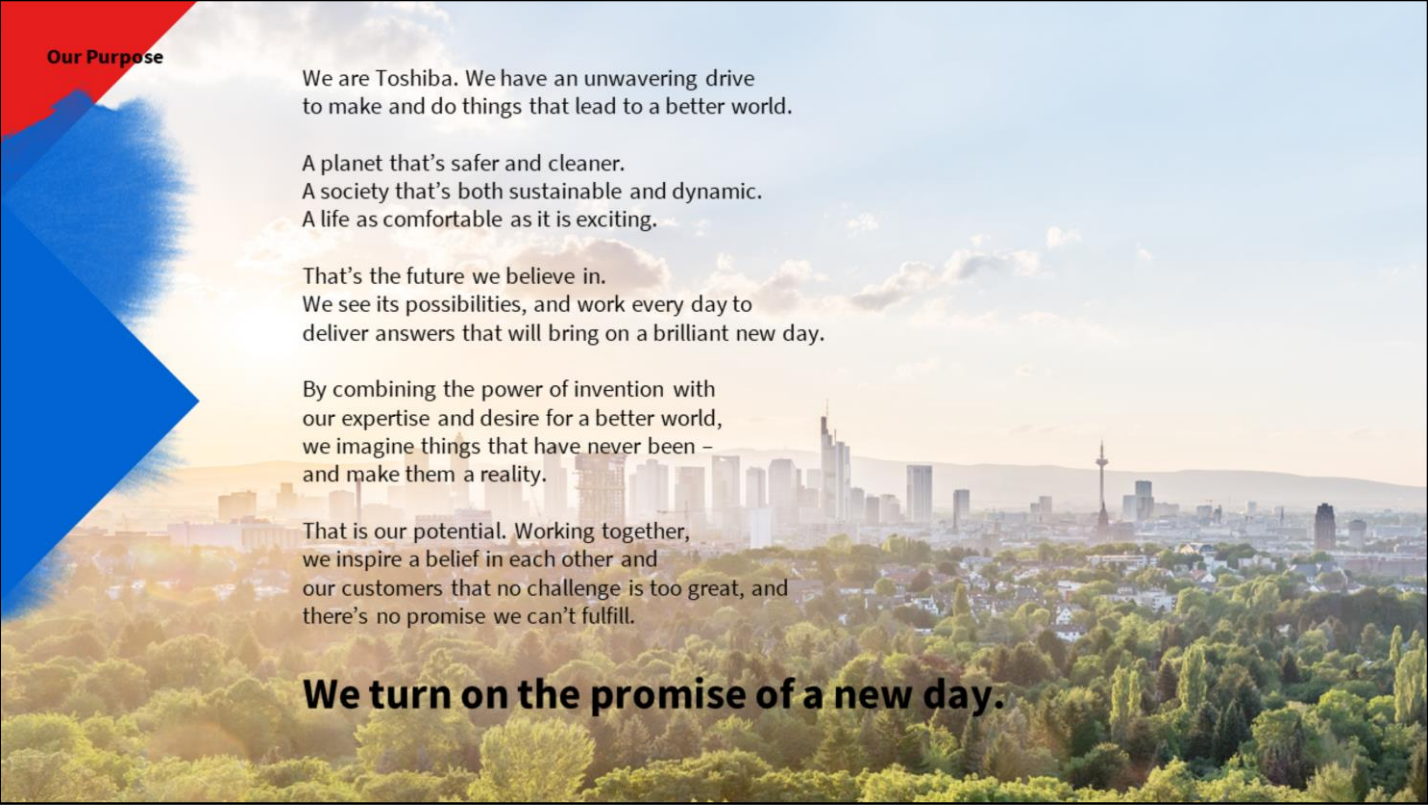
Purpose and Vision

First, I would like to talk about our purpose and vision.



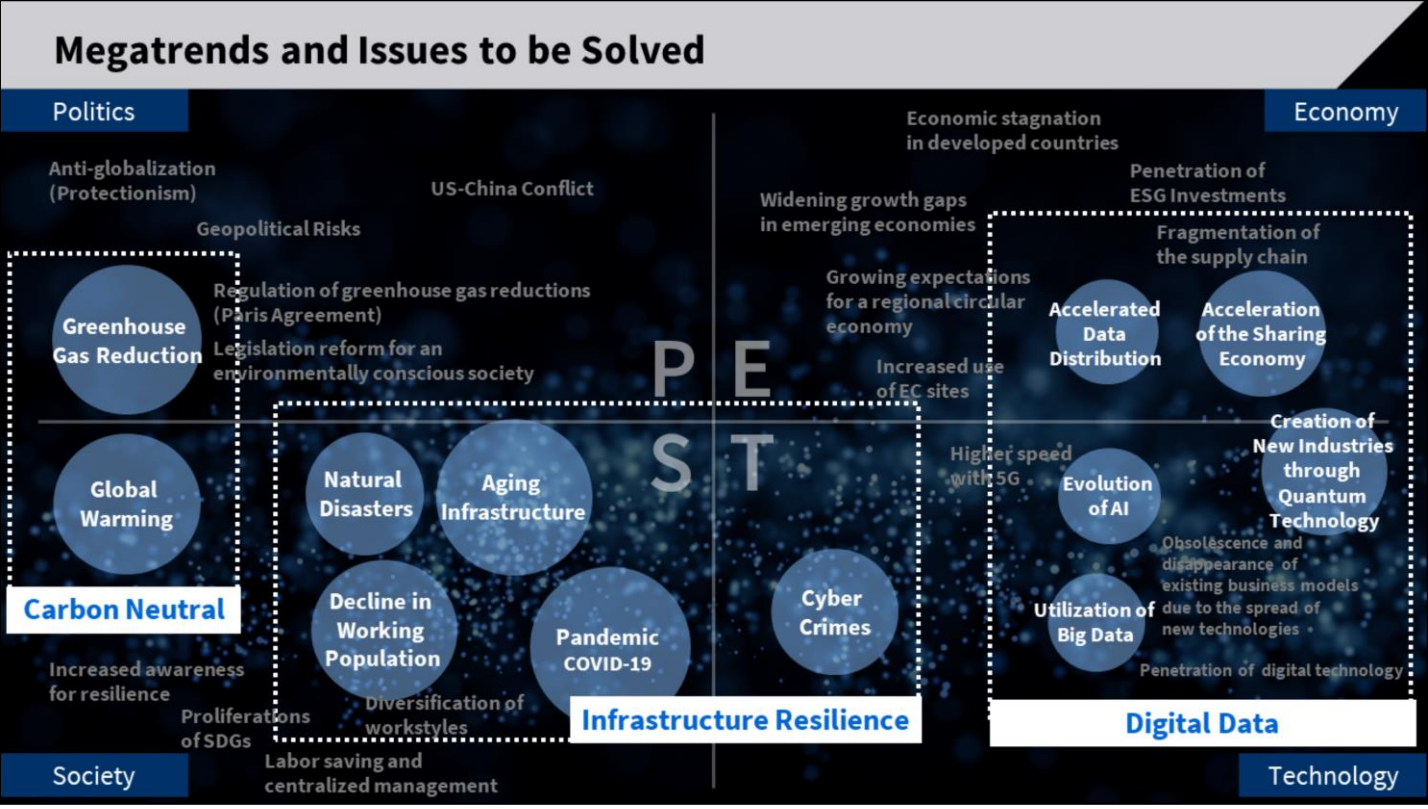
"Committed to People, Committed to the Future"

At Toshiba Group, we are committed to raising the quality of life for people around the world, ensuring progress that is in harmony with our planet.
This commitment will remain core to the Infrastructure Service Co. as we take this new company forward.



Our purpose is clear:

We have an unwavering drive to make and do things that lead to a better world.
We will continue contributing to a more sustainable society by bringing together the creativity and technological capabilities that we have cultivated over the past 140 years.
We are committed to people and committed to the future. We turn on the promise of a new day.

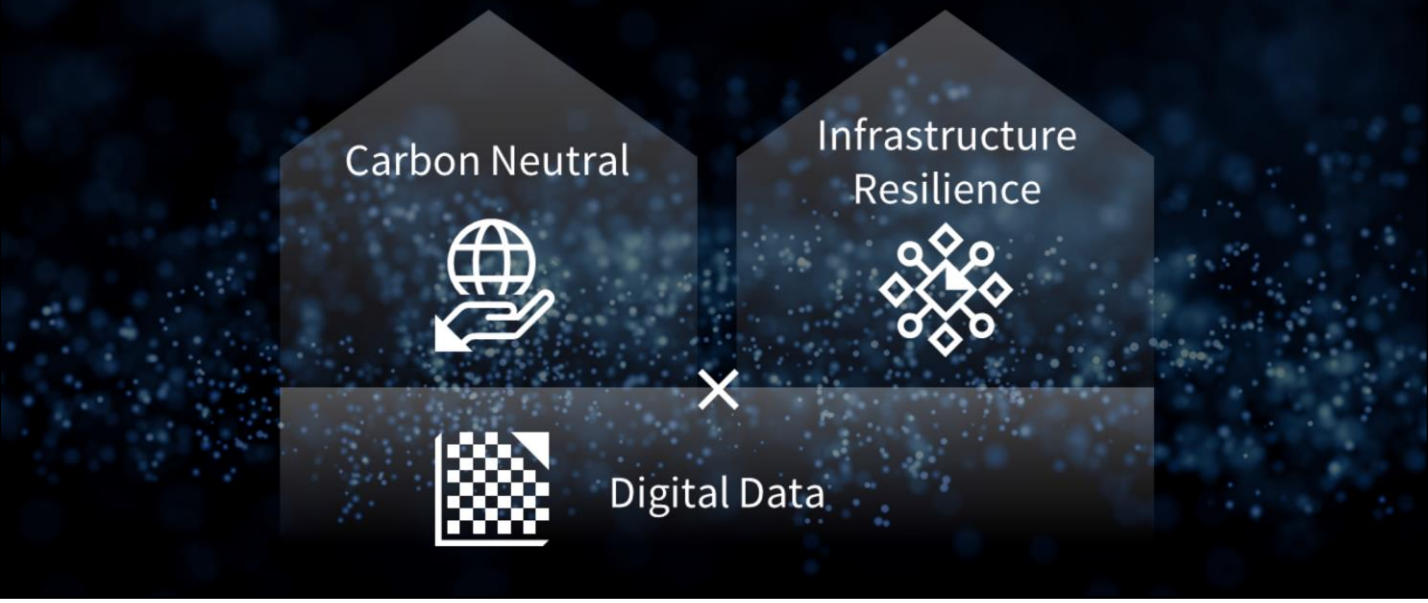


The world is changing rapidly.
And we are currently facing numerous challenges.

Among these changes and challenges, "reduction of greenhouse gas emission" and "response to global warming“ lead to the need of carbon neutrality, and "increasing natural disasters," "aging infrastructure," and "advancing cybercrimes," lead to the need to secure infrastructure resilience.
These issues cannot be ignored as we work to create a sustainable society.

From the economic and technological standpoint, we are at a tipping point with "acceleration of data distribution," "acceleration of the sharing economy" and "advancement of AI,” all of which require us to respond with urgency and agility.

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"



As we work to address these complex issues, 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

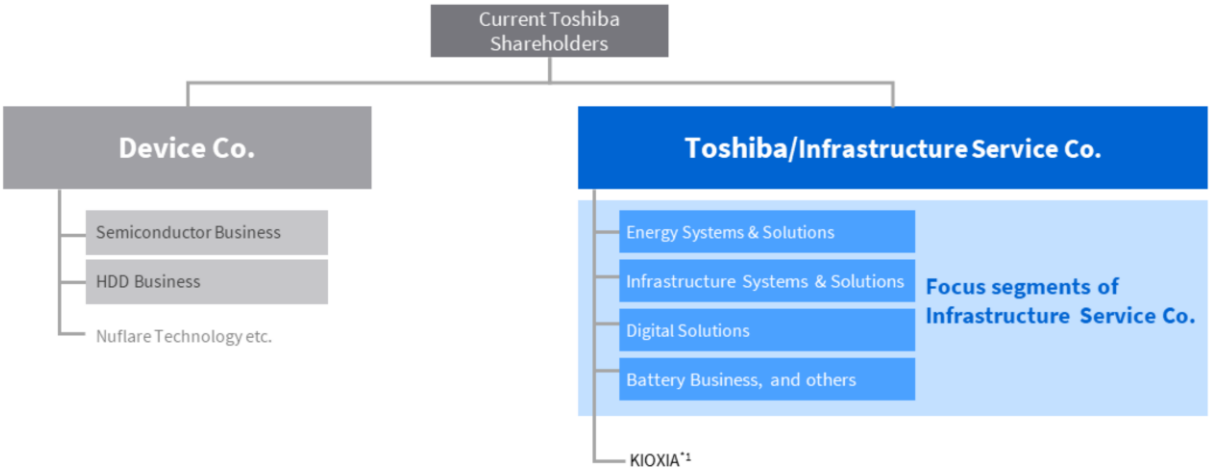
Business Structure Reform

In this next section, I will look at the 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.

This slide shows the focus segments of Infrastructure Service Co.

As Tsunakawa explained yesterday, after the execution of Device Co. Spin-off and externalization of Building Solutions, the Toshiba/Infrastructure Service Co.'s focus will be sharpened on Energy Systems & Solutions, Infrastructure Systems & Solutions, Digital Solutions, and Battery Business and others.

I will explain these areas as "Focus segments of Infrastructure Service Co."

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.

On this slide I will explain the purpose and objectives of the Spin-off.

By streamlining the management structure, we will improve our management decisions more quickly and in an agile manner.
We will quickly execute reforming business structure, improving productivity, and strategic investment such as M&A.
We will be able to execute this reform with great speed.

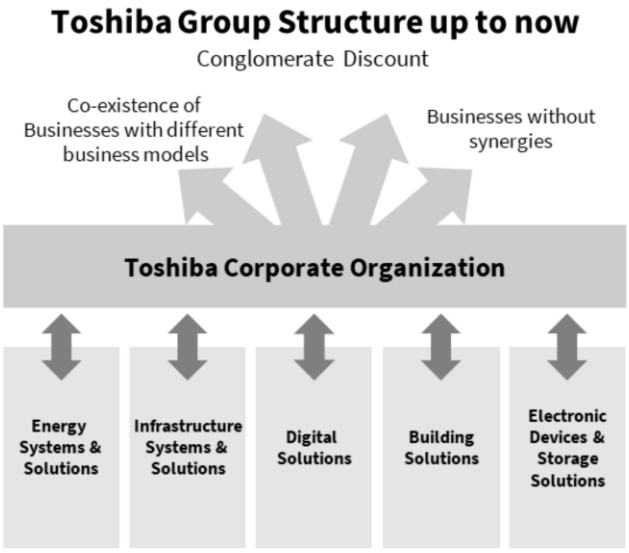
In our conventional conglomerate management structure, there wasn't the priority on investing in factory equipment and digitizing the infrastructure service businesses.
Now, with a clearer focus, we will invest intensively in resources.

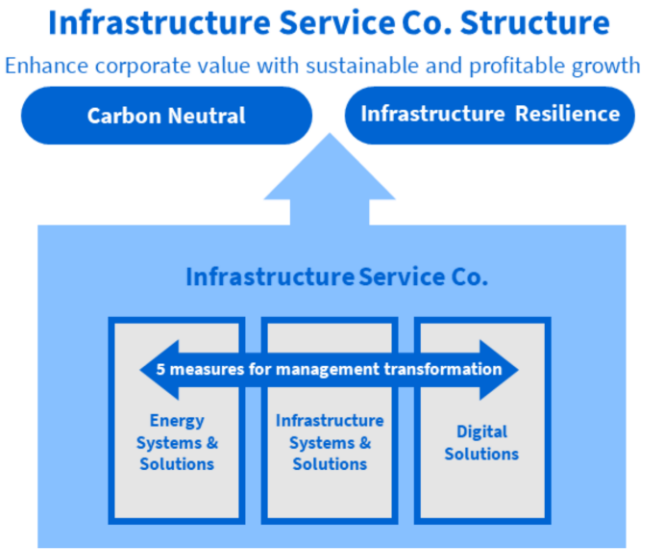
We want to build a world-class team by actively recruiting both within Toshiba and across our industry to attract the best and brightest talent to help us lead our structure reform.

And based on our deep industry relationships, we are confident that we can accelerate our new solutions by working more closely with partners with unique strength in this field.

Business Structure Reform

Transform business structure to directly link with social issues and businesses





On this slide, I will explain the image of our goal through the business structure reform of Infrastructure Service Co.

As of today, Toshiba Group has a large corporate organization to govern diverse business areas; Energy, Infrastructure, Digital, Building and Device, as you can see in the left-hand side.

While each business entity has a responsibility in its operations, corporate organization has checks and balances function by monitoring low-profit businesses.
As a result, Toshiba Group has undervalued with conglomerate discount due to the co-existence of different business models which do not create synergies.

On the other hand, we will be consolidating and linking all Infrastructure Service segments, as shown in the image in the right-hand-side, that enables our business structure to directly link with social issues.
We will be able to respond directly to in need of carbon neutral and infrastructure resilience.

We believe this structure will fuel our businesses with more quick and agile management decisions that will allow us to achieve sustainable, profitable growth and increase corporate value.

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)

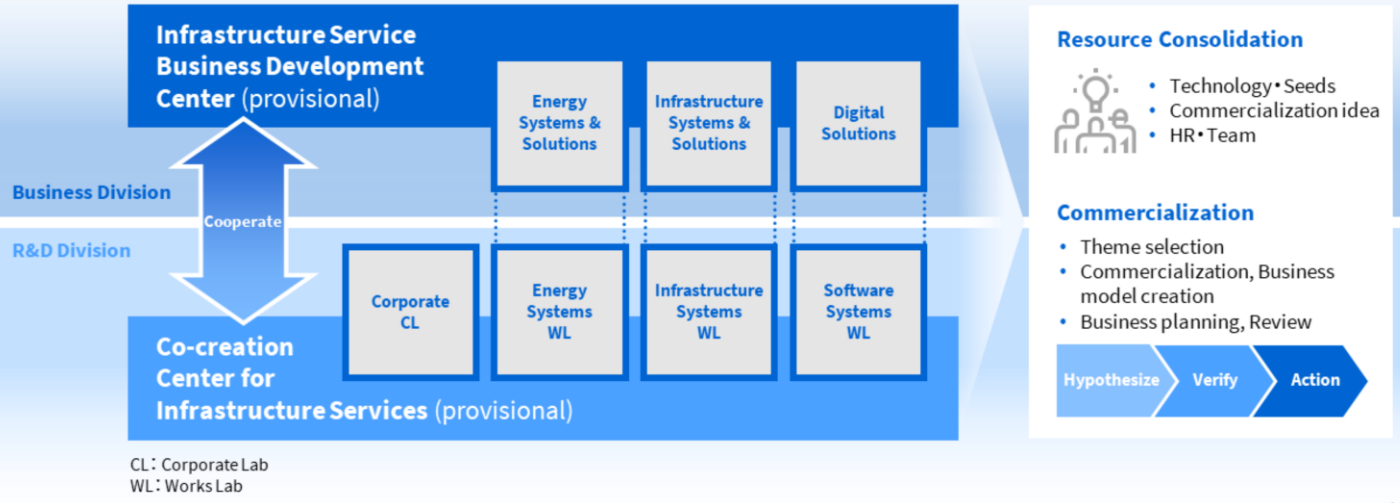
Here I will explain the measures that swiftly enact the business structure reform.

We will focus on the following 5 measures:
1. Cross-sectional new business creation;
2. Sales structure reform;
3. IT and digitization investments;
4. Technical human resource development;
5. ESG.

We will explain on these 5 measures in more detail from the next slide.

1. Cross-Sectional New Business Creation

Establish cross-sectional organization to commercialize new growth areas



CL：Corporate Lab
WL：Works Lab

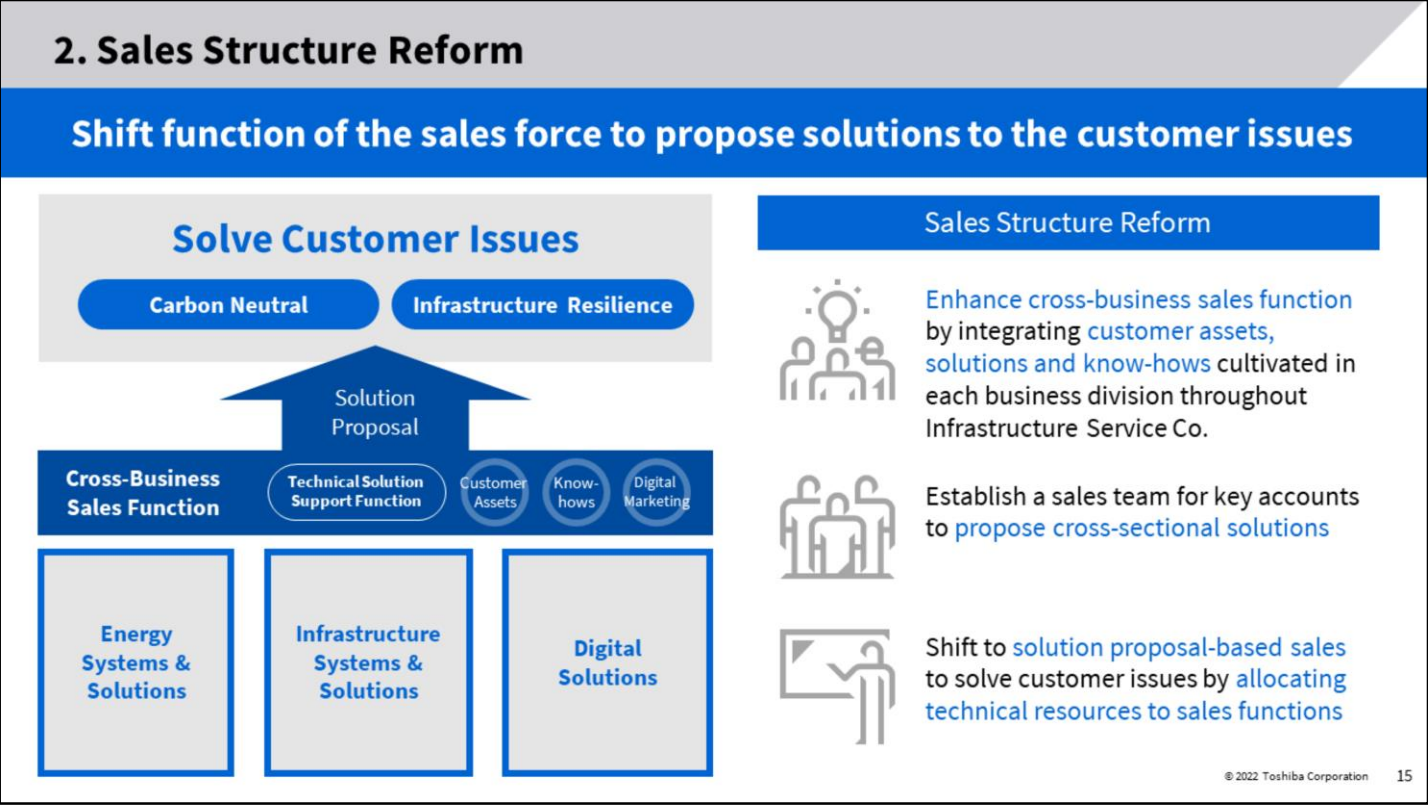
Let's first look at the cross-sectional new business creation.

We will establish a cross-functional organization for both technological development and commercialization in order to convert from a vertically integrated business to a cross-sectional and solution providing businesses to leverage the strengths of existing businesses and the capabilities of digital technologies.

As written at the top of this slide, this includes launching the Infrastructure Service Business Development Center, that this is a cross-sectional organization that will be responsible for business development of infrastructure services that will directly solve customers' issues. We will integrate technology seeds and ideas for commercialization together with human resources, as well as for new ventures and partner with external partners to realize swift commercialization.

Aa shown in the box at the bottom, the Co-Creation Center for Infrastructure Services is also going to be established within our corporate laboratory, in collaboration with the Infrastructure Service Business Development Center.
Importantly, we intend to optimize the allocation of R&D resources and the selection of R&D themes from commercial perspectives.

Through these initiatives, we aim to shorten the lead time from R&D to commercialization, while at the same time dramatically improving ROI in R&D.



Second, we will look at our reforming of sales structure.

We see a necessity to shift in our sales structure from being vertically integrated to a cross-sectional, solutions providing organization.

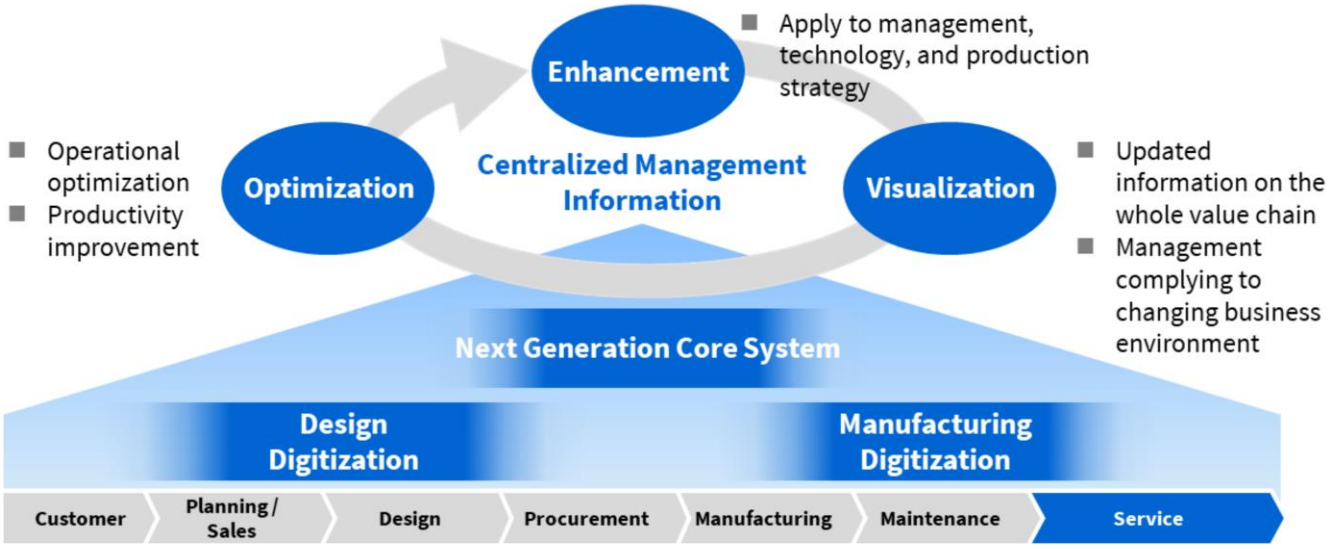
We will strengthen cross-business sales functions by sharing the customer assets and solution know-hows held by each business division across Infrastructure Service Co.

In addition to establishing a key account sales team for key clients, we will expand our interface with customers by upgrading digital marketing tools.

In order to strengthen solution proposals that solve customers' issues, we will expand our resources to support technical proposals and focus on the development and enhancement of sales resources.

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



Third, we will look at “IT & Digitization investments.”

I will discuss the foundation that makes reforms on R&D, business development, and sales functions in becoming a cross-sectional and solution-based organization possible: transforming our business processes through digitization.

We will integrate management information by introducing the next generation core systems and digitizing business processes of the frontline business, including design and manufacturing.
By visualizing it, we can constantly keep track of the latest information in the entire value chain, improve operational and production efficiency, and further enhance management decisions.

Until now, decisions on business processes related to IT and digitization investments were dependent on the frontline and division personnel, which had prioritized short-term performance, and lacked the long-term perspectives of future investments to get ahead of emerging trends.

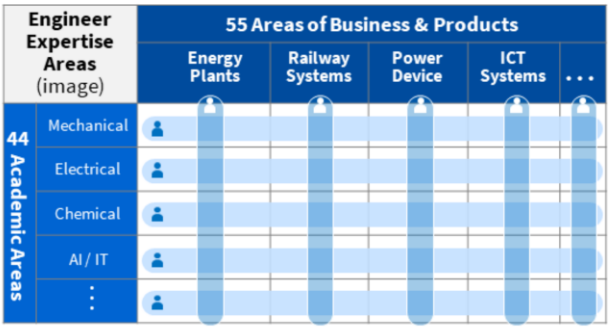
As part of our new business structure, we will actively undertake investments to firmly rebuild our business foundation.

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



Specialization Areas (image)

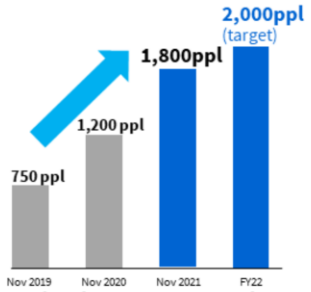
Expand specialized resources to promote infrastructure services

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

Next, we will focus on HR in technology.

We recognize the urgency of expanding our technology capabilities and resources to develop solutions that go beyond the boundaries of our existing businesses and lead to solving issues that our customers face.

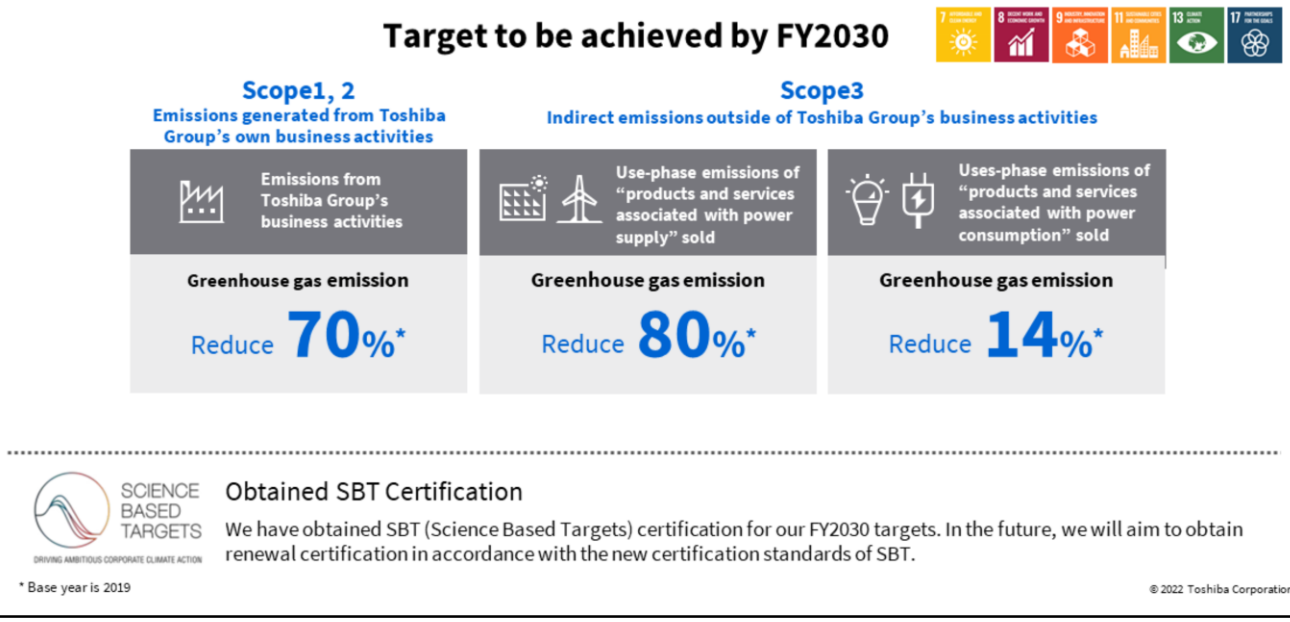
On the left-hand side is Engineer map.
The expertise of our engineers based on business, products, and academic fields, and by mapping that we can better analyze our current technical capabilities and focus on developing and acquiring expertise needed to promote the next generation of infrastructure services and technology solutions.

Through internal human resource development, as well as recruitment of new talents, we have increased the number of AI experts from 750 in 2019 to 1,800 at the end of the last year.
We intend to expand this number to 2,000 by the end of FY22.

To achieve this, when assessing candidates with significant advanced technology skills, including in the fields of AI and IoT, we are evaluating them based on industry-level benchmarks to ensure we are providing enriching and engaging opportunities, as well as competitive compensation packages through "Professional Employee System."

5. ESG: Addressing Climate Change

Achieve carbon neutrality throughout our entire value chain by FY2050



SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

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

Lastly, we will focus on our ESG efforts and climate change.

Infrastructure Service Co. sets the goal to achieve carbon neutrality throughout our entire value chain by FY2050.
By boldly promoting efforts to reduce greenhouse gas emissions, Infrastructure Services Co. will contribute to realizing carbon neutrality as a whole society.

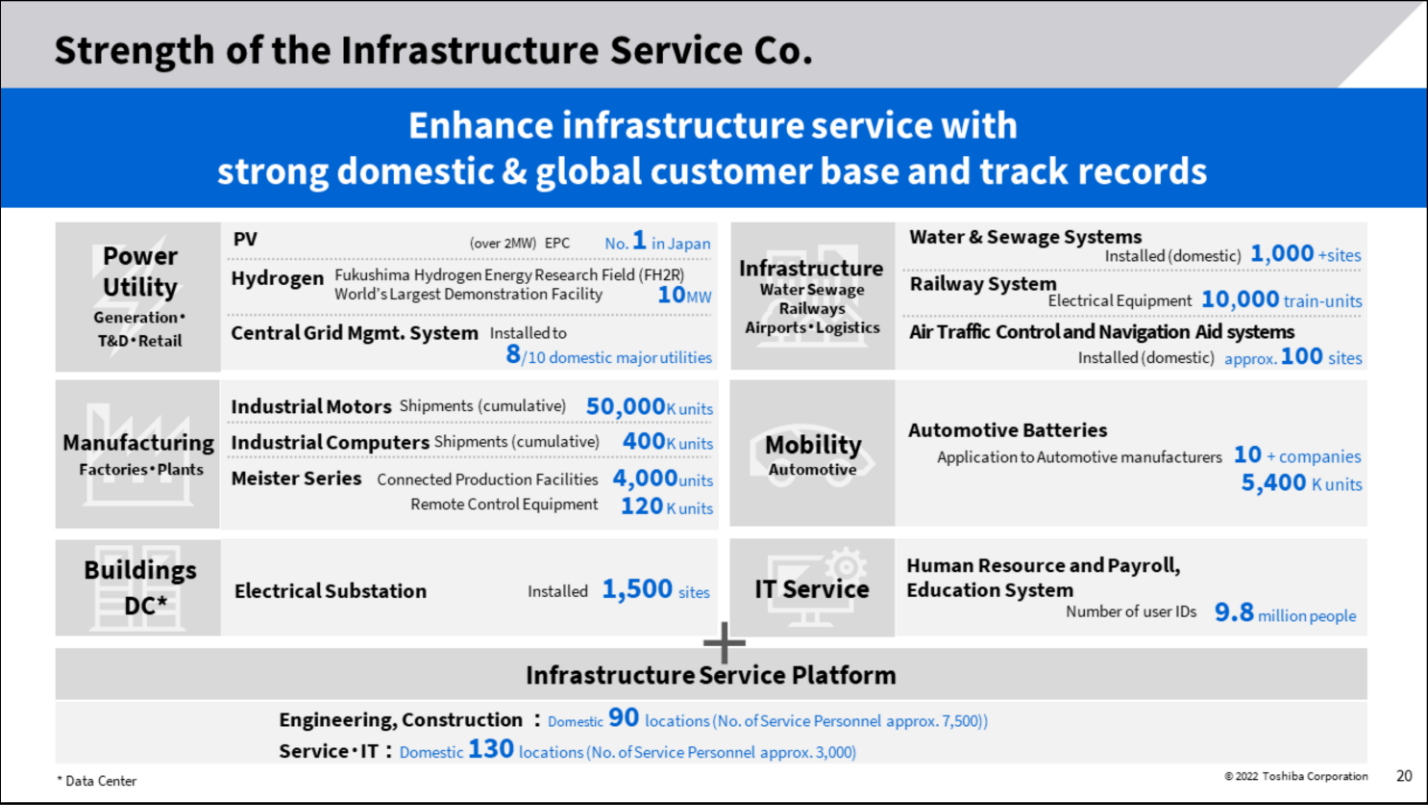
To achieve our goal, we plan to reduce emissions by 70% from 2019 levels by 2030 as a business activity of our own group, through collaboration with suppliers.

In addition, we will work actively to reduce greenhouse gas emissions through our products and services provided to our customers.

03

Business Plan and Focus Business Areas

Moving to the next section, I would like to discuss Infrastructure Service Co.'s business plan and focus business areas.

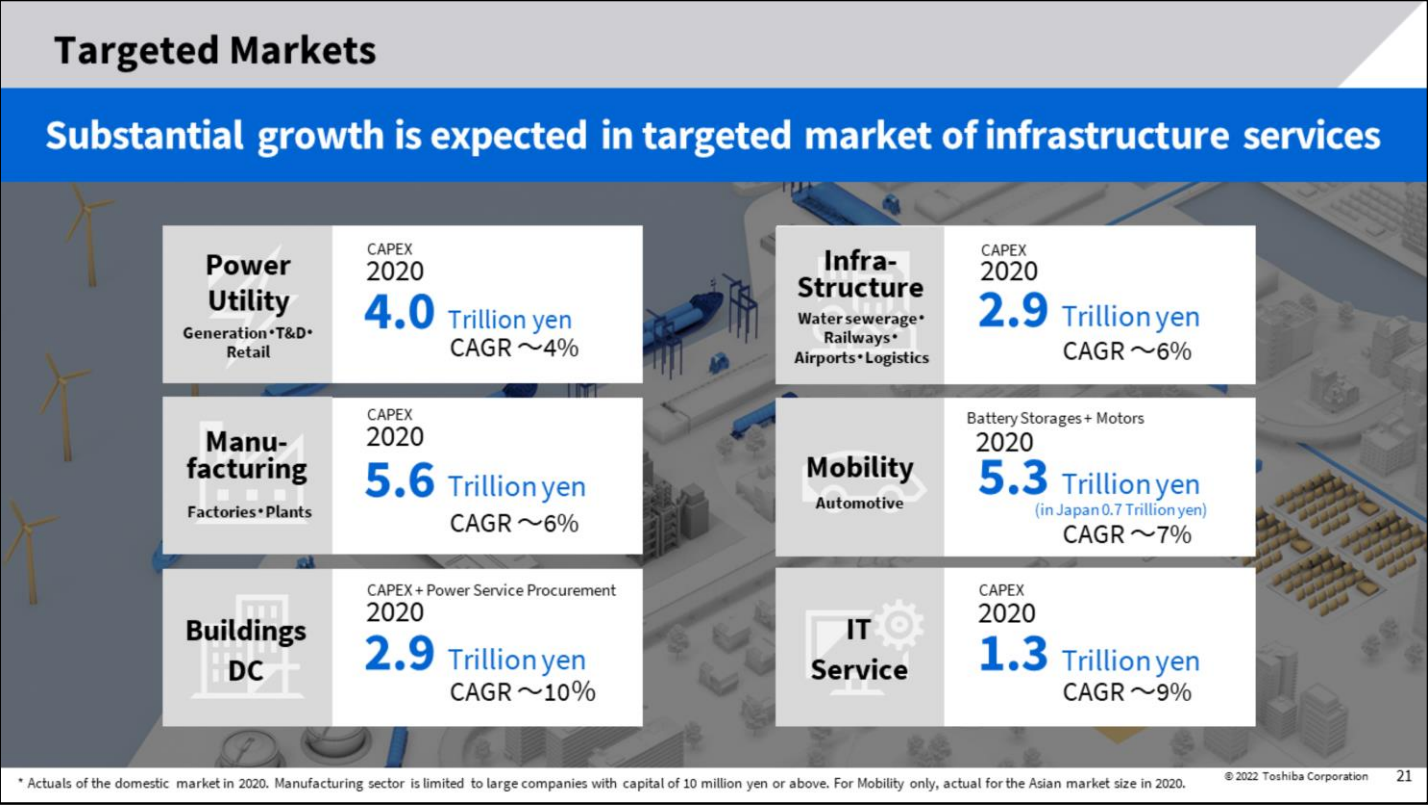


Here I will explain the strength of our Infrastructure Service Co.

As you can see on this slide, Infrastructure Service Co. has an extensive track record of providing a wide-range of equipment and services to customers across Japan and around the world.

Through our trusted relationships, we support the critical infrastructure across vital industries, such as power utility, social infrastructure, manufacturing, mobility, buildings and data centers, and IT service.

Our span of the work is not only providing the equipment, but also the full life-cycle from new equipment and solutions through maintenance services to maintain the quality of our customers' operations.
Our ability to work closely with our customers to help solve urgent issues is a testament to the assets and strengths of Infrastructure Service Co.



This slide shows our targeted markets.

Taking a look at the growth drivers, we have outlined the CAPEX in each industrial sector in 2020 as the size of the market.

As you can see, each sector is projected to grow by an average of 5% to 10% annually. Infrastructure Service Co. intends to achieve high growth together with our customers by providing equipment, services, and solutions that will maintain the quality of our customers' operations and solve issues that customers face.

Infrastructure Service Co. Mid-term Business Plan*1

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

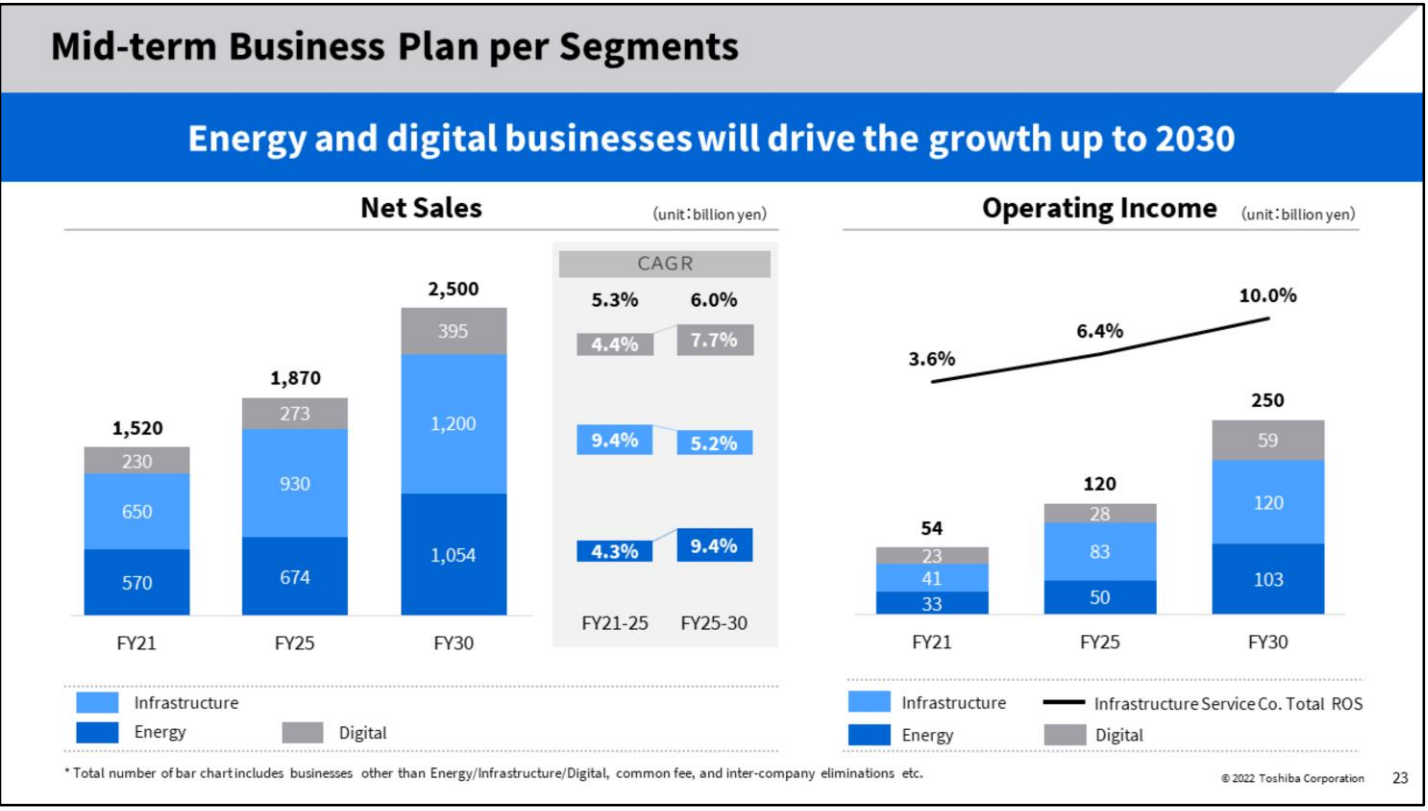
	FY21 Forecast	FY22 Plan	FY23 Plan	FY 25 Plan	FY 30 Target
Net Sales	1.52 T-yen	1.54 T-yen	1.61 T-yen	1.87 T-yen	2.50 T-yen
Operating Income (ROS%)	54 bil. yen (3.6%)	65 bil. yen (4.2%)	90 bil. yen (5.6%)	120 bil. yen (6.4%)	250 bil. yen (10.0%)
EBITDA*2	104 bil. yen	122 bil. yen	159 bil. yen	198 bil. 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

This is the mid-term business plan of Infrastructure Service Co.

In November, we announced our FY22 and FY23 plans.
We have now developed projections that will look forward to FY2030 based on the drivers that we see for our business.
The plan includes Energy Systems & Solutions, Infrastructure Systems & Solutions, Digital Solutions, and Battery Business and others, as focus segments.

We forecast net sales of 1.5 trillion yen for FY21.
We have also set a target of 2.5 trillion yen for FY30, which we will achieve through aggressive investments in growth areas and an increase in sales in align with the market expansion.
For our Operating Income, ROS is expected to achieve 6.4% in FY25, and above 10% by FY30, from current 3.5%.



This slide shows the net sales and operating income from each segment.

We expect sales to grow by an average of 5.3% per year for the next 4 years up to FY25.
We expect significant growth for Infrastructure Systems & Solutions due to the recovery from COVID-19 crisis in industry sector, large railway projects in Japan and overseas, and expansion of automotive motors business for EVs.

Many of the growth areas related to Carbon Neutrality is expected to be fully launched by around 2030, in line with 2050 target set by the government.
From FY25 to FY30, we anticipate for Energy Systems & Solutions and Digital Solutions to increase their revenue significantly as part of the effort that realize Carbon Neutrality based on renewable energy and energy management.
Overall we are projecting an average annual growth rate of 6.0%.

Investments

	Investments (FY21 to FY25 total)	Growth Initiatives	
CAPEX	**400** Billion yen	Carbon neutral response	Perovskite PSC facilities, Wind Power Nacelle 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

This is the investment plan.

We plan to invest a total of over 900 billion yen from FY21 to FY25.
This amount is 1.5 times greater than the amount of investment over the 5 years until FY20.
Our intention is to invest proactively to enable growth over focusing areas as we have previously explained.

CAPEX related to Carbon Neutrality is expected to be 400 billion yen for new-generation solar cells, wind power generation facilities, and increasing the production of SCiB™ rechargeable batteries.

For R&D, we plan to invest more than 390 billion yen mainly in the areas of digital data, including forecasting and optimization technologies, weather data analysis, and IoT data infrastructure.

We are also planning to make strategic investments for example to acquire a minor stake in renewable energy projects under develop, operate, and resale business models.

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.

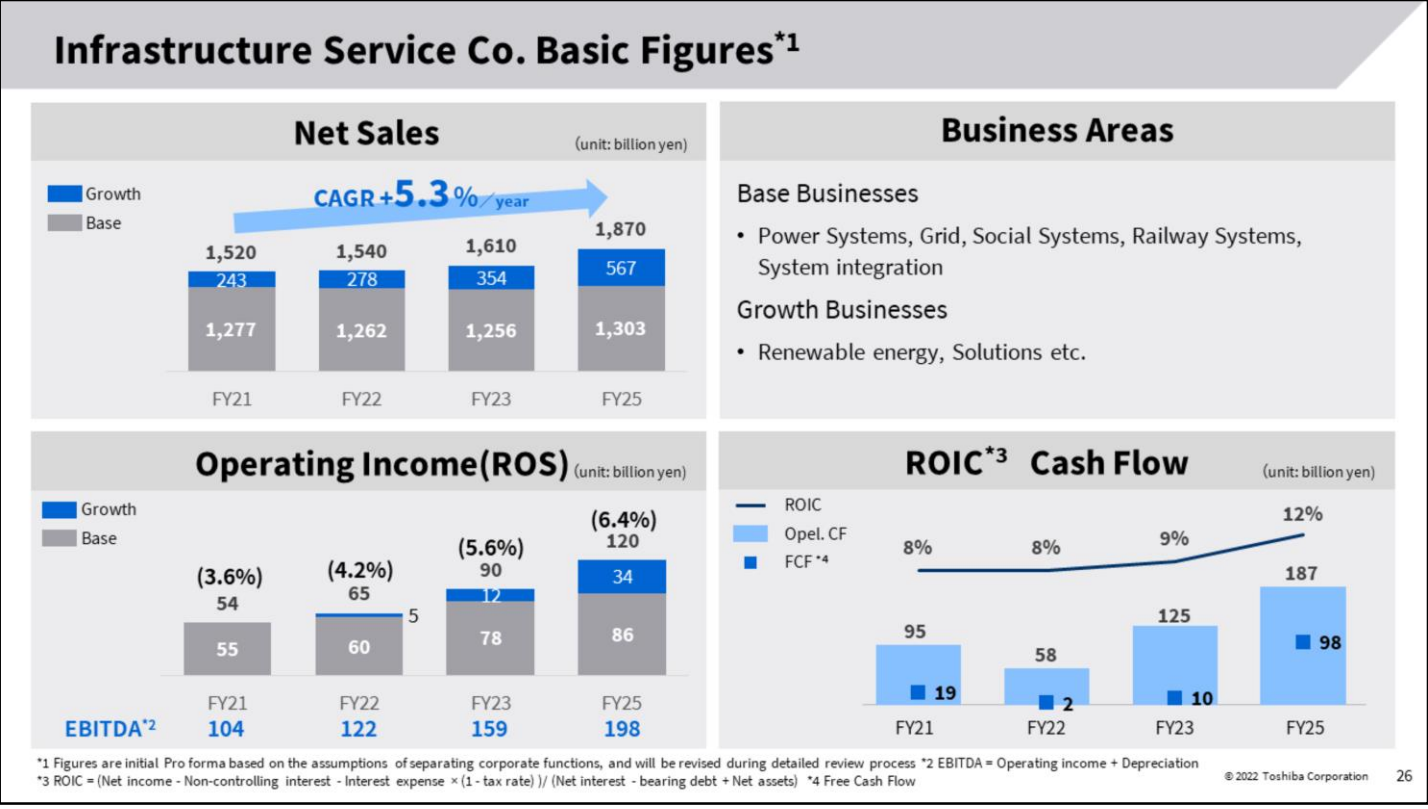
Now on the capital allocation policy.

We are looking at enhancing corporate value from 3 perspectives.

In addition to the investments focusing on growth areas, we are also consider forming partnerships and alliances so our stakes accelerate our commercialization leveraging external know-hows.
We also look supplement lacking functions through programmatic M&As as required.

As for financial leverage, we will be guided by the discipline of 50% debt-equity ratio and 150% for net-debt/EBITDA ratio.

A shareholder return policy will remain consistent with Toshiba Group's existing policies.
We aim to realize for an average consolidated dividend payout ratio of at least 30%.
Capital in excess from appropriate level will be used to provide shareholder returns including share repurchase.



On this slide, the business plan of the Infrastructure Service Co. is shown in terms of base businesses and growth businesses.

The base businesses include the power generation systems business for nuclear and thermal power plants, the grid business, and the social systems infrastructure business, and etc.

Growth businesses include renewable energy business and other solutions businesses, which provide logistics solutions and smart manufacturing.

Net sales are expected to grow by CAGR of 5.3% to to 1.87 trillion yen in FY25 from 1.52 trillion yen in FY21.
The increase in sales will be driven by growth businesses.

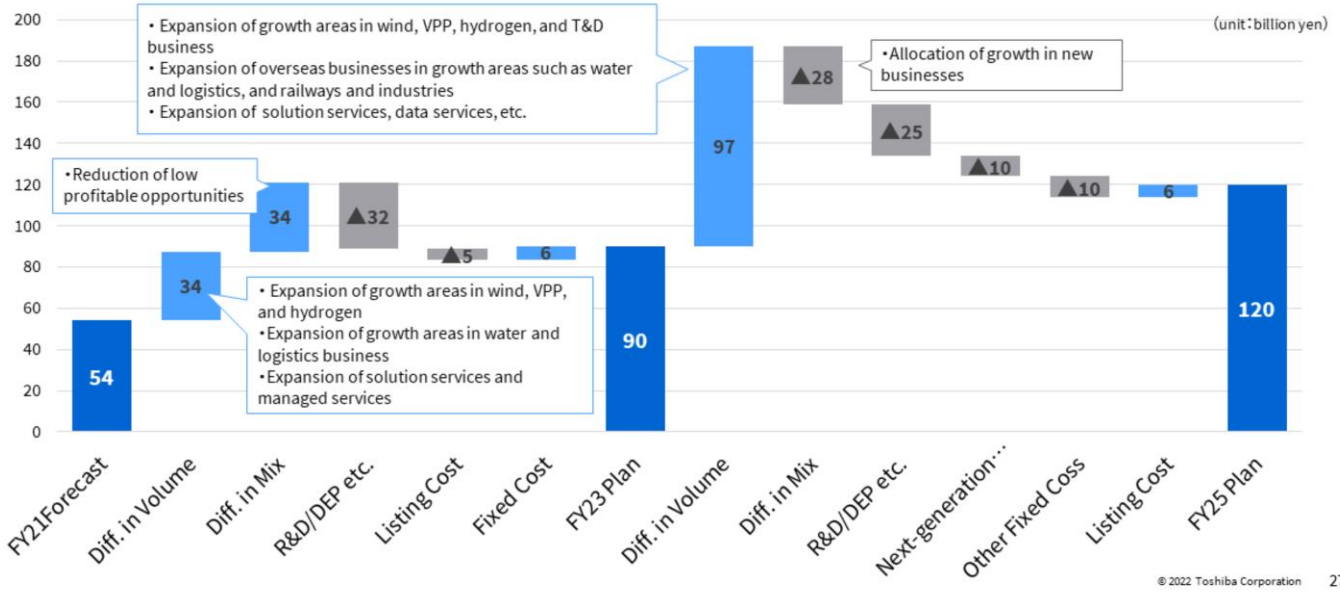
Operating income is expected to lead 120 billion yen, ROS of 6.4% in FY25, from 54 billion yen, ROS of 3.6% in FY21.
Transformation of business structure will help increase of operating income in the growth area significantly, and we anticipate it to account for approximately 30% of the total in FY25.

Free cash flow will decline temporally due to the promotional strategic investment such as programmatic M&A, however we expect growth strongly through FY25.

We consider ROIC as an essential KPI, that demonstrate the efficient use of management resources.
Our ROIC target for FY25 will be 12%.

Infrastructure Service Co. Operating Income Analysis

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



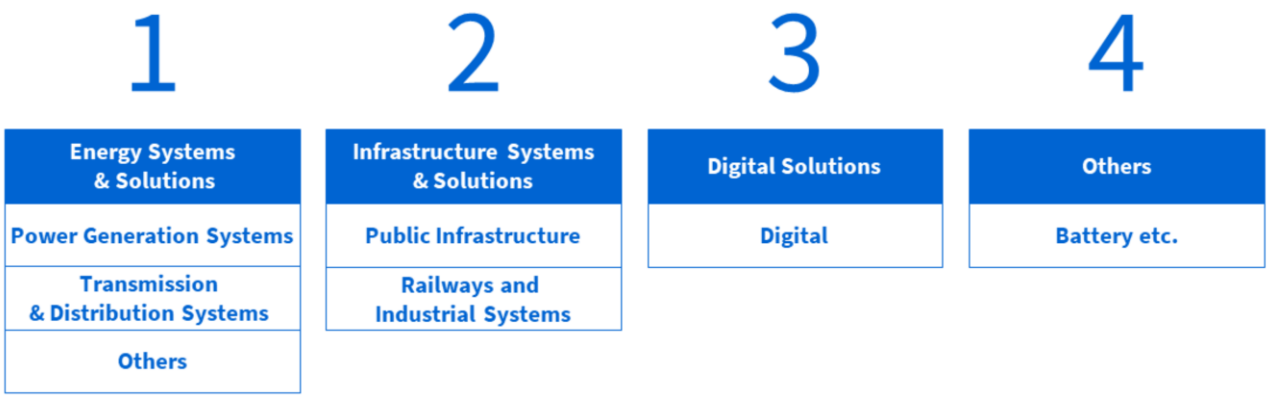
This slide gives an analysis of our operating income for the period from FY21 to FY25.

Left half of the slide shows the analysis up till FY23.
We are expecting to improve profitability 33.5 billion yen due to the greater volume coming from renewable energy related and solutions businesses.
We are also embedded 33.5 billion yen for difference in mix, due to reduce loss-making contracts enabled by stricter screening of projects to limit low profitability undertakings.

We are expecting fixed cost increase for growth, and after reflecting listing cost we are projecting to achieve operating income of 90 billion yen in FY23.

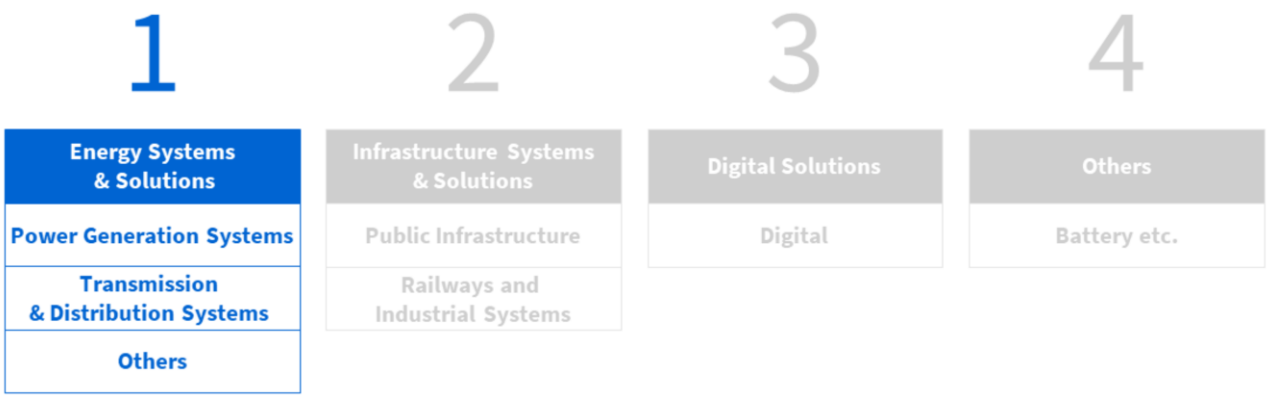
Right half of the slide shows the analysis from FY23 to FY25.
A plan is to achieve 120 billion yen of operating income in FY25 driven by the expansion of the business in growth areas.

Segment Structure

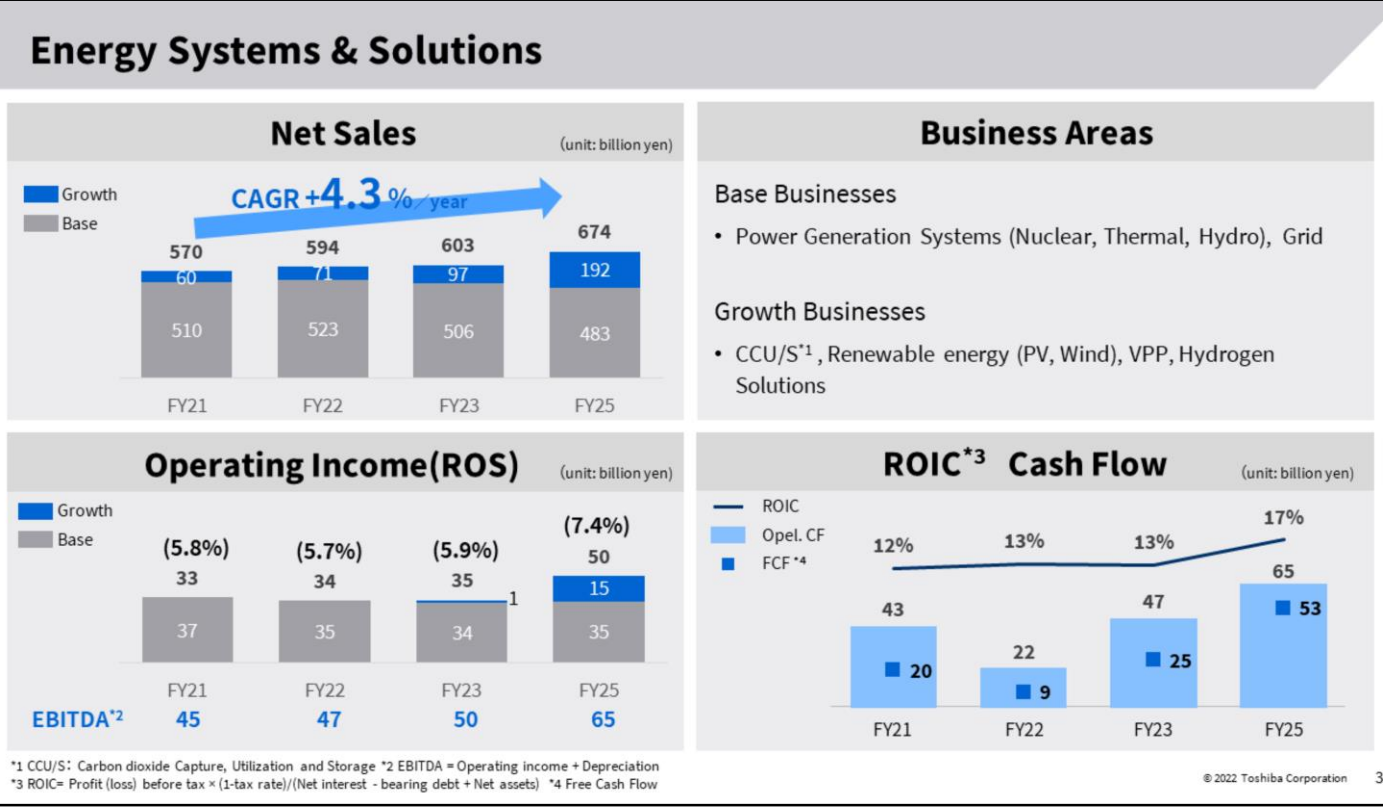


From here, I would like to explain the business plan and growth strategy for each of the business segment.

Segment Structure



First, Energy Systems & Solutions segment.



The business plan of Energy Systems & Solutions is expressed in terms of base businesses and growth businesses, on the slide.

The base businesses include the power systems business for nuclear and thermal power plants that will generate stable profits over the long-term, and as well as the grid businesses.

The growth businesses include product and services for renewable energy such as next-generation PV and wind, VPP, hydrogen solutions, and CCU/S.

We are planning to achieve ROS of 7.4% and ROIC of 17% in FY25, when we can expect greater contribution from growth businesses in addition to from stable base businesses.

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

This is the breakdown of the Energy Systems & Solutions which is made up of Power Generations Systems, Transmission & Distribution Systems and others.

We will look at each business in more detail on the following slides.

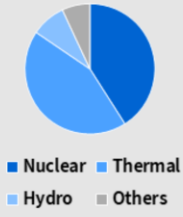
Energy : Power Generation Systems

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

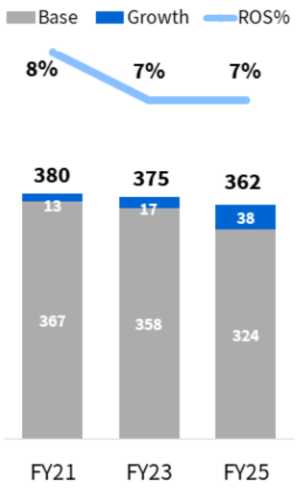
Business Composition



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

First, the Power Generation Systems business.

As shown on the left, it is made up of nuclear, thermal, hydro and others.

Priority measures are described in the middle, we intend to maintain and expand service solutions in the Power Generation Systems business making use of our advanced capabilities in engineering and project management.
At the base business, the provisional services to nuclear and thermal power plants has remained stable, and the order backlog for this business is now over 1 trillion yen.
We have made a strong progress with business conversion regarding thermal power plants with services now accounting for 50% in FY20, making contributions more stable earnings.

The business plan is shown on the right.
We are planning to maintain high ROS are based on stable earnings from from base businesses, although net sales will remain more or less flat.

CCU/S (CO_2 Capture, Utilization and Storage)

Lead market creation with world-class technology

Focus Area

CO_2

CCU/S*1

Separates, captures, utilizes, and stores CO_2 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 CO_2 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**

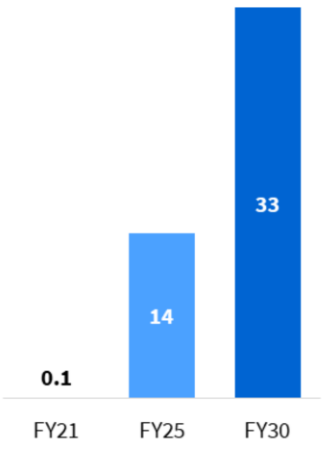
Demonstration of high CO_2 recovery performance

(at Mikawa Power Plant of SIGMA POWER Ariake Corporation)

- **Recover most of CO_2 in exhausted gas from combustion**
- **Japan's largest CO_2 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

As an example of a growth business in the Power Generation Systems business, I would like to explain CCU/S, a business to capture, utilize and store carbon dioxide made it from various plants.

Driven by growing interest in carbon neutrality, businesses that limit CO_2 have continued approach us inquiring about our CO_2 separation and capture technologies.

The advantage of our technology described at the bottom is that it can be applied to various type of facilities that generate CO_2 as it is based on the post-combustion capture technology uses a technique called chemical absorption.
It can be used widely in general industry area not just with power plants.

One of our group companies, Sigma Power Ariake, completed its Mikawa Power Plant in 2020.
This was the world's first biomass power plant equipped with a large-scale CCS.
And it is currently demonstrating its high CO_2 capturing capacity of 600 tons per day.

Net sales of the business is shown on the right.
We aim to achieve net sales of 30 billion yen in FY30, by responding to the needs of our customers using our higher efficiency technologies and expertise we have accumulated over many years in the areas of general industries and the power generation.

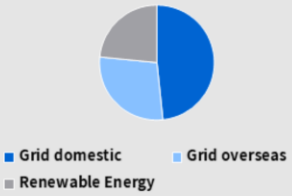
Energy : Transmission & Distribution (T&D)

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

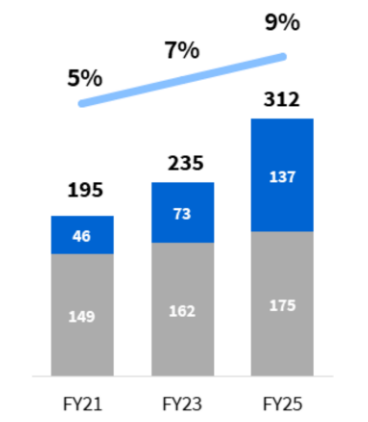
Business Composition



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)



Transmission & Distribution business will lead the growth of Energy Systems & Solutions segment.

In the Transmission & Distribution business, we provide a wide range of technologies and products, including renewable energy development, transmission and distribution services, and energy management, as shown on the box in the left-hand side.

As shown in priority measures listed in the box in the middle, renewable energy remains a key growth area for the business.
To meet the increased demand, we will be introducing next-generation PV, entering the domestic offshore wind market, and launching our energy aggregation business.

The business plan is shown on the box in the right-hand side.
We expect this business to achieve net sales of around 300 billion yen and ROS of 9% in FY25.

I will explain photovoltaic, wind power and VPP, as examples of growth businesses in T&D business.

Photovoltaic

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

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)

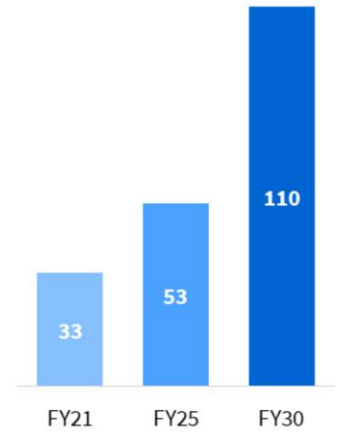
Cu_2O tandem type*3

High efficiency x Lightweight

Control impurities in Cu_2O 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**

Net Sales (unit: billion yen)



*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

First, I will discuss photovoltaic.

We believe that we will be able to gain an advantage in the next generation PV market based on our record of being No. 1 in installing mega-solar power domestically, and our experience in providing the one-stop solutions from EPC to O&M.

Our low cost, lightweight, and flexible film-type perovskite, which is shown in the left-hand side of the box in below, can be installed in places where conventional solar cells are not a good fit. This includes windows in office buildings and roofs of electric vehicles.

In the bottom of the slide, our Cu_2O tandem-type is the first of its kind technology in making transparent cells.
This efficient and light weight technology can be used on EVs and other electric mobility to realize no-plug charging driving.

The graph on the right-hand side shows net sales of the business.
Currently, the net sales of our solar power generation-related business is just over 30 billion yen, but through our aggressive growth plans to meet rising demand, we anticipate it triples to 110 billion yen in FY30.

Wind Power

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 or offshore wind (including floating offshore wind turbines) by 2040

Growth Strategy

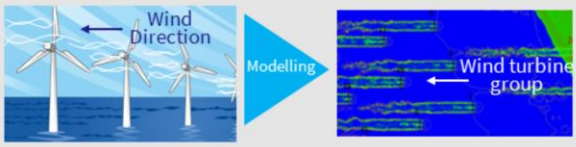
Enter into new market through partnering strategy

- 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 condition analysis of offshore wind farm

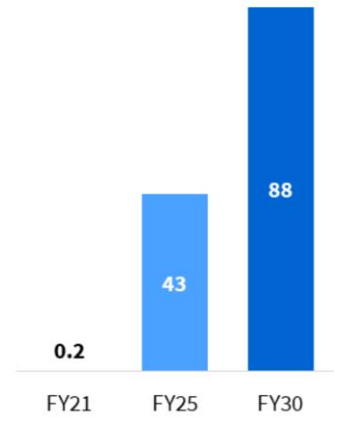
Analysis technologies cultivated in onshore wind experiences

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

Net Sales (unit: billion yen)



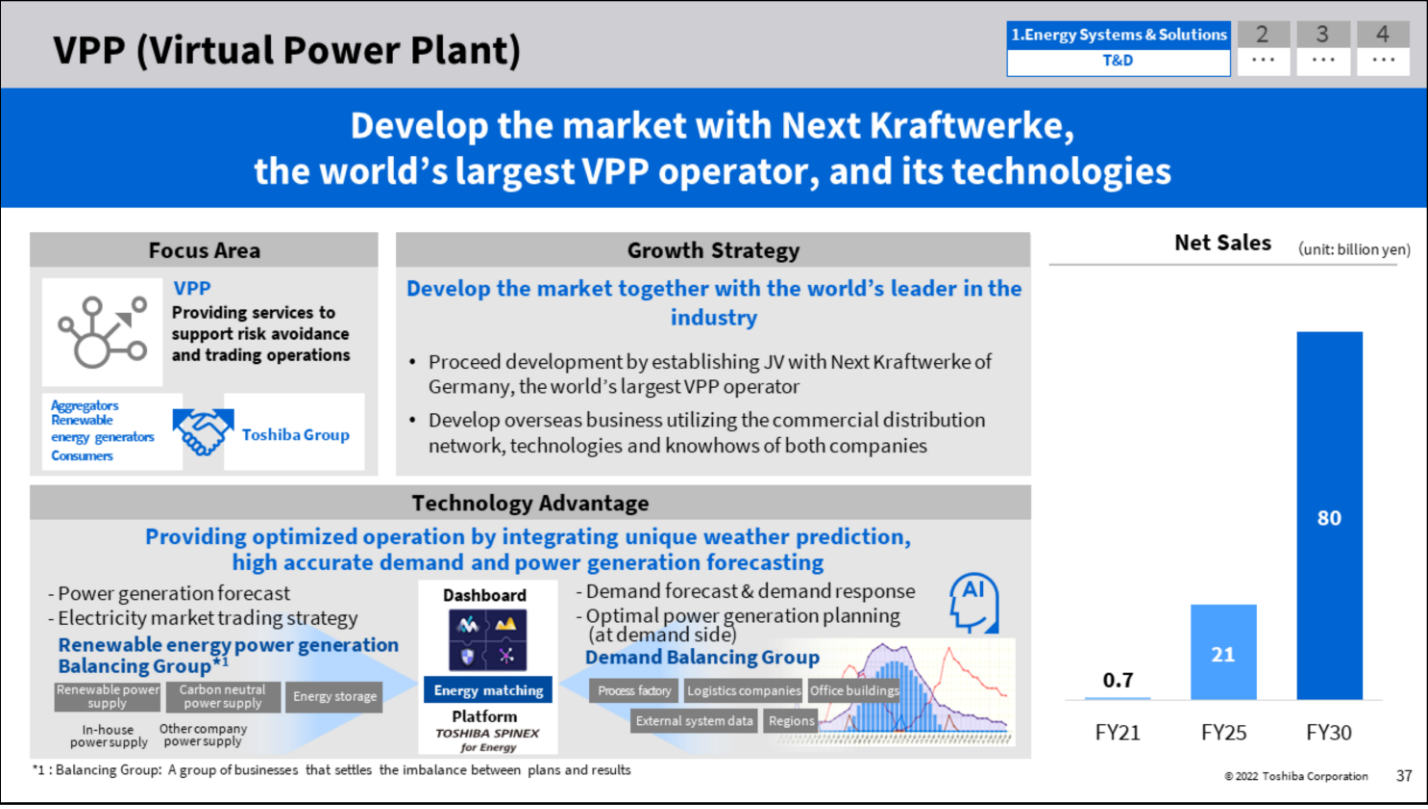
*1 : Press Release on May 11th 2021, https://www.toshiba-energy.com/en/info/info2021_0511_02.htm
*2 : Press Release on April 19th 2021, https://www.toshiba-energy.com/en/info/info2021_0419.htm

Next, I will discuss wind power generation.

In collaboration with GE, we are planning to enter the offshore wind market in Japan.
As shown in the upper left box, the government has set a goal of installing up to 45GW of offshore wind by 2040, and our work in this area will help Japan meet this important goal and have carbon neutral society.

The box in below shows our technology advantage.
Based on the analytical technologies developed for onshore wind power generation, we will develop wind condition analysis technologies that reflect the temperature effects of the sea surface and the mutual effects between wind turbines to optimize the efficiency of the entire offshore wind farm.

The graph on the right shows net sales of the business.
We anticipate sales in this business to increase to over 40 billion yen in FY25 and reach 88 billion yen in FY30.

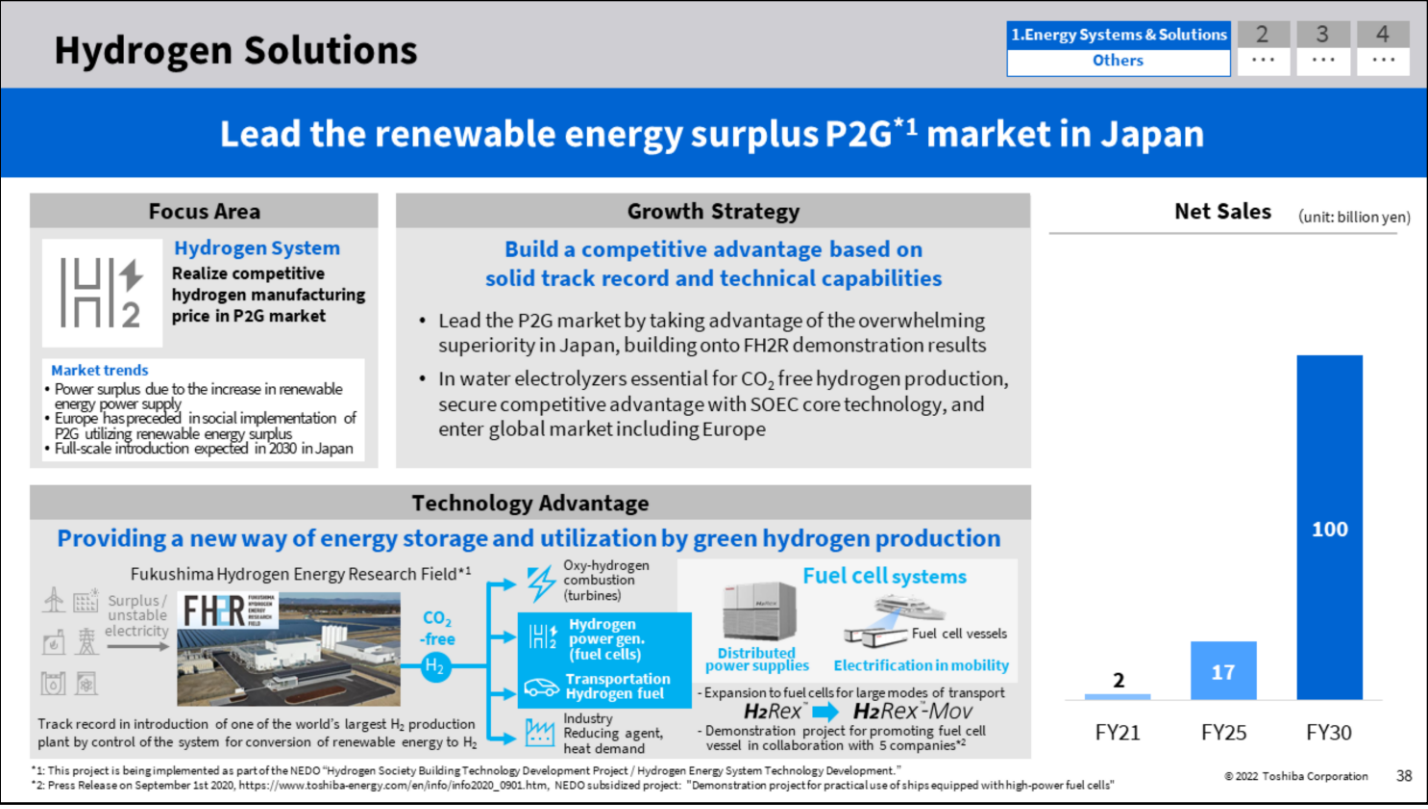


Next, I will discuss the VPP virtual power plant.

In November 2020, we established a joint venture with Next Kraftwerke, the world's largest VPP operator, and have been actively preparing for the launch of the government's new feed-in-premium scheme – or FIP – in April 2022.

Our technology advantage is shown in the box at the bottom.
We are developing high-precision demand forecasting and optimum control technologies and other forecasting technologies for renewable energy generation.
We will implement these technologies in TOSHIBA SPINEX for Energy to provide a large number of micro-services, and offer optimal solutions for energy management by integrating the power generation and demand offerings.

The graph on the right shows net sales of the business.
Consistent with our expectation that the market will rapidly expand in the future, we anticipate net sales to reach 20 billion yen in FY25 and to rise up to 80 billion yen in FY30.



Finally, I will explain about hydrogen solutions.

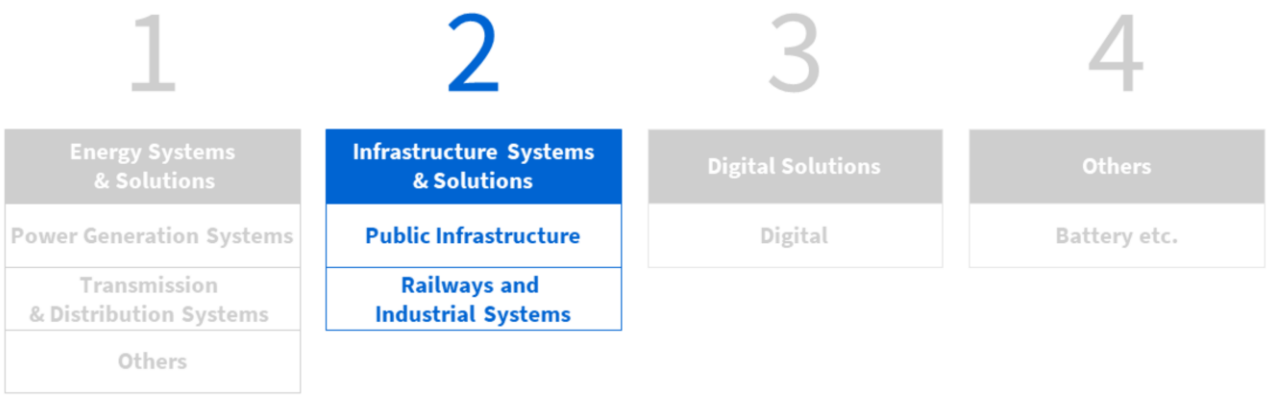
As shown in the upper left box, based on Europe's rising demand for renewable energy solutions, we believe that Japan's needs for P2G will also increase as a way to convert surplus power to gas such as hydrogen.
In the domestic market, full-scale implementation is expected to begin in 2030 onwards.

Our technology advantage is shown in the box at the bottom of the slide.
The Fukushima Hydrogen Energy Research Field is one of the world's largest CO_2 free hydrogen production facilities that utilizes renewable energy, and its R&D initiatives are leading to new energy management capabilities to grid balancing.
CO_2 free hydrogen is used in a variety of applications, including power generation, fuel and industrial reducing agents.

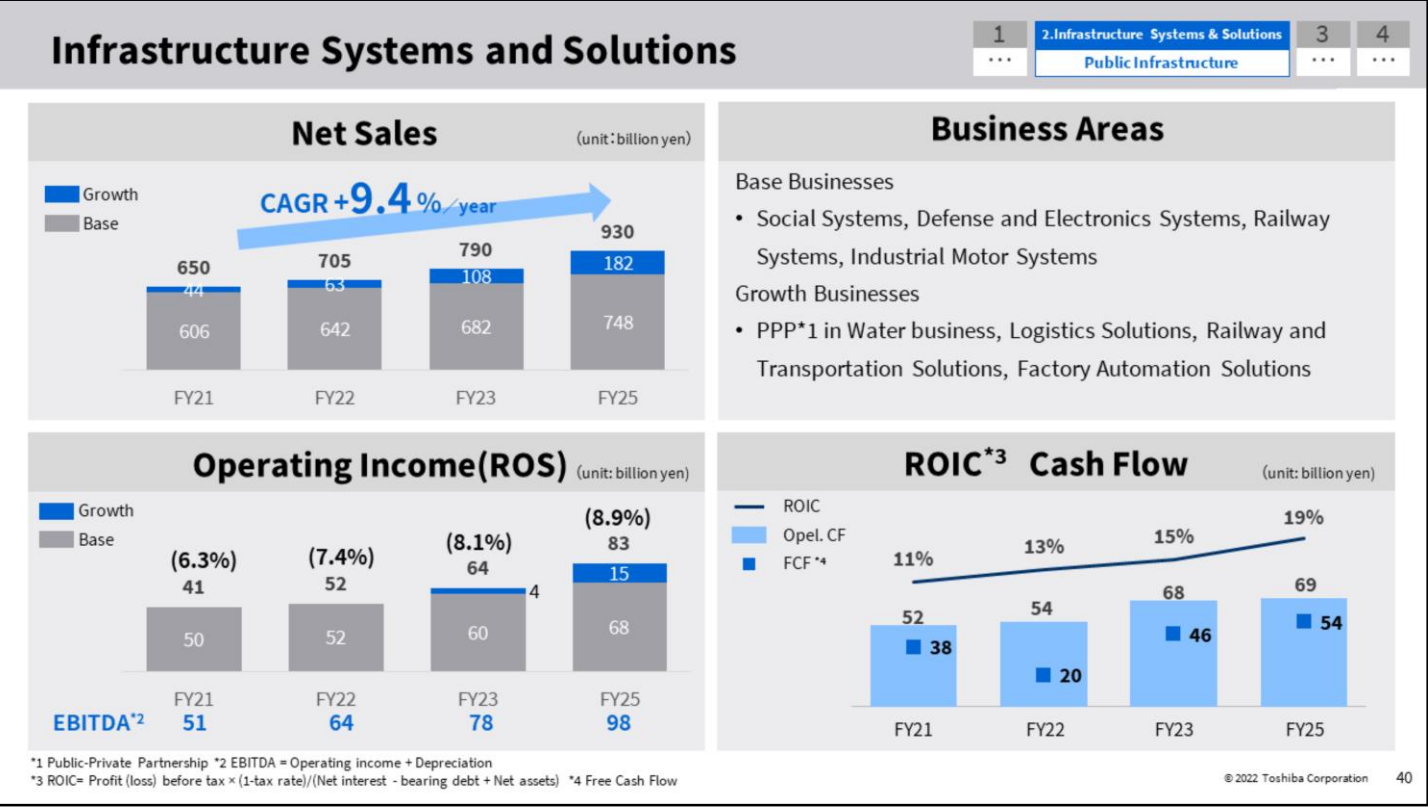
In the bottom right corner of the slide, as for fuel cells, H2Rex-Mov for mobile vehicles has been newly developed from H2Rex for stationary applications.
The demonstration on pilot project for fuel cell vessels is being promoted collaboration among five companies, including Toshiba.

The graph on the right-hand side shows net sales of the business.
We want to expand the reach of our hydrogen systems and services as the production unit prices becomes more competitive, through high efficiency SOEC technology.
We anticipate that our net sales will reach 100 billion yen in FY30.

Segment Structure



Next, I will discuss the infrastructure Systems & Solutions segment.



On this slide, we look at the growth plan in both base businesses and growth businesses in Infrastructure Systems & Solutions segment.

While building on to existing businesses such as Social Systems, and Defense and Electronics Systems, we want to capture new opportunities created by the rise in public-private partnerships (PPP) and by the solutions businesses such as logistic, railway transportation and factory automation.

We believe this combination will drive our growth in net sales and profitability, which will reach 9.4% annual growth in net sales, 8.9% ROS, 19% ROIC in FY25.

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

This is the breakdown of the Infrastructure Systems & Solutions segment by businesses.
It contains Public Infrastructure business, Railways and Industrial Systems business, and others.

We will look at each business in more detail from the next slides onwards.

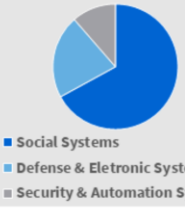
Infrastructure : Public Infrastructure

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



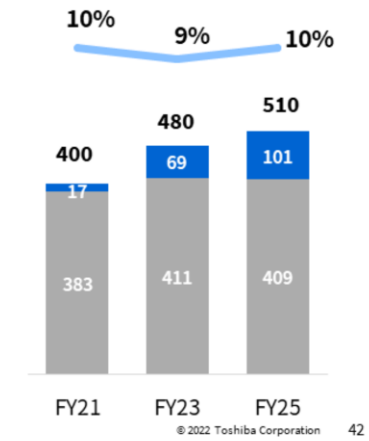
Priority Measures

【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)



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

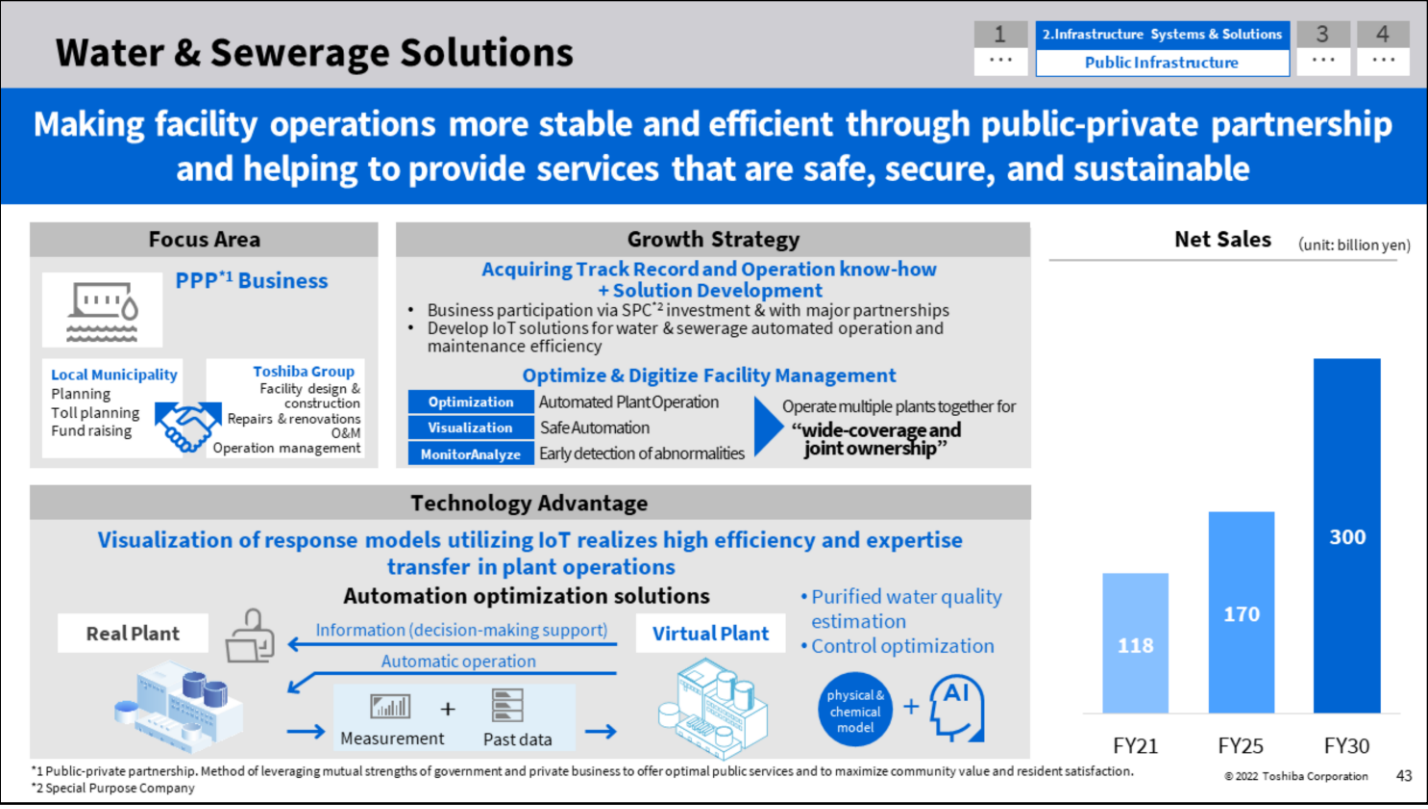
Public Infrastructure business contains Social Systems, Defense & Electronic Systems, and Security & Automation Systems.

The left box shows the market environment of this business.
Considering responses to the expanding needs in public-private partnerships for aging social infrastructures and in seeking for measures on the national resiliency against natural disasters as growth opportunities, we will be providing solutions to public and private customers.

In the box in the middle, in our Social Systems business, we will strengthen our existing offerings and expand into new growth areas by strengthening partnership in water and sewerage solutions business and programmatic M&A.
Defense & Electronic Systems will expand base business with differentiated technology and enter into new business such as counter drones business.
Security & Automation Systems will develop security solution business in existing area, in addition, expand logistics solutions business.

The business plan is shown on the box in right-hand side.
We expect this business to achieve net sales of around 500 billion yen and to keep 10% ROS in FY25, through stable base business area and enhancing solution businesses.

I will explain from the next slides onwards, water and sewerage solutions and logistics solutions, as examples of growth businesses in Public Infrastructure business.

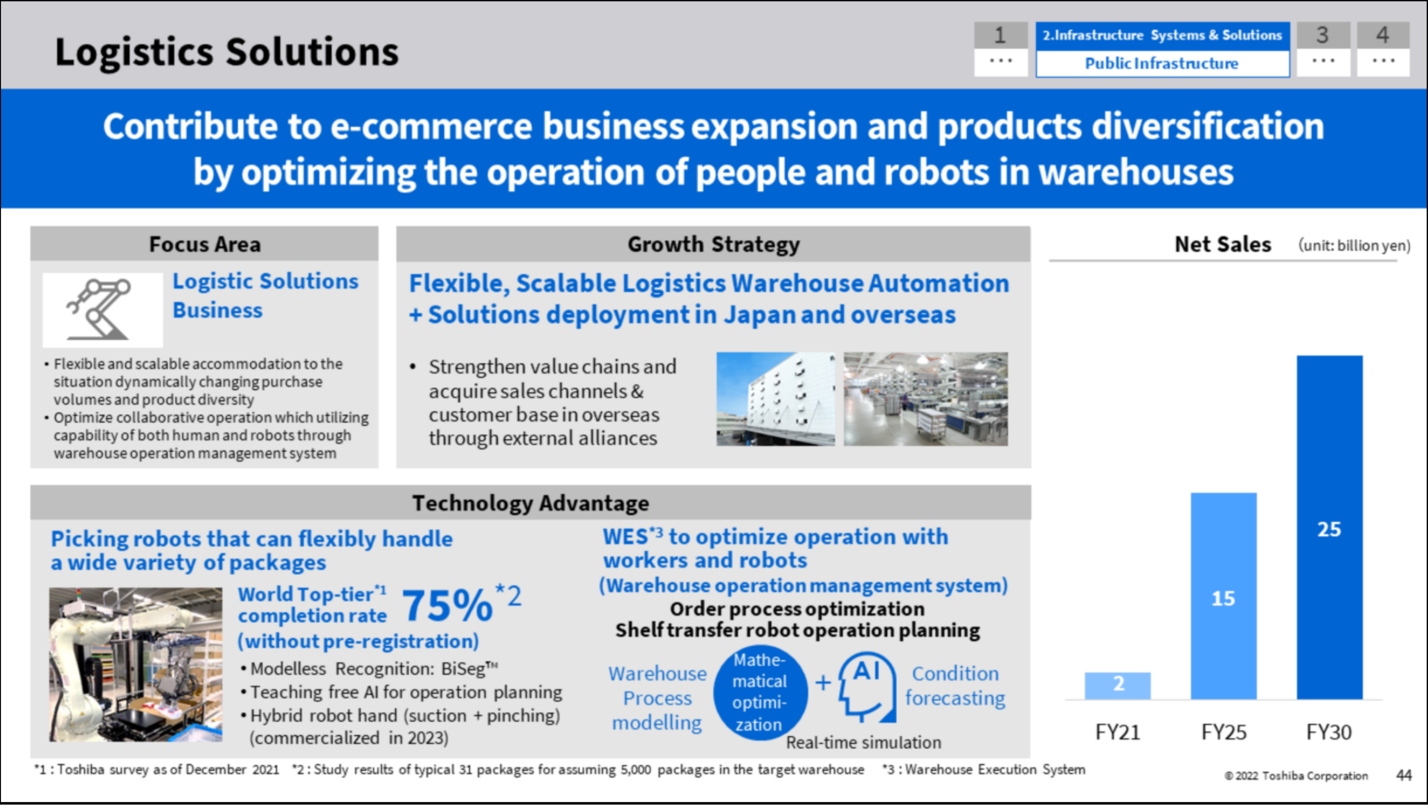


First, water and sewerage solutions.

The upper box shows our growth strategy.
We have proven track record of delivering electrical equipment to more than 1,000 locations in Japan, providing O&M services to more than 30 locations.
We will play our inherent strength to acquire additional operational expertise by investing in SPCs and supporting business operations.
We will also support our growth by developing IoT solutions to automate operations and improve maintenance efficiency.
By promoting optimization and digitization of facility management, we will respond to "wide-coverage and joint ownership" of multiple plants, and will contribute safe and sustainable services with public-private partnership.

As shown in the box at the bottom, the optimized automation solution realizes high-efficient automatic operation and transfer of expertise by estimating water purification quality and performing control optimization in virtual plants utilizing physical and chemical models and AI.

The graph on the right shows net sales of the business.
We anticipate that our water and sewerage segment will grow from just under 120 billion yen in FY21 to 300 billion yen in FY30, in total as Water Supply & Sewerage Business.



Next, I will discuss our logistics solutions.

We believe that logistics functions will become increasingly critical as more people change their lifestyles due to the COVID-19.
And in order to respond labor shortages such as people having less children and the aging society, our innovative logistics solutions can also help address growing labor shortages and the need to improve productivity.

The upper box shows our growth strategy.
We will leverage the SI and mechatronics technologies we have cultivated through our mail sorting machines and logistics equipment businesses to develop automation and labor-saving solutions for logistics warehouses domestically and overseas.

As you can see at the bottom left corner of the box, our picking robots can realize world top-tier picking ratio of 75% without being pre-registered.
Warehouse Execution System combines mathematical optimization with AI to optimize order processing and make a shelf transfer robot operation plan to optimally distribute packages to workers and robots.

The graph on the right shows net sales of the business.
We anticipate net sales to reach 25 billion yen in FY30 as digitalization of the global economy accelerates.

Infrastructure : Railways and Industrial Systems

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)

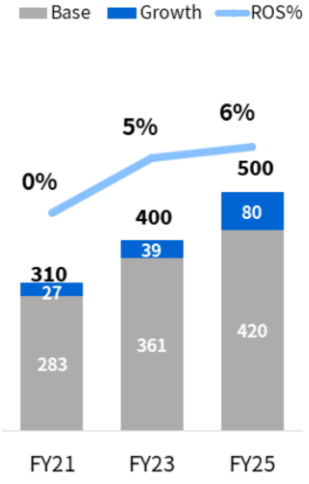
Business Composition

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)



This slide shows Railways and Industrial Systems business which is another core business area in Infrastructure Systems & Solutions segment.

The left box shows the market environment of this business.
We understand decrease in use of railways and decrease in factory utilization rate affected with COVID-19.
On the other hand we anticipate steady increase of demand to save energy consumption in railways and increase in automated vehicles in need for carbon neutrality, and that will be our opportunity to provide our solutions.

In the box in the middle, in our Railways Systems business, we will expand base business of electrical products for vehicles in domestic and overseas market, and will contribute to improve efficiency and save energy of railway operators through Traction Energy Storage System (TESS) and IoT maintenance services.
In industrial Systems business, we will expand high-efficiency automotive motors, and IoT solutions such as cloud controllers for factories.

The business plan is shown in the right box.
Although we are facing severe financial outlook in FY21, due to the supply problems in electronic devices, steep rise in prices of parts and materials, longer logistics lead time and spikes in transportation cost, and lack of supplying the products from factory in Vietnam caused by lock-down, we plan to recover ROS 6% with strong sales expansion up to 500 billion yen in FY25.

I will explain railway transportation solutions and factory automation solutions, as examples of growth businesses in Railways and Industrial Systems business in the next

pages onwards.

Railway Transportation Solutions

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

Traction inverter with all-SiC devices

Battery for power failure operation mode with regenerative energy function

Permanent Magnet Synchronous Motor (PMSM)

Energy Saving Carbon Neutral

Resilient Infrastructure

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

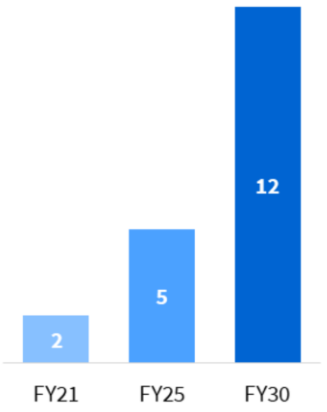
Charging TESS*1 Discharging

deceleration (regenerate energy)

Acceleration

*1: Traction Energy Storage System

Net Sales (unit: billion yen)



Now, I will discuss railway transportation solutions.

The upper box shows our growth strategy.
In railway transportation solutions, we will contribute to reducing the environmental impact of railway operators by utilizing surplus electric power and energy-saving measures enabled through our Traction Energy Storage System.

The box below shows our technological advantage.
Using on-board and ground equipment that utilizes SCiB™ for energy management, it provides energy-saving and resilient power systems by reducing power consumption and realizing emergency driving in the event of a power failure.

The graph on the right shows net sales of the business.
We are aiming to grow it to 12 billion in FY30.

Factory Automation Solutions

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

Focus Area

Instrumentation Cloud Service Business

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

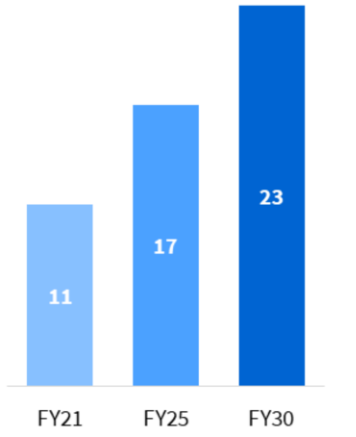
Growth Strategy

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

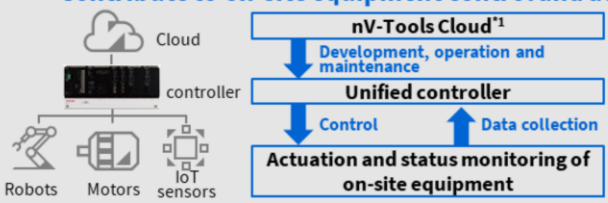
Net Sales

(unit: billion yen)



Technology Advantage

Contribute to on-site equipment control and advanced data utilization



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)

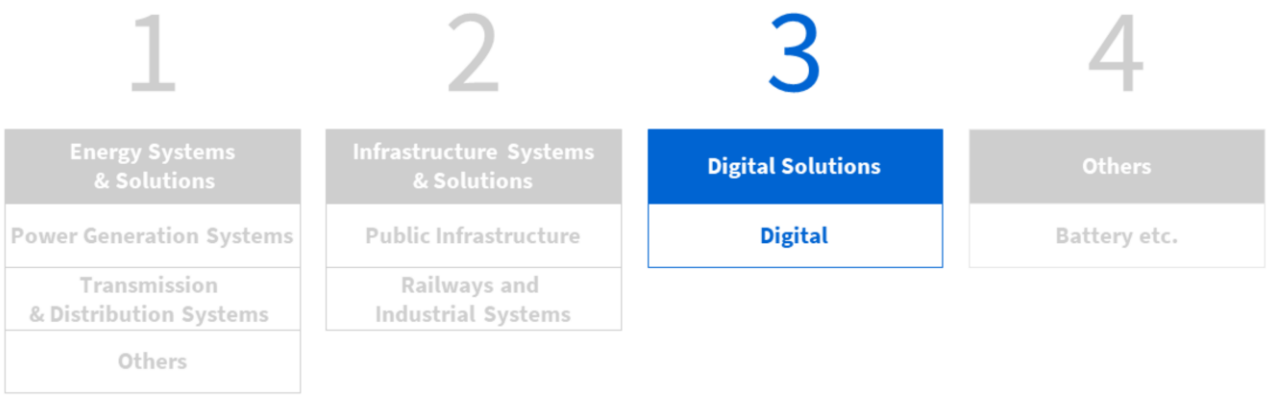
Next is factory automation solutions.

The upper box shows our growth strategy.
In order to provide solutions for labor shortages or remote-control requirements at plant sites, we provide one-stop-shop services from control and management of equipment to data utilization by providing a flowmeter platform enabled by cloud-based software controllers.

The box below shows our technological advantage.
Unified controller with advanced data processing can contribute to equipment actuation and full data utilization.

The graph on the right shows net sales of the business.
We expect current net sales of 10 billion yen to grow over 20 billion yen in FY30.

Segment Structure

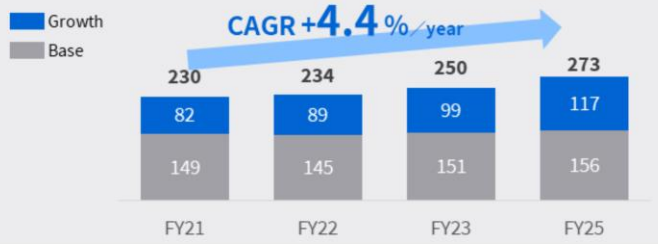


Next is regarding Digital Solutions segment.

Digital Solutions

Net Sales

(unit: billion yen)



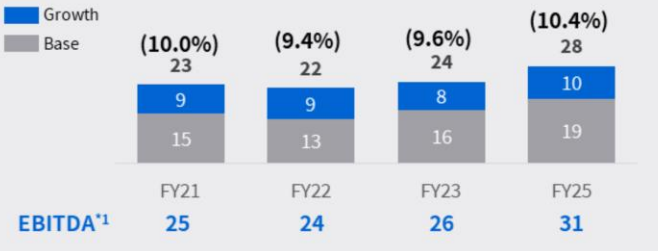
Business Areas

Base Businesses
- System Integration business, Embedded business

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

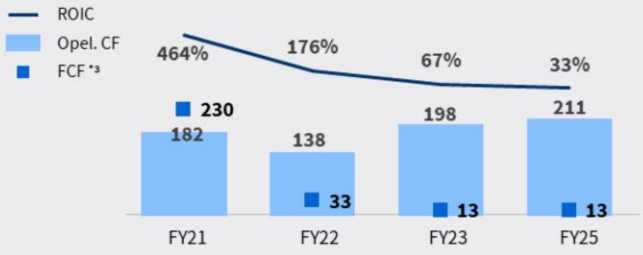
Operating Income(ROS)

(unit: billion yen)



ROIC*2 Cash Flow

(unit: billion yen)



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

On this slide, we look at the growth plan in both base businesses and growth businesses in Digital Solutions segment.

For growth businesses, we will focus on the data service business and launch the smart factory business and the HR data utilization business.
We expect free cash flow to decline in FY22 as we plan to execute strategic and programmatic M&A to expand our business.
We believe this stronger platform will enable us to achieve ROS of more than 10% in FY25.

Looking forward to the long-term, we will continue to move forward with the advancement of our quantum key distribution business, which we will steady contribute to growth beginning in FY30.

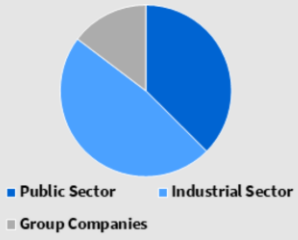
Digital : Digital Solutions

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.

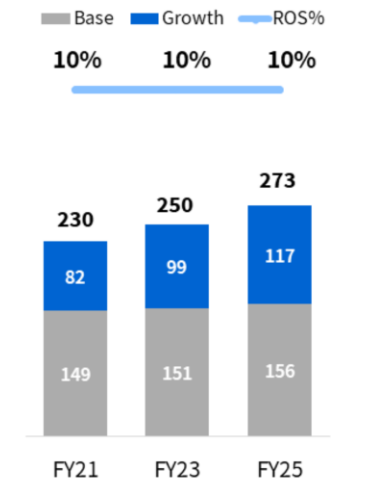
Business Composition



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)



In the digital solutions business, we will expand our solution and managed services by leveraging our industry knowledge.

The left box shows the market environment of this business.
As digital transformation efforts progress and expand investments, we will realize growth by capturing opportunities.

In the box in the middle, in our Digital Solutions business, we will leverage our deep industry knowledge gained over many years to develop IoT solutions and promote the shift to data services that utilizes accumulated data.

The business plan is shown in the right box.
We expect this business to achieve net sales of around 270 billion yen and to keep high ROS of 10% in FY25.

I will explain smart manufacturing business and Quantum Key Distribution business, as examples of growth businesses in Digital Solutions business.

Smart Manufacturing

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

Toshiba Group
Digital Twin
Software Controller
Asset Administration Shell
AI

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

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

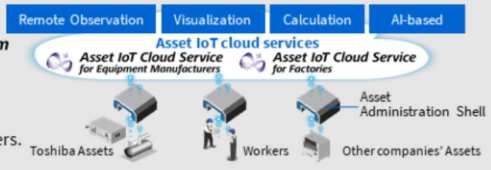
Technology Advantage

Factory IoT Platform for combining multiple factories

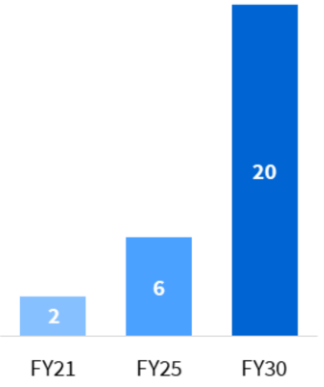
Manufacturing data platform

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

Quick application of open-information model "Asset Administration Shell*1"



Net Sales (unit: billion yen)



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

First, I will discuss smart manufacturing.
We will utilize our in-house practice of smart manufacturing and the expertise gained from our Manufacturing Engineering Center to digitize customers' entire factories in the industrial sector.

The upper box shows our growth strategy.
We will deploy IoT tools practiced within Toshiba Group through partners, and we will deploy AI services and data services on the ecosystem built with equipment manufacturer.
We already have deployed 40 some solutions with 85 partners.

The box below shows our technological advantage.
An upgrade to our Meister Digital Twin has added an online function for combining data from multiple factories, including Toshiba and partnering company's factories.
We were also one of the first to respond to the Asset Administration Shell proposed by Industrie 4.0.
We will contribute to O&M efficiency by enabling that we can collect and utilize facility data not only from the equipment of Toshiba Group, but also from other partner companies as well.

The graph on the right shows net sales of the business.
We anticipate this business to grow steadily with net sales reaching 20 billion yen in FY30.

Quantum Key Distribution (QKD)

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

Focus Area

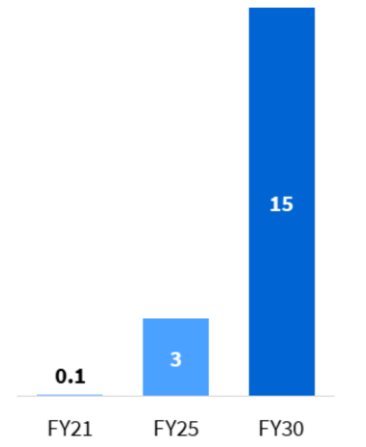
Providing platforms that deliver secure end-to-end cryptographic communication

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

Net Sales (unit: billion yen)



Technology Advantage

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

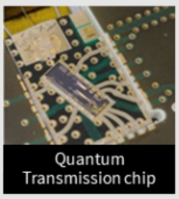
Commercialized in 2021

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

*1: Quantum STrategic industry Alliance for Revolution *2: Part of this achievement is supported by the EU through the Horizon 2020 project OpenQKD. *3: Part of this achievement is supported by Agile Quantum Safe Communications, an InnovateUK joint research and development project through the Industrial Strategy Challenge Fund of the UK Government.

Next, I will discuss our QKD, quantum key distribution solutions.

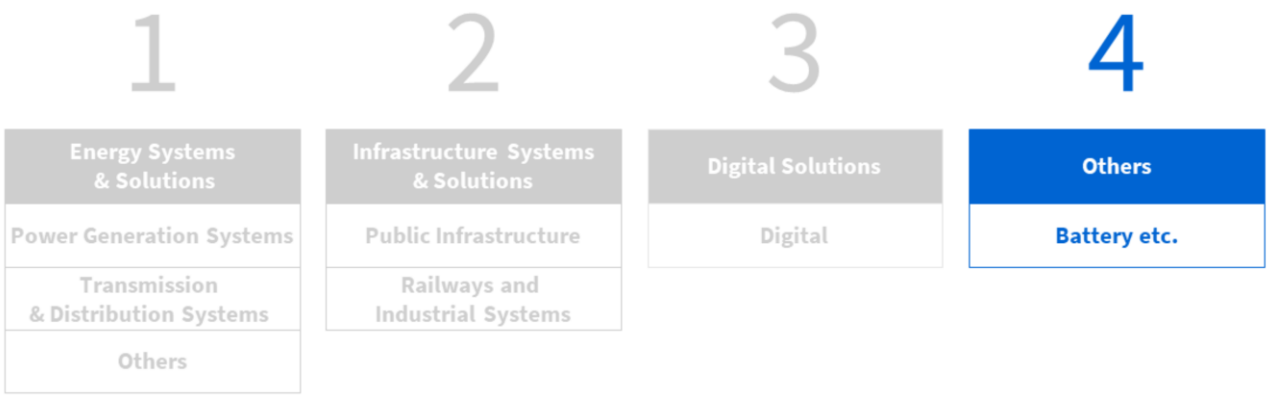
The upper box shows our growth strategy.
We are expanding our quantum key service globally by making it a platform that enables quantum cryptographic communication, making it theoretically impossible to eavesdrop.

The box below shows our technology advantage.
The products commercialized in 2021 achieved the world's highest key delivery speed and longest key delivery distance.
In addition, through a research aimed at a more advanced and easy-to-use system resulted to have miniaturized chip-based system and the system capable of over 600km of communication distance.

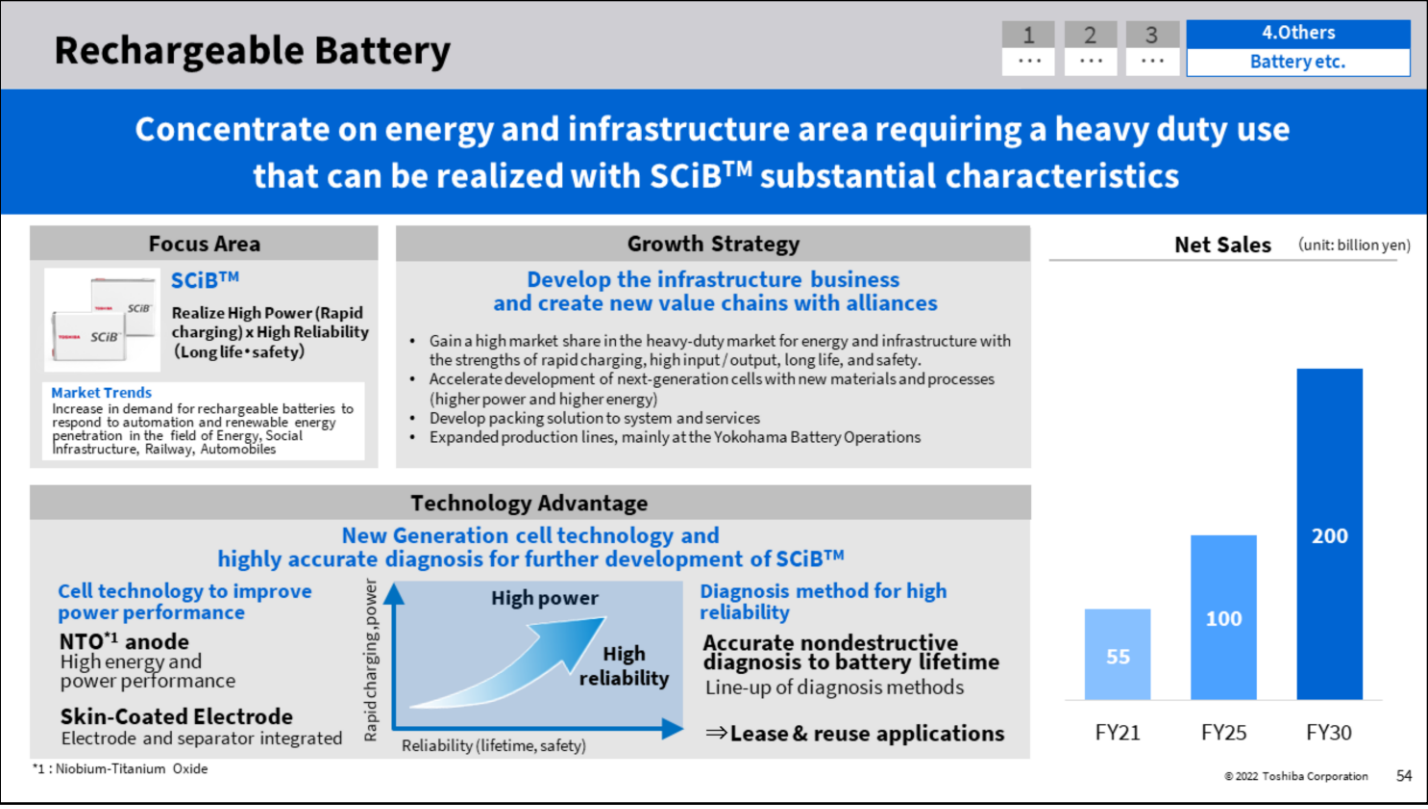
Currently, feasibility studies are ongoing, but collaboration among industry, government, and academia has led to the launch of Quantum Strategic industry Alliance for Revolution (Q-STAR), a council for the creation of new industries using quantum technology.
Activities toward commercialization are rapidly progressing.

The graph on the right shows net sales of the business.
We intend to build a quantum key distribution service of approximately 15 billion yen in FY30.
Longer-term, as quantum cryptography networks become increasingly popular due to heightened awareness of cyber security, we expect the scale of our business to grow to become even more robust from FY30 onwards.

Segment Structure



Finally, I will discuss our Rechargeable Battery business.



As shown in upper left box, we have developed SCiB™, which has the features that other batteries cannot achieve through the use of lithium titanate as negative electrode.
Our differentiators include its rapid charging and discharging, long life, and safety.

The upper box shows our growth strategy.
We will also contribute to the power supply demand management and the construction of critical infrastructure systems in railways by developing high energy and high-power cells that extend these features, and diagnostic technologies that take advantage of our strengths.
In terms of production, we will expand manufacturing lines mainly at the Yokohama Battery Operations and develop overseas production bases through alliances.

The box below shows our technological advantage.
We will further develop SCiB™ with cell technology to improve power performance and with highly accurate diagnostic technologies that take advantage of high reliability.

The graph on the right shows net sales of the business.
We anticipate the net sales of the business will increase from current about 50 billion yen to reach 200 billion yen in FY30.

Now I will hand over to Ishii, our CTO, to explain technology strategy.

04

Technology Strategy

I’m Ishii, Chief Technology Officer, and I would like to explain Infrastructure Service Co.’s technology strategy.

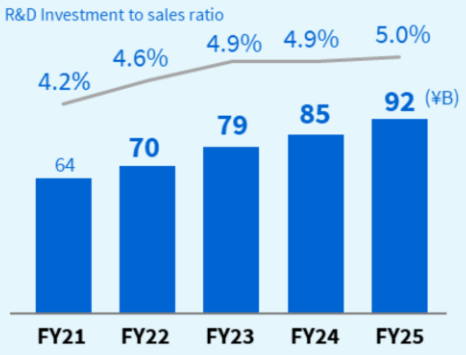
Further Emphasis on Growth Areas : R&D Investment

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

Energy X Digital

- Solar
  (perovskite, Cu_2O 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**

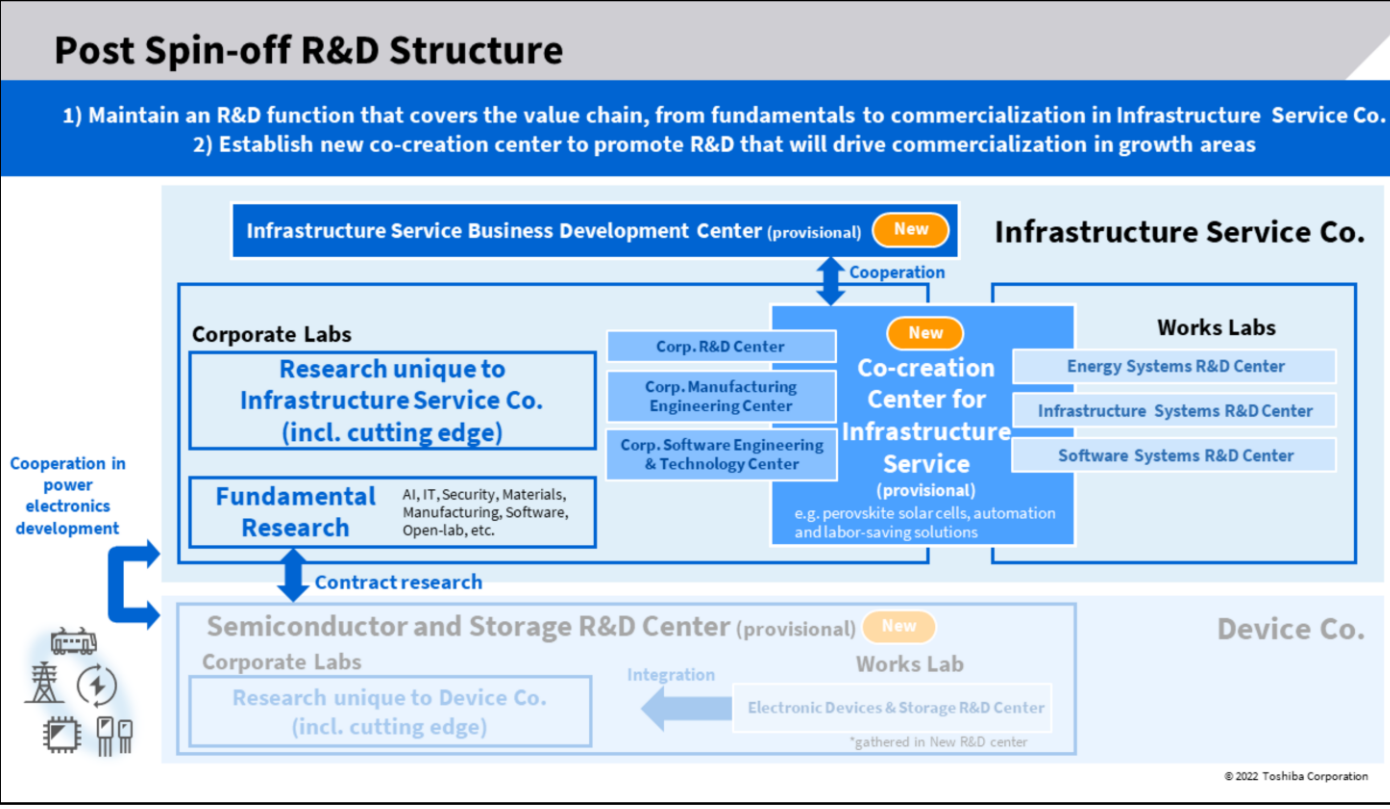
*1 : Power to Gas　*2 : Power to Chemicals　*3 : Carbon dioxide Capture, Utilization and Storage

I would like to explain R&D investments.

The bar graph on this slide shows the R&D investment plan from FY21 to FY25.

Focus areas for energy as well as public and general industries are also shown on the slide.
Over the 5 years from FY21 to FY 25, we are planning to invest approximately 390 billion yen in total.
This is an increase of 50 billion yen compared to the total amounts spend in past five years from FY16 to FY20.

We intend to continue increasing the R&D budget from FY22, with raisin ratio spend vis-a-vis net sales, so that we are able to strengthen our competitiveness further in the growth areas.



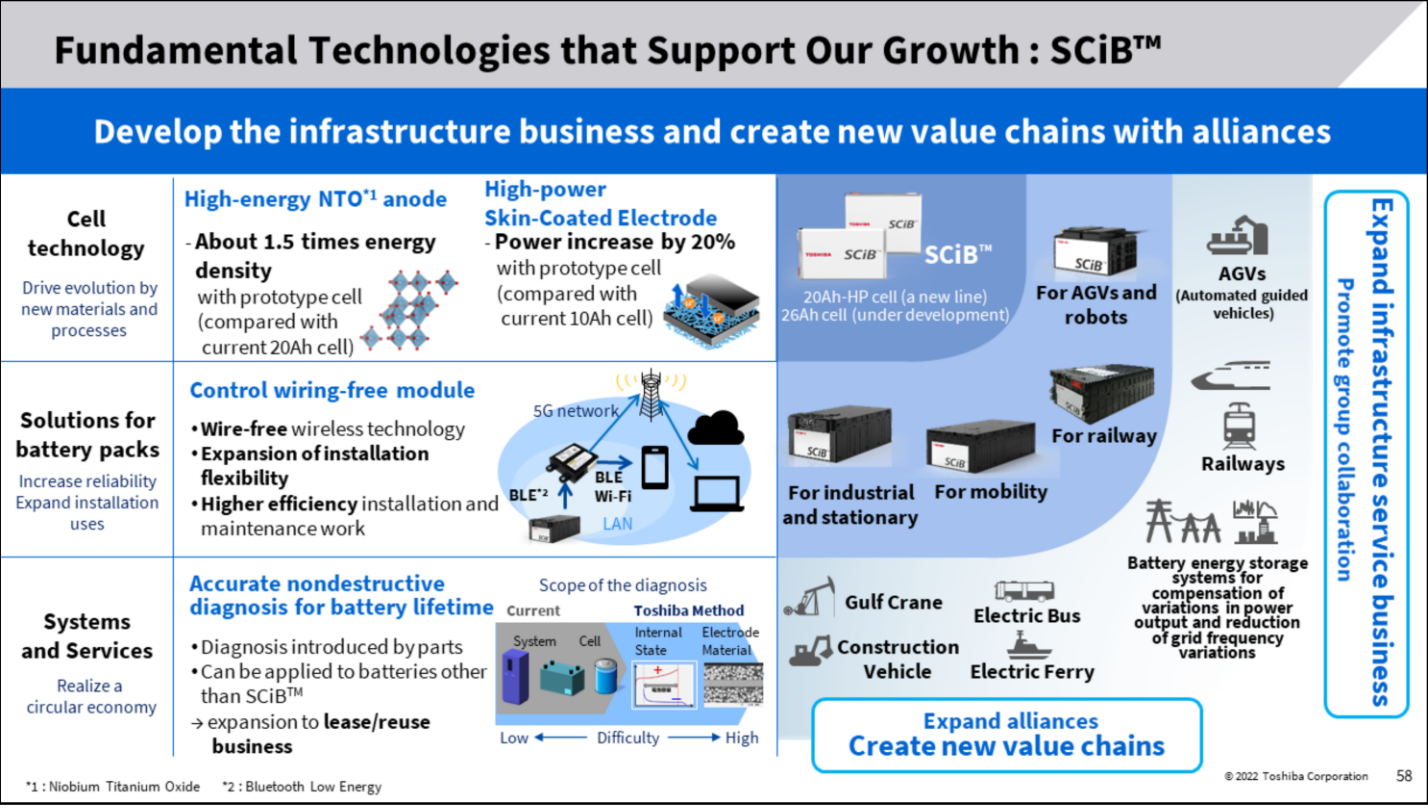
Here you can see our post spin-off R&D structure.

We will maintain an R&D function that covers the value chain, from basic research to commercialization across the business, in not only areas focused on Infrastructure Service Co. but also common areas with Device Co..

We will establish new Co-creation Center for Infrastructure Services with overarching research capabilities across the corporate labs and works labs, and closely collaborating with new “Infrastructure Service Business Development Center” in a business unit side.

We will promote cooperation between these centers, and prioritize R&D that drives commercialization in new growth areas, such as next generation solar cell development, automation and labor-savings solutions.

Next five slides I’ll take a more detailed look at fundamental technologies that underpin our growth, and cutting-edge technologies that we expect to be a driver of future business creations.



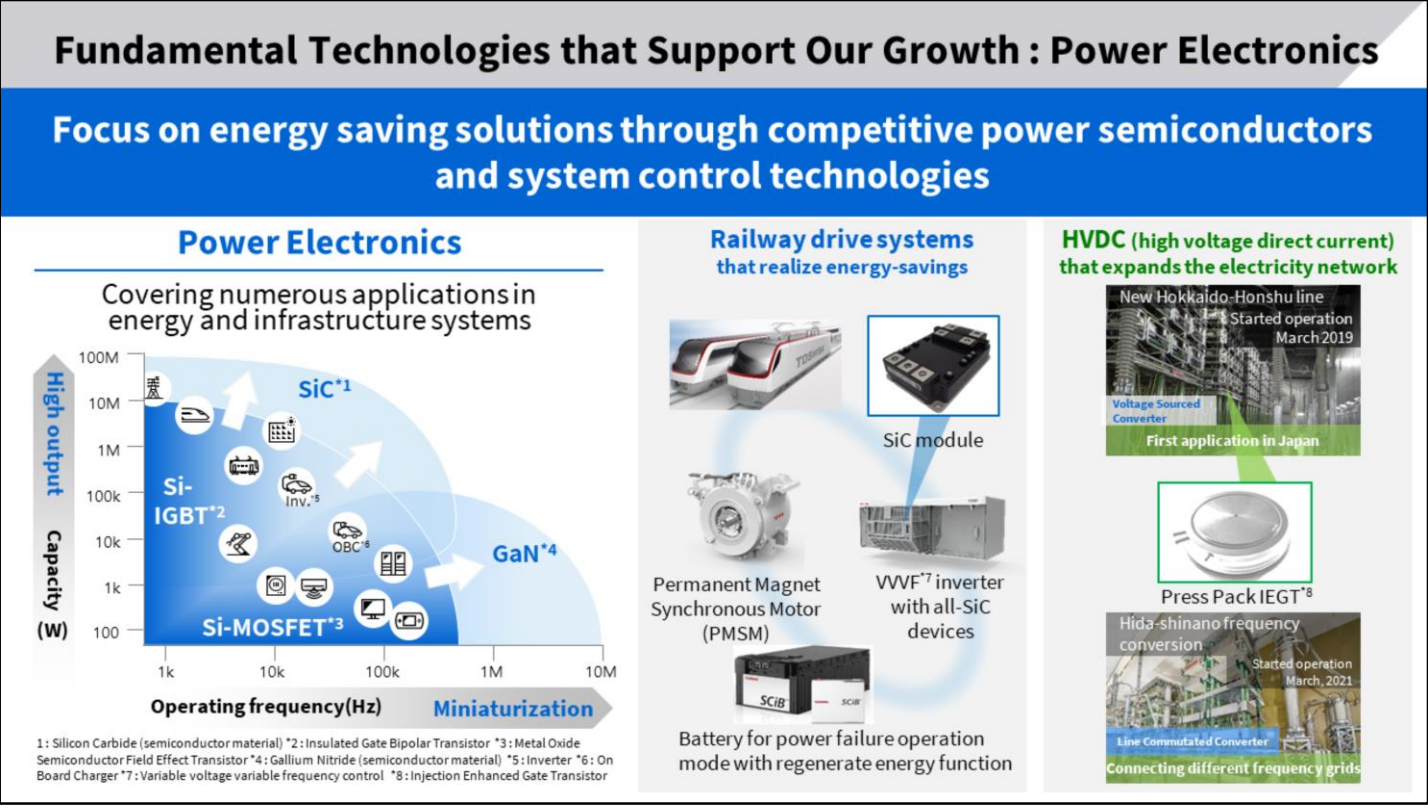
Let me share first example of our fundamental technologies, the SCiB™.

This lithium-ion battery offers the advantages of long life and high reliability, and we are realizing higher energy and higher power cells with the application of new materials and processes.

We are working to expand installation flexibility and simplification of maintenance by developing a control wiring-free module as a solution for battery packs.

Moreover, we are contributing to the realization of a circular economy by applying accurate diagnostic technology to the battery lifetime, to make lease and reuse of batteries possible.

We are also expanding our business to AGVs and railways by promoting group collaboration, and to public infrastructure, such as electric bus and electric ferry, through creating alliances outside Toshiba.

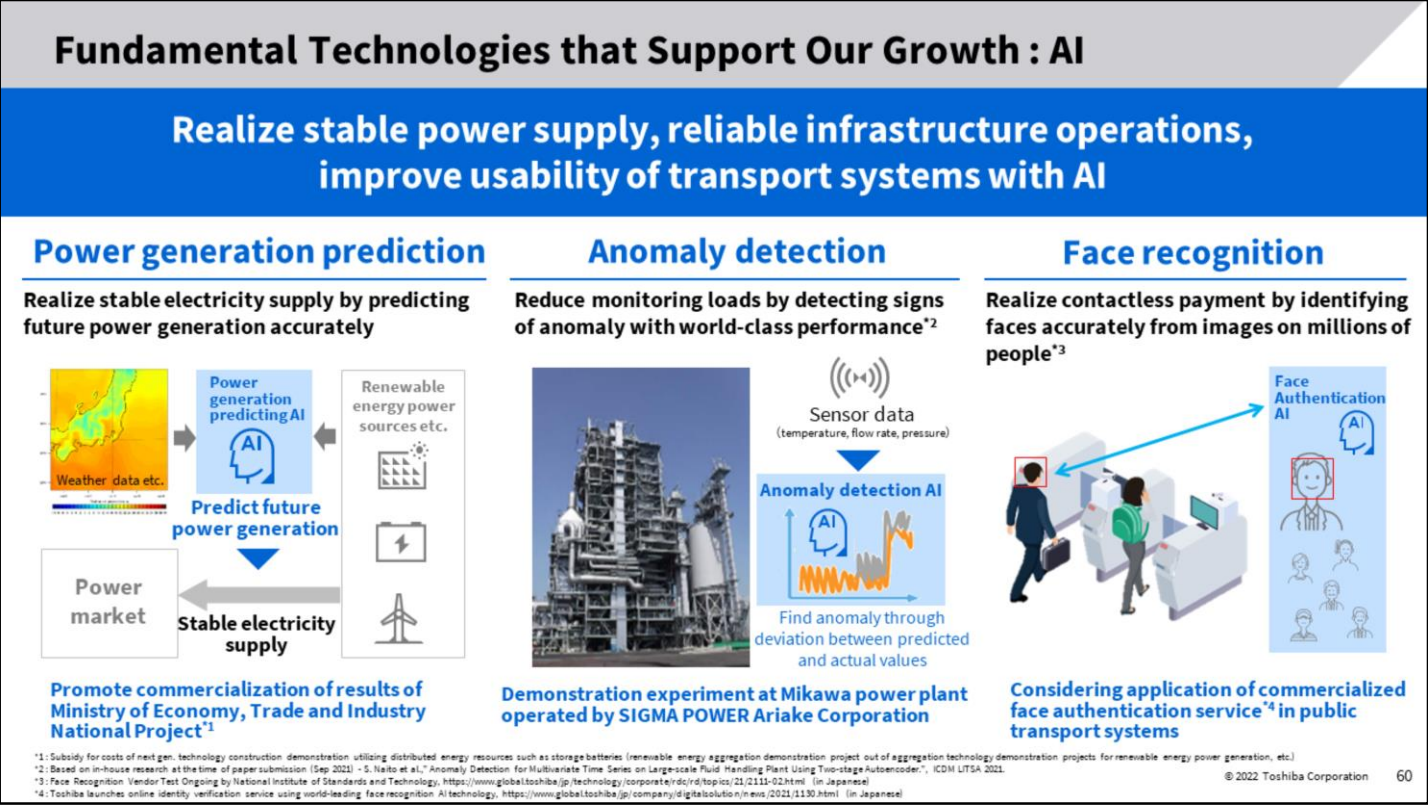


Second example refers to the fundamental technology is our power electronics strategy.

Infrastructure Service Co. provides a wide range of energy and infrastructure products that utilize the excellent energy-saving capabilities of power semiconductors.

We have been developing a converter as a basic technology to support our system and applying it to railway drive systems with SiC compound devices and DC power transmission systems with high withstand voltage Si devices.

We will promote intra-company cooperation and focus on energy-saving solutions through our competitive power semiconductors and system control technologies.



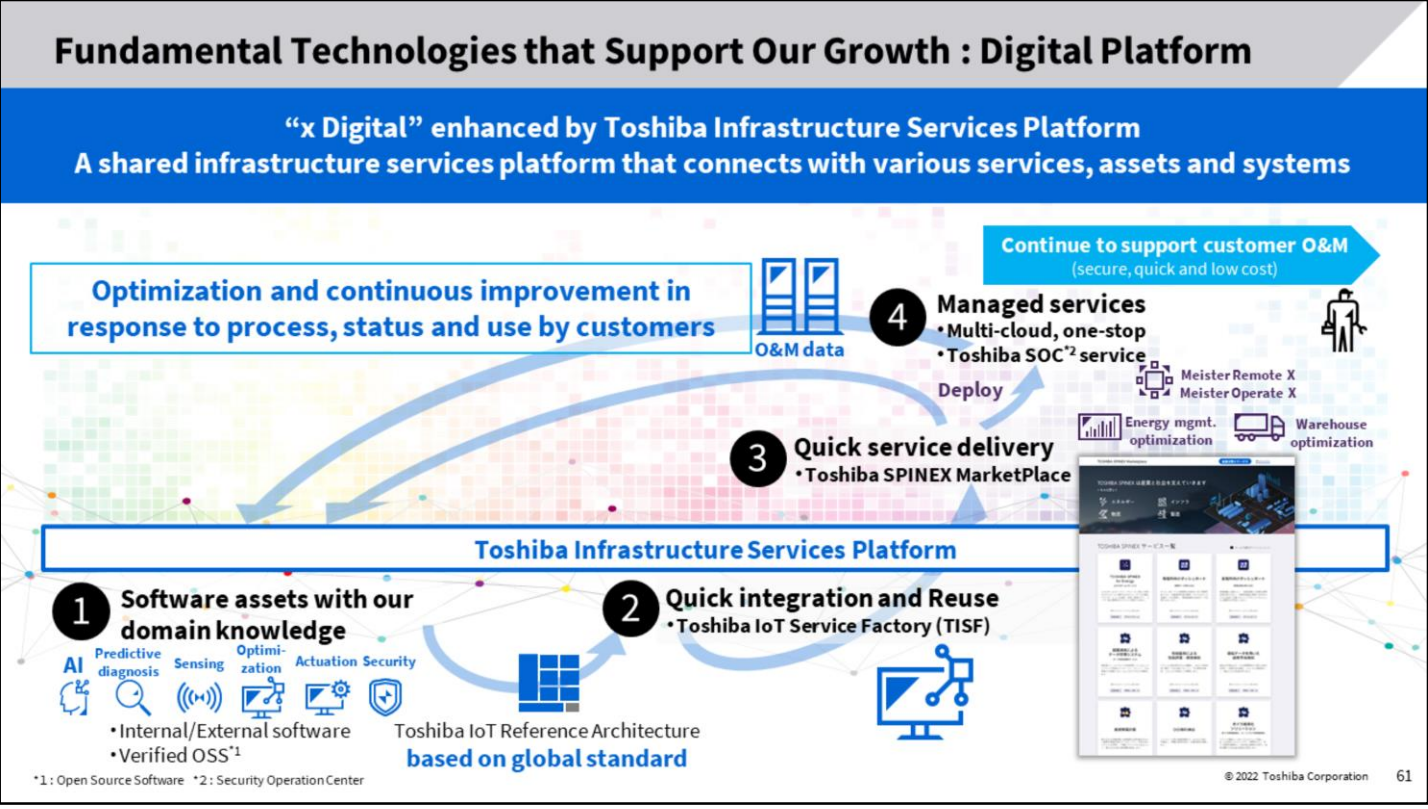
Third example of our fundamental technology is AI.
We have 3 applications of the AI technology that Infrastructure Service Co. has been developing.

Renewable power prediction AI provides accurate forecasts by linking actual values for weather data and amount of electricity generation in distributed power sources.

Anomaly detection AI is Toshiba ‘s unique technology for detecting irregularities with the world’s highest performance, and it is now applied to our group plant for its verification.

Our face recognition AI has been applied to identification for online services, and we are evaluating further applications such as contactless payment at ticketed gates.

By applying these AI technologies, we aim to improve operations of infrastructure and enhance usability across multiple functions.



As the fourth fundamental technology, I will explain the platform for creating infrastructure services one after another.

We will accumulate software assets that incorporate Toshiba group's domain knowledge in a manner that complies with global standards.
These assets can be integrated quickly, and are also reused in the Toshiba IoT Service Factory.

The Toshiba SPINEX Marketplace also offers open services that can be delivered quickly.
In addition, our managed services support customers in service operation and maintenance needs.

We continue to use O&M data we obtain, and improve services for our customers' processes.

We will develop Toshiba Infrastructure Services Platform as an open system that links diverse services, assets, and systems.
We have already started to apply this platform to our solutions development, such as VPP, smart manufacturing, logistics solutions.

Cutting-Edge Technologies for Further Growth

Support infrastructure security and safety with cutting-edge technologies

Superconductivity technology

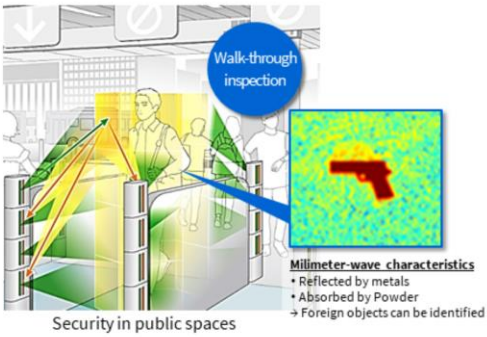
He-free cooling technology*1 with conductive cooling realizes magnet coils with the world's highest performance

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



Security in public spaces

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)

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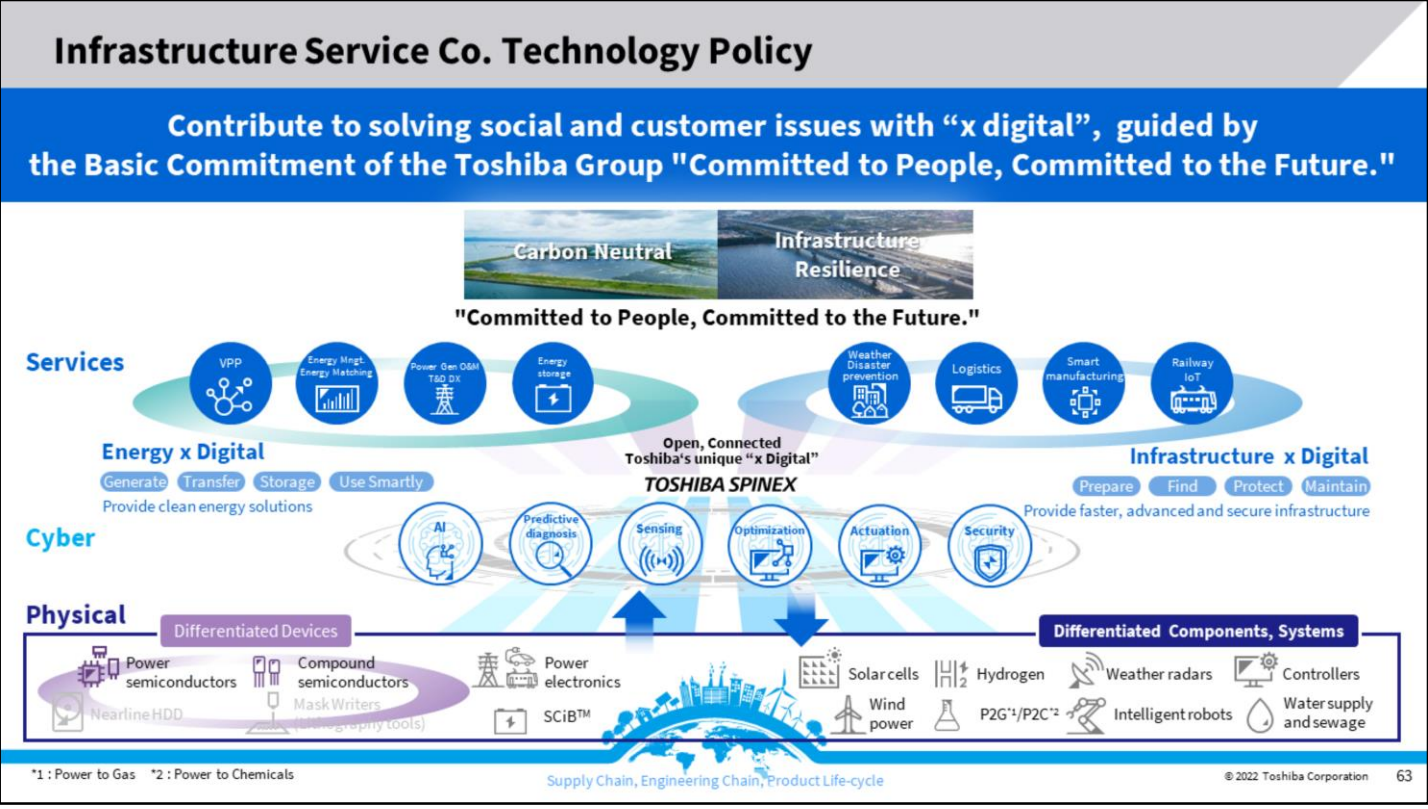
On this slide, we want to highlight a few of our cutting-edge technologies that we expect to be key driver of future business creation.

On the left is our superconductivity technology, which has realized He-free magnet coils with the world's highest performance. We are expand our business in the semiconductor industry and promoting development of small superconducting rotary electric machines that will contribute to energy saving and carbon neutrality.

In the middle, is our improved amplifier and antenna for millimeter-wave imaging can detect foreign objects instantly, raising the possibility of walk-through inspection.

And on the right is our simulated bifurcation machine™, which achieved 10 times faster computation than the previous algorithm, by applying a quasi-quantum tunneling effect. We have started to evaluate computing performance in areas where instant judgments are required, such as financial transactions.



Let me conclude with the full scope of our technology policy.

We aim to contribute to solving social and customer issues guided by our basic commitment: "Committed to People, Committed to the Future”.

We endeavor to solve global issues facing society and our customers by utilizing our strengths in CPS technologies, and offering differentiated devices, components and systems that will lead the evolution of social and information infrastructure.

With our "TOSHIBA SPINEX" brand we provide infrastructure services and solutions based on open IoT reference architecture.

Summary

Now I would like to summarize today's presentation.

We will reform current business structure to integrated structure by gathering all infrastructure service businesses.
In this regard, we will execute 5 measures with certainty.

We will contribute to realization of carbon neutrality and infrastructure resilience through our corporate and business activities.

We will grow business through concentrated investment in focused business area, by utilizing our strength in technology and solid customer base.

Accordingly, I am confident in achieving sustainable and profitable growth, and enhancing corporate value.

Thank you very much for your attention.

TOSHIBA