

**TOSHIBA**

Toshiba Group IR Day 2022

# **Business Strategy of Device Co.**

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Good afternoon. Thank you for joining us today. I'm Hiroyuki Sato, President & CEO, Toshiba Electronic Devices & Storage Corp.

I'm here with Seiichi Mori and together we will discuss the business strategy of Device Co.

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- Results in segments have been reclassified to reflect the current organizational structure, unless stated otherwise.
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## Today's Agenda

- 01 Device Co. Growth Plan
- 02 Semiconductor Business Strategy
- 03 Storage Business Strategy
- 04 NuFlare Technology Business Strategy
- 05 Technologies and Products to support Device Co.

## Appendix

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During our session, we will review the overall business plan; discuss the specific strategies for our semiconductor, storage and NuFlare Technology business; and highlight the technologies and products that underpin our competitive advantage in this space.

# 01

## Device Co. Growth Plan

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Let me begin the discussion of our growth plan with some of the foundational principles that drive everything we do.



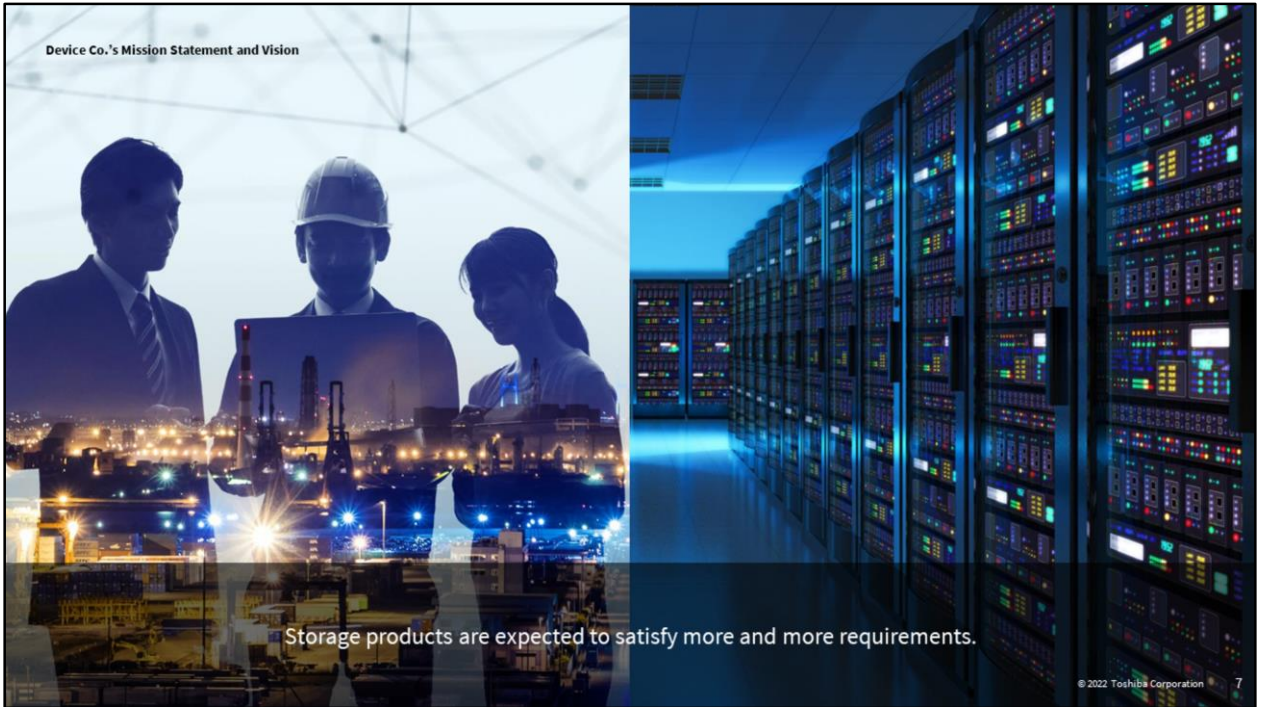
(Our Environment)

- We have a clear mission statement and vision, which is a key imperative to ensure the entire world works together to achieve a sustainable society.



(Importance of Power Semiconductors)

- And through our power semiconductors, we have the potential to reduce energy consumption in all industries, tackle energy issues and minimize our carbon footprint around the world.



(Importance of HDDs)

- The use cases for the massive amounts of data society generates are continuously evolving due to the development of IoT and demand for storage devices - including HDDs – and this demand is expected to continue to increase in the future.

**Advances in social and information infrastructure,  
push for sustainability and digitalization**

Semiconductors



Storage Products



Semiconductor  
Manufacturing  
Equipment



Device Co. focuses on semiconductors, storage products and manufacturing equipment for advanced semiconductors, and to contribute to attractive and sustainable society.

(Our Portfolio)

- As a standalone company, we will have greater focus on semiconductors, storage, and advanced semiconductor manufacturing equipment. These are essential to the evolution of social and information infrastructure and contribute to the realization of an attractive and sustainable society.

## Toshiba Electronic Devices & Storage Overview

<b>Trade Name</b>	Toshiba Electronic Devices & Storage Corporation	<b>FY21 Sales revenue (forecast)</b> 
<b>Date of succession</b>	July 1, 2017	
<b>President &amp; CEO</b>	Hiroyuki Sato	
<b>Headquarters office</b>	Kawasaki, Japan (Registered principal office: Tokyo, Japan)	
<b>Capital stock</b>	10 billion yen	
<b>Main products</b>	Semiconductors, HDDs, Semiconductor manufacturing equipment (NuFlare Technology) Materials & Devices (Toshiba Materials, Toshiba Hokuo Electronics)	
<b>Net sales</b>	860 billion yen (consolidated FY21 forecast, as of Feb, 2022)	
<b>Employees</b>	23,100 (consolidated, Japan: 9,200; overseas 13,900 ) as of Sep 30, 2021	
<b>Major Sites</b>	Kawasaki (Semiconductor), Yokohama (HDD, Semiconductor manufacturing equipment)	
<b>Consolidated subsidiaries</b>	Japan: 12; overseas: 14; total: 26	
<b>Production sites</b>	Semiconductor - Japan: 6, Thailand HDD - Philippines, Semiconductor manufacturing equipment - Japan	
<b>Sales offices</b>	Japan: 3; overseas: 39; total: 42	

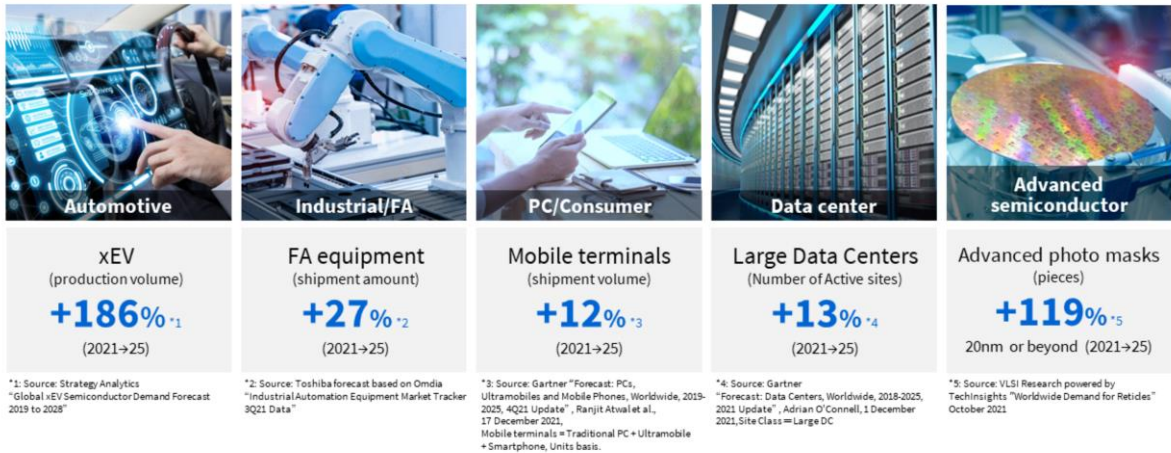
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### (Corporate Profile)

- Outlined here is the current Toshiba Electronic Devices & Storage Corp., which serves as the parent of Device Co.
  - Based on FY20 sales revenue, 48% came from HDD, 37% from semiconductors and the rest from semiconductor manufacturing equipment.
  - We expect annual net sales of ¥860 billion for our main products such as semiconductors, HDDs, and NuFlare Technology's semiconductor manufacturing equipment.
- As you see, the Company has about 23,100 employees, 13,900 of which are overseas.
- We also have six semiconductor factories in Japan and one in Thailand, as well as an HDD factory in the Philippines.

## Business Scopes

### Investments in push for sustainability and digitalization continue to increase



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### (Target Markets)

- As our investments in sustainability and digitalization continue, we have a variety of key targets across automotive, industrial, PC/consumer, data centers and advanced semiconductors.
- We are confident that the rapid pace of digitalization around the world will continue to fuel our growth.

## Focus Markets

Offer key devices and components  
that lead progress in social/information infrastructure

 <b>Automotive</b>	 <b>Industrial/FA</b>	 <b>PC/Consumer</b>	 <b>Data center</b>	 <b>Advanced semiconductor</b>
<b>Semiconductor</b>			<b>HDD</b>	<b>Semiconductor Manufacturing Equipment</b>
<ul style="list-style-type: none"> <li>✓ Motor driver IC</li> <li>✓ Power device (MOSFET, IGBT)</li> <li>✓ Optocoupler</li> <li>✓ Interface bridge IC</li> </ul>	<ul style="list-style-type: none"> <li>✓ Power device (MOSFET, SiC)</li> <li>✓ Optocoupler</li> <li>✓ MCU, MCD</li> <li>✓ Linear image sensor</li> </ul>	<ul style="list-style-type: none"> <li>✓ Consumer HDD (for mobile, Gaming)</li> <li>✓ Power device (low voltage MOSFET, IGBT)</li> <li>✓ MCU, MCD</li> </ul>	<ul style="list-style-type: none"> <li>✓ Large capacity nearline HDD (for cloud &amp; enterprise)</li> <li>✓ Power device (low voltage MOSFET, IGBT)</li> <li>✓ Diode</li> </ul>	<ul style="list-style-type: none"> <li>✓ Electron beam mask writer</li> <li>✓ Epitaxial growth system</li> <li>✓ Mask inspection system</li> </ul>

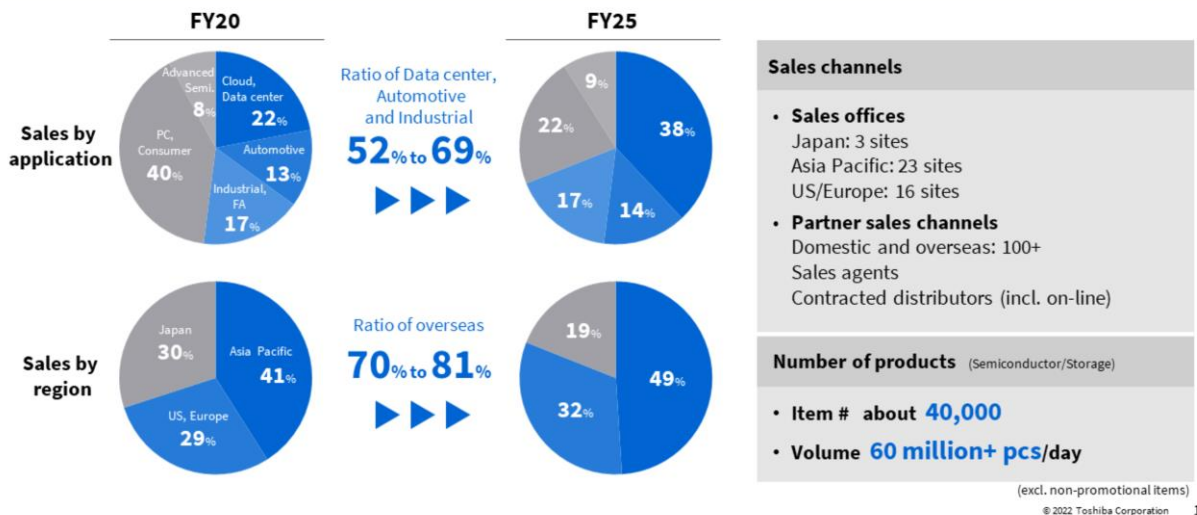
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(Market Served by Our products)

- Slide 10 details our key markets, percentages of the sales by business, and the devices and components that we provide to those customers.
- For example, we supply semiconductors and HDDs to each of our target markets, while semiconductor manufacturing equipment are specifically sold to semiconductor and mask manufacturers.

## Customer Base

Work actively worldwide; offer values to global customers

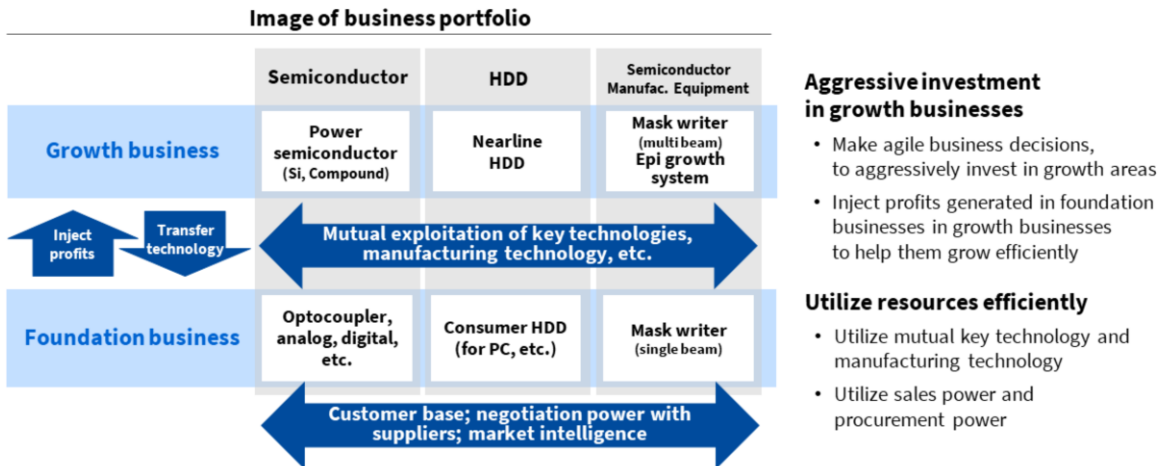


### (Customer Base)

- In the last fiscal year, approximately half of our sales were to customers in the cloud, automotive, and industrial and FA markets.
- By FY25, we would like to raise this percentage to 69%.
- As shown in the lower half of this slide, our overseas sales ratio is currently 70%.
  - We plan to expand semiconductor and HDD sales overseas, mainly in China, so that by FY25, the overseas sales ratio is expected to exceed 80%.
- We have 42 global sales offices. The majority of which are overseas, serving as sales channels to support our growth plan.
- We are proud to say that we have about 40,000 product varieties across our portfolio.

## Business Portfolio

Enhance growth potential and efficiency through synergies in the group



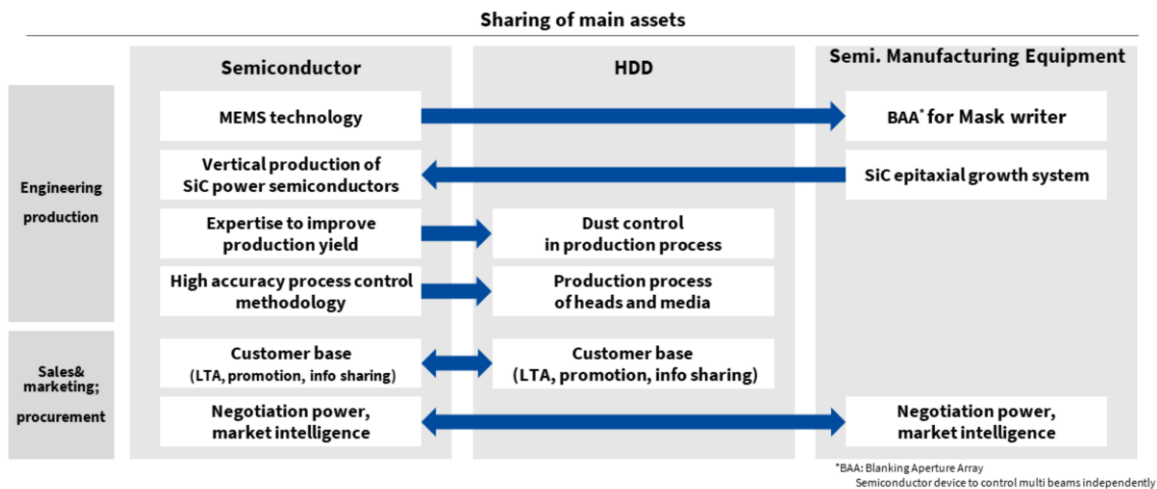
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(Business Portfolio)

- Touching on our business portfolio, it currently consists of the foundation and growth businesses.
  - Across these businesses, we provide power semiconductors, HDDs for data centers, and multi-beam mask writers and epitaxial growth systems for semiconductor manufacturing equipment.
- There are two key ways of thinking about our business portfolio.
  - Vertically – which focuses on the growth and foundation business:
    - We plan to inject profits generated by the foundation areas in the growth areas to accelerate attaching necessary resources and growing.
    - At the same time, the technology and production capacity they create are shared with the foundation businesses to run the businesses efficiently.
  - Horizontally – which focuses on resource sharing:
    - Not only technical assets, but customer bases and procurement network sharing across the group.

## Efficient Resource Utilization through Intra-Group Collaboration

### Share technology and customer assets cultivated by each business



#### (Sharing of Resources)

- Our three businesses will grow exponentially by leveraging each other's assets.
  - For example, BAA was developed with semiconductor MEMS technology and is a key device for NuFlare's multi beam mask writers.
  - The development and production of compound semiconductors, which is our focus product, can also be accelerated through the vertical production integration model with NuFlare's high performance epitaxial growth system.
- Through our process of production engineering, we share expertise to improve production yield, cultivate semiconductor factories, to dust control of the HDD factory.
  - Similarly, semiconductor's high accuracy process control technology can be used for the process engineering of HDD's heads and media.
- We continue to win new LTAs with customers who are engaged with both semiconductors and HDDs, and by sharing customer and supplier bases we will grow much more efficiently.

## Resilient Supply Chains

Continue increasing production capacity and securing stable supply chain to cope with global tight semiconductor supply-demand balance and increasing storage demand

### Increase production capacity

Capex (FY21-25, commitment base)	Production capacity (vs FY20)
About <b>260</b> billion yen	<b>Semi.</b> Si power semiconductor* <b>about 1.7x</b>
	<b>HDD</b> Nearline HDD <b>about 2x</b>

<b>Strategies</b>	<b>Semi.</b>	Bring forward 300mm line operation (FY23/1H to FY22/2H)
	<b>Semi.</b>	Secure room for increased production in the new clean room
	<b>Semi.</b>	Convert Si 200mm line to compound device production
	<b>HDD</b>	Continuous investment in Philippines and China production Site
	<b>Semi. Mfg. Equip.</b>	Expand production space in Yokohama, Japan

### Secure stable supply chain

Ratio of  
long-term  
agreement

**80%**

Ratio of  
multi sourcing

**70%**

(Major materials for semiconductors)

<b>Common</b>	Early response to issues in BCP system Enhance collaboration with suppliers
<b>Semi.</b>	Long-term agreement, advanced ordering
<b>HDD</b>	Strengthen supply chain with suppliers from development stage
<b>Semi. Mfg. Equip.</b>	Pursue new suppliers

\*: Production capacity of 200mm and 300mm lines (200mm wafer equivalent)

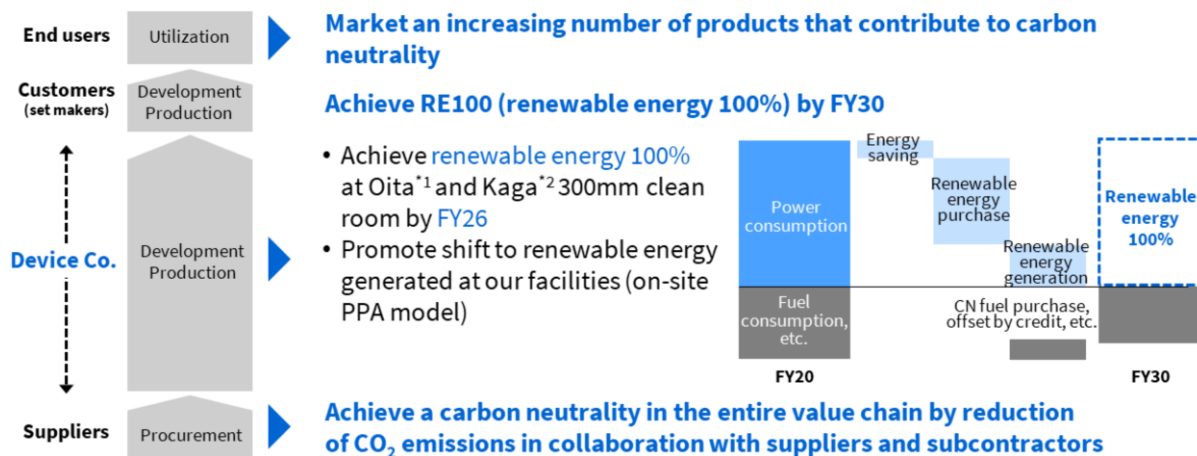
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### (Supply Chain)

- As you know, semiconductor devices are currently experiencing a very severe global shortage and we have continuously faced increasing demand.
  - As a result, we have increased production capacity and built a stable procurement network.
- In terms of production capacity, we will invest approximately ¥250 billion over five years, 1.7 times that for silicon semiconductors, and double that for nearline HDDs.
- Our major initiatives include:
  - ✓ Invest in the 300mm line at the Kaga Toshiba factory, as reflected by our recent announcement;
  - ✓ Convert the silicon 200mm production lines to those for compound semiconductors;
  - ✓ Increase nearline HDD production, including the new facility in China; and
  - ✓ Expand manufacturing space at the Yokohama Plant for semiconductor manufacturing equipment.
- In addition, as shown on the right, we are building a stable procurement network in which 80% of the materials required to create semiconductors are covered with long-term purchase contracts.
- We are also increasing the ratio of multi-vendors to 70%+, and we will promote the creation of an even more stable production system.

## Market an increasing number of products



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- (Initiatives for Carbon Neutrality)
- We are committed to our sustainability initiatives and have outlined detailed plans to contribute to carbon neutrality.
  - At Device Co., we will continue to offer and market more products that will contribute to carbon neutrality.
  - In addition, we are dedicated to achieving 100% renewable energy utilization for our production processes by FY30.
  - The Oita Plant, the main base for mass production of semiconductors, and the new 300mm plant at the Kaga Plant plan to achieve 100% renewable energy by FY26. We seek to realize carbon neutrality across the entire value chain by collaborating with customers and contract manufacturers and reducing greenhouse gas emissions.
  - We will also promote the conversion to use natural energy generated in-house.

## Device Co.'s Capital Allocation Strategy

**Inject 500+ billion yen in five years in focus and growth areas**

Investments (FY21-25 total)		Main items	
Capex*1	260 billion yen	Silicon power	New 300mm line, increase in 200 mm line
		Compound semi.	Equipment for SiC/GaN development (increase capacity, bigger diameter)
		Nearline HDD	Increase in production capacity, enhance BCP
R&D	310 billion yen	Silicon power	Wider lineup, higher efficiency package
		Compound semi.	High-voltage SiC, GaN devices
		Nearline HDD	New drives (next gen assist recording, multi-stacking)
		Mask writer	Next generation multi beam writer
Total	570 billion yen		

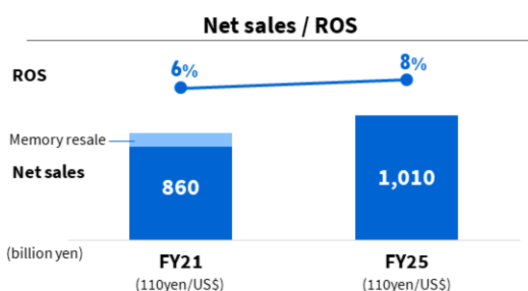
<sup>\*1</sup>: Excluding costs such as capex for contacted manufacturing in the Philippines

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### (Resource Injection)

- As part of our capital allocation strategy for Device Co., we plan to invest in CAPEX to expand power semiconductor production, as well as increase development equipment for compound semiconductors and expand nearline HDD production capacity.
- With R&D, we plan to expand our lineup of products and develop new products that will have industry-leading potential.
- Additionally, our five-year investments between FY21 and FY25 will total more than ¥500 billion.

## Device Co. Growth Plan <sup>\*1</sup>

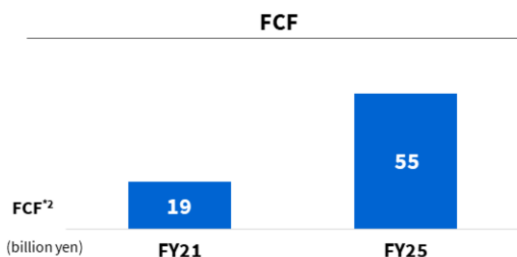


### Net sales

- ✓ 300mm line investment starts to bear fruits in FY24
- ✓ Consider bringing forward production start to maximize sales

### ROS

- ✓ Marginal profit rate improves +2pt thanks to cost improvement, etc.
- ✓ Increase R&D investments by 1.3x (FY21 to 25)



### FCF

- ✓ Continue approx. 50 billion yen/Y capex
  - ✓ Cumulative total of FCF in FY21 to 25: 140 billion yen
- Cumulative total of CF from operating activities 420 billion yen  
Cumulative total of CF from investment activities ▲280 billion yen

<sup>\*1</sup>: Figures are initial Proforma based on the assumptions of separating corporate functions, and will be revised during detailed review process.  
<sup>\*2</sup>: Free cash flows

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### (Growth Plan)

- On slide 17, we have detailed our growth plan.
- For FY 21, we expect to deliver net sales of ¥860 billion and a 6% operating income margin. This is largely due to the strength of the semiconductor market and our withdrawal from the future development of advanced system LSIs last fiscal year.
- Given the near-term industry volatility, we have a rather conservative plan for FY25, but we intend to increase our growth by making additional investments.
  - We plan to continue investing around ¥50 billion each year, largely in semiconductors.
  - And we expect to generate cumulative total of FCF of ¥140 billion in FY 21 - FY25.

## Financial Policy (Plan as of February, 2022)

### Maximize corporate value by strengthening profitability and investments for growth

#### Capital allocation

- Strengthen earning power; aggressively invest for growth
- Inject cash generated in the foundation area into the growth area

#### Balance sheet

- Maintain net cash position; flexibly study utilization of debts to improve capital efficiency and invest for growth to capture growth opportunities

#### Shareholder return

- Aim at 30%+ average consolidated dividend payout ratio
- Prioritize investment for growth; unused free cash flows, if no qualified investments, should be paid to shareholders via dividends or share buyback
- Improve capital efficiency from a mid- to long-term perspective and aim at four-year average <sup>\*1</sup> 15%+ ROE

<sup>\*1</sup>: Average of FY22 to FY25

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#### (Financial Policy)

- With regard to Device Co.'s financial policy, specifically capital allocation, we plan to use the cash we generate to improve earnings power and fund growth investments.
- We would also like to maintain a net cash position on our balance sheet, while looking to smartly use leverage to support our growth.
- For shareholder returns, we aim for a dividend payout ratio of 30%+, on average.
  - And as discussed, we prioritize investments for growth, but unused cash flows should be returned to shareholders via dividends and/or share buyback, etc.
- At the same time, we will also try to improve capital efficiency and aim for an average of 15%+ ROE.

## Objectives of “Spin-off”

**Realize sustainable, profitable growth and enhance corporate value with highly professional and agile management most suited to the industry**

### Growth

**Make agile management decisions including invests and M&A** in the fast changing business and technological environments to grow faster than competitors

### Costs

**Carefully review costs and investments and inject resources directly, in a timely manner** from Device Co.’s viewpoint; increase freedom and cost control

### KPI

**Decide KPIs focused** on market dynamics and business characteristics, and **disclose business and financial information and strategies more frequently**

### Human resources

Promote **personnel management systems most suitable to the industry** : recruit and retain professional and excellent human resources

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(Objectives of “Spin-off”)

- As a standalone public company, we will remain committed to these main objectives:
  - Growth – Ensure agile management decisions across the board
  - Costs – Be disciplined in managing costs and making investments and resource allocation decisions
  - KPI – Establish transparent and consist KPIs across the business
  - HR – Attract and retain the best and most innovative team in the industry

# 02

## Semiconductor Business Strategy

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Next, I will discuss our semiconductor business strategy.

## Focused Markets for Semiconductor Business

Market expansion by increasing investment in push  
for sustainability and digitalization



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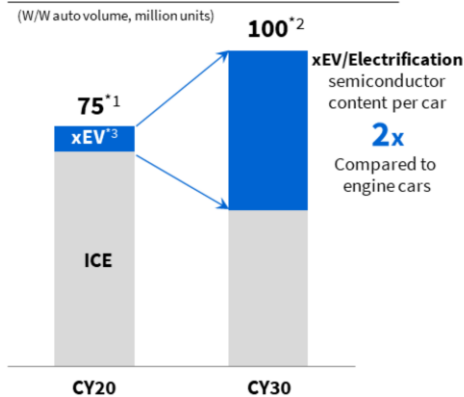
(Focus Markets)

- This slide highlights our target markets.
- As you see, demand in each of these markets is expected to continue to grow due to push for sustainability and digitalization.

## Automotive Market

### Demand for semiconductors is steadily expanding with electrification

#### Outlook for demand of xEV and Electrification



#### Trends of xEV and Electrification

- ✓ **Tightened sales regulation for Internal combustion engines, with worldwide concerns for carbon neutrality**
  - Market growth of xEV, electric motor system and etc. become more realistic
- ✓ **Demand for weight saving and extended mileage will increase**
  - Increase demand for low power and high efficiency in inverter, battery management systems and motor controls etc.
- ✓ **Request for cost reduction and shorter development TAT**
  - Reduce development costs and TAT while ensuring quality through platformization and modularization

\*1: Source: Strategy Analytics, "Automotive Electronics System Demand 2019 to 2028 Updated Jan 2022"  
 \*2: Source: Yano Research Institute Ltd., "xEV Key Devices & Components Market 2021", Sales Forecast 31/08/21  
 \*3: xEV : EV, FCV, HEV, PHEV

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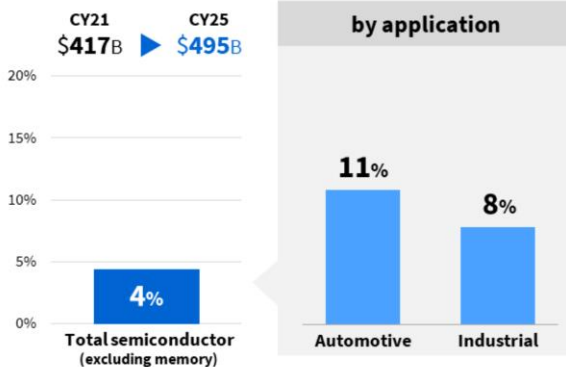
#### (Automotive Market)

- Specifically, within the automotive market, regulations on sales of internal combustion engines are expected to be stricter to meet new environmental standards. The graph on the left shows that xEV will drive market growth.
- In addition, it is forecasted that electrification will accelerate, which will drive the market for electric motor systems.
- Demand for power-saving and high-efficiency inverters, battery management systems and motor controls will also grow in response to increasing demand for lighter vehicles that can extended mileage.
- Furthermore, in automotive equipment, platforming and modularization are being accelerated in order to shorten the development period and reduce costs.
  - Semiconductors are also expected to respond to various requirements, including ensuring quality.

## Outlook for Semiconductor Market

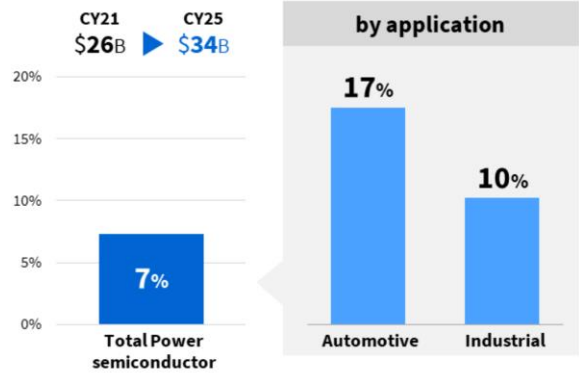
**Automotive, industrial and infrastructure will drive Semiconductors growth, especially power semiconductor market**

**CAGR of semiconductor market (excluding memory)\*<sup>1</sup>**



\*1: Source: Gartner, "Semiconductor Forecast Database, Worldwide, 4Q21 Update", Ben Lee et al., 23 December 2021  
Sum of Final Device Forecast (Semiconductor) excluding Total Memory.  
Automotive = Factory-Fitted - Automotive - Aftermarket, Industrial = Industrial Electronics.  
Chart created by Toshiba Electronic Devices & Storage Corporation based on Gartner research, Device Forecast, Revenue basis.

**CAGR of Power semiconductor market\*<sup>2</sup>**



\*1: Source: Omdia "Power Discrete and Module Market Tracker - 2020 Database, Dec2021"

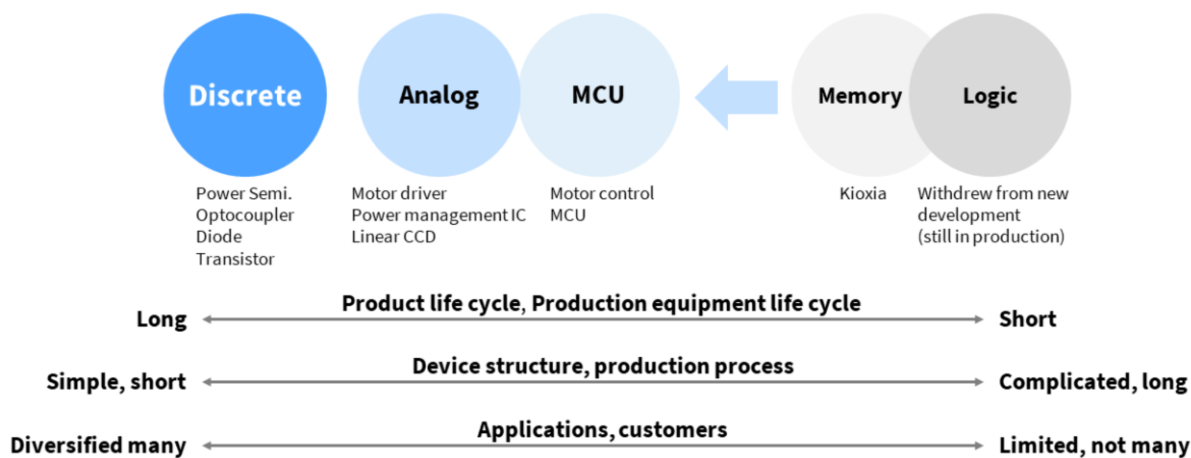
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### (Semiconductor Market Outlook)

- On slide 23 is our outlook for the automotive market.
  - The semiconductor market - excluding memory - is expected to grow from approximately 417 billion yen in 2021 to approximately 495 billion yen in 2025, representing an average annual growth rate of 4%.
  - Within this market, automotive and industrial applications are expected to grow significantly, by 11% and 8%, respectively.
- Focusing in particular on power semiconductors - shown on the left, annual growth is forecasted to average 7%, with higher growth projections for automotive and industrial applications at 17% and 10%, respectively.
  - Device Co. is targeting these as key growth markets.

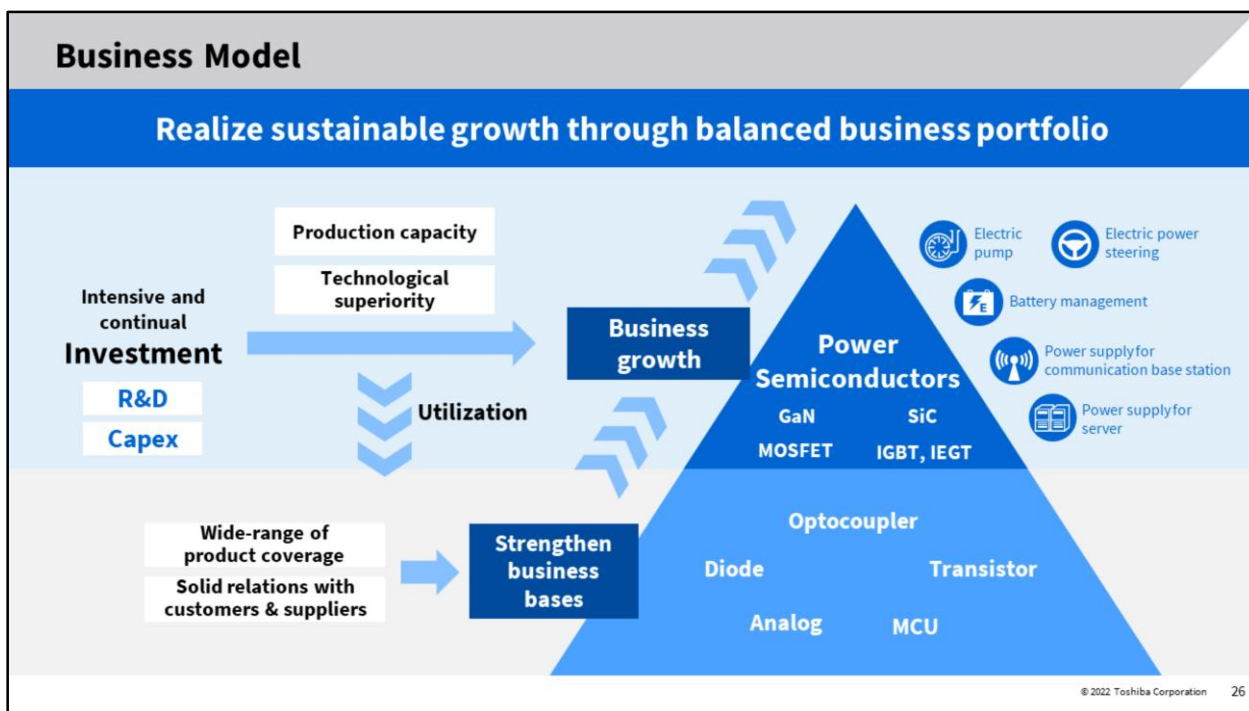
## Device Co.'s Semiconductor Business Fields

**Focus on areas that are not heavily dependent on business environments, require lower capex**



(Business Domains of the Device Co. Semiconductor Business)

- This diagram maps out Device Co.'s current semiconductor business, including our plan to focus on areas of the business that are not heavily dependent on business environments and require low CAPEX.
- Consistent with this approach, in FY20 we announced the we withdrew from future development of logic LSIs, and as you know, we sold the NAND flash memory business.
- While these businesses, on the right side of the slide, make up nearly two-thirds of the total semiconductor market, they also require a great deal of capital investment and therefore, going forward, they will not be a focus area for us.
- Instead, we will focus our investments on the MCU, Analog and Discrete segments of the business – they have long product life cycles, infrequent facility upgrades, and a wide range of applications.
- While the semiconductor industry is generally regarded as volatile, our go-forward semiconductor business will be relatively CAPEX light and will enjoy lower volatility than the industry writ large.



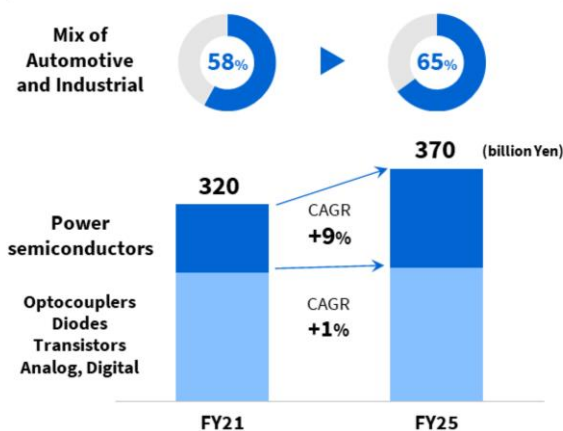
### (Semiconductor Business Model)

- Here is our semiconductor business model.
- Among the business domains described on the previous slide, we have positioned power semiconductors, which are expected to grow significantly and complement our strengths, as an important growth area.
  - We also plan to invest aggressively in R&D and CAPEX.
- We will further strengthen the businesses by transferring the technological superiority and production capacity we cultivate here in our foundation businesses.
  - These cover a wide range of products used with power semiconductors such as diodes, optocouplers, transistors, analog devices, and microcontrollers - all located in the lower part of the pyramid diagram.
- By investing profits from the foundation businesses into power semiconductors, we will realize further business growth.

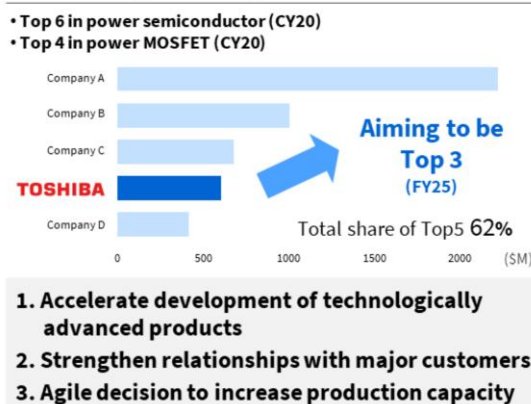
## Semiconductor Business Targets

Expand the power semiconductor business,  
mainly in the automotive and industrial fields

### Semiconductor business revenue plan



### Market position of power semiconductor<sup>\*1</sup>



\*1: Source: Omdia, "Competitive Landscaping Tool CLT, Annual ~3Q21"

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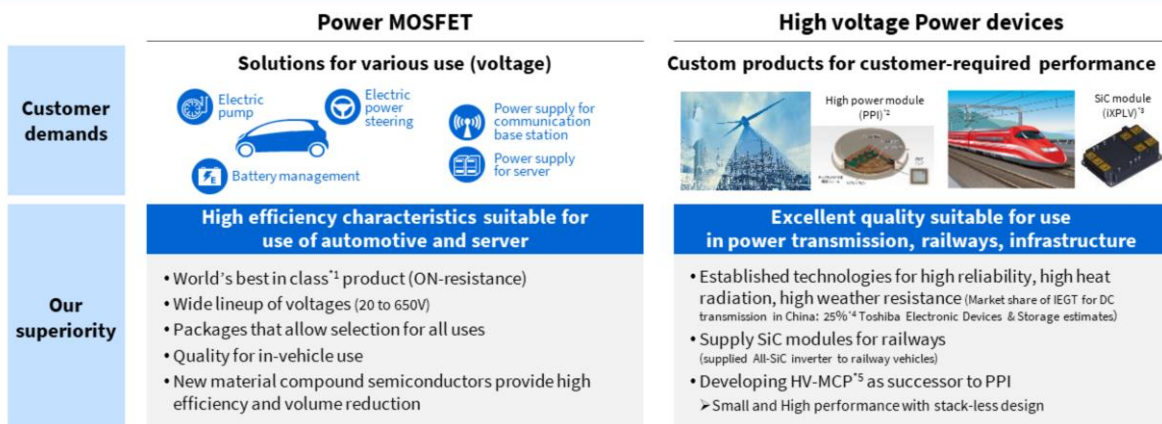
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### (Semiconductor Business Targets)

- On this slide, we highlight our business targets for semiconductors.
- As I noted earlier, power semiconductors are a fast growing segment of the semiconductor market and we anticipate a 9% CAGR on our sales between FY21 and FY25.
- We plan to achieve this growth by expanding sales to automotive and industrial applications, which have some of the highest demands.
- We also plan to increase the business mix of these segments from 58% to 65%.
- The graph on the top right shows the solid positioning of our power semiconductor business.
- We have also further accelerated the development of new products to leverage our technological superiority and we will continue to strengthen relationships with our large, domestic customers, where we already have a high market share, while expanding overseas sales, particularly in China.
- I will delve deeper into our three main goals.

# 1. Accelerate Development of Technologically Advanced Products

**Double R&D for Power semiconductor from FY21 to 25,  
strengthen technological superiority and accelerate product development**



<sup>\*1</sup>: As to 80V/N channel power MOSFET, compared its On-resistance × Switching characteristics (Ron×Qoss) among product with the same rating, as of January, 2022. Toshiba survey.

<sup>\*2</sup>: PPI(Press Pack IEGT); Hermetically sealed, pressure contact module <sup>\*3</sup>: IXPLV(Intelligent flexiBle Package Low Voltage); package for SiC module <sup>\*4</sup>: Source: Toshiba estimates

<sup>\*5</sup>: HV-MCPI(High voltage multi chip package); New package technology with stack-less design

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## (Technology Advantages of Power Semiconductors)

- First is to accelerate the development of power semiconductors.
  - Our Power MOSFET, our specialty, is used in a variety of equipment and applications. We offer a broad lineup of various voltage requirements, and the applications include electric pumps, automotive battery management, power supply for servers, and telecommunications base stations.
  - Our products focus on high-efficiency characteristics, which are important in the automotive and other fields, and boast the world's best in class performance in terms of on-resistance and switching characteristics – all of which are important indicators for evaluating the efficiency of power semiconductors.
- In the future, we will launch compound semiconductors that contribute to higher efficiency and miniaturization of equipment.
- As you see on the right, the high-voltage power devices are used for power transmission & distribution, railways, and infrastructure.
- By leveraging our technological strengths, such developing components that have a high reliability, high heat dissipation, and high weather resistance, our IEGTs have captured a 25% share of the fast-growing power T&D market in China.

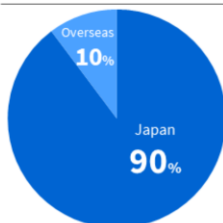
- SiC modules are also already supplied to electric railways, contributing to improve product reliability and reduce size and weight.
- In addition, we are developing HV-MCP aimed at further miniaturization and higher performance by fully utilizing packaging technologies accumulated in the power device field for infrastructure.

## 2. Strengthen Relationships with Major Customers

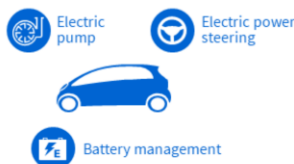
Maintain and strengthen domestic customer base, accelerate overseas sales promotion utilizing the achievement Japanese No.1 vendor<sup>\*1</sup>

### Automotive market

Sales mix of our power semiconductors for automotive in FY20



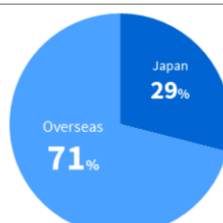
#### Many major customers in Japan market



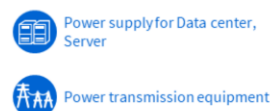
- ✓ Further strengthen relationships with domestic customers by offering better solutions
- ✓ Make full-scale entry into the overseas xEV market with the achievements cultivated in Japan
  - increase the number of FAE<sup>\*2</sup> in overseas and strengthen quality support system
  - strengthen development system for automotive with MBD<sup>\*3</sup>

### Industrial market

Sales mix of our power semiconductors for industrial in FY20



#### Major power supply customers in and out of Japan, infrastructure system equipment customers and so on



- ✓ Strengthen relationships with major industrial power supply customers
- ✓ Offer 5G infrastructure customers better solutions
- ✓ Strengthen development system for customized product suitable to customer requirement in railways and power transmission equipment of domestic and foreign market

<sup>\*1</sup>: Source: Omdia "Competitive Landscaping Tool CLT, Annual -3Q21"  
<sup>\*2</sup>: Field Application Engineer <sup>\*3</sup>: Model Based Development

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### (Strengthen Sales of Power Semiconductors)

- Second, is to continue to strengthen relationships with major customers.
- We were recently ranked as the leading powered MOSFET manufacturer in Japan for the third consecutive year.
- Currently, 90% of our automotive sales are for the domestic market, where we will strongly penetrate the xEV market overseas, leveraging this track record.
- We have already increased field application engineering resources overseas, particularly in China, and are strengthening application engineering and quality support.
- In addition, we will further strengthen our model-based development and contribute to reductions in customers' development TAT and costs.
- In the industrial market, we have continued to sell to leading domestic and overseas power supply manufacturers, and infrastructure-related customers with custom devices.
- 71% of our industrial sales are in the overseas markets.
- Going forward, we will continue to strengthen relationships with major industrial companies that have a strong track record of innovation and execution.
- We will propose solutions for expanding 5G infrastructure, such as base

stations, servers and data centers. We will also enhance our tailored support to railway and power T&D customers in the domestic and overseas markets.

### 3. Agile Decision to Increase Production Capacity

Install advanced production lines and ensure capacity for future expansion



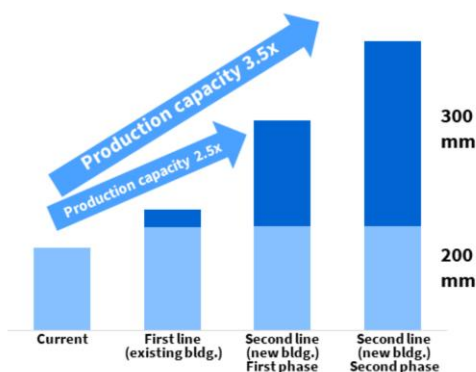
(New 300mm Kaga Toshiba Clean Room)

- Last, is our flexible increase in production capacity.
- The image on this slide is an artist's impression of the new 300mm clean room building of Kaga Toshiba factory, which was just announced on February 4<sup>th</sup>.
- The building on the far right is the new clean room that will support the expanded production capacity of our power semiconductors.
- The basic concepts of the new building will be explained in the following slide.
- However, we plan to realize RE100, secure BCP, as well as pursue higher product reliability and higher production efficiency.
  - In a nut-shell, we plan to build the most advanced production facility in the industry.

### 3. Flexible Increase in Production Capacity

**Double capital expenditure<sup>\*1</sup>, construct and start mass production of Japan's first<sup>\*2</sup> 300mm line for manufacturing silicon power semiconductor**

Capacity plan for silicon power devices<sup>\*3</sup>



<sup>\*1</sup>: Cumulative capital expenditure of semiconductor business for 5 years, comparison FY16-20 to FY21-25

<sup>\*2</sup>: Source: Toshiba, as of Feb, 2022

<sup>\*3</sup>: Capacity of 200mm and 300mm line (200mm wafer equivalent)

<sup>\*4</sup>: Kaga Toshiba Electronics

Production strategies for construction of 300mm line

**First line** Establish technology and contribute to early mass production by utilizing existing building

- ✓ 300mm line is under construction in an existing clean room at Kaga Toshiba<sup>\*4</sup>
- Bring forward mass production schedule to 2H/FY22 (original plan was 1H/FY23)

**Second line** Expanding production capacity and improving productivity by building new fabrication facility

- ✓ Decided to build new 300mm wafer fabrication facility at Kaga Toshiba
- Mass production will start in FY24
- Pursue production efficiency by designing exclusively for the 300mm wafer
- New fab will achieve use of 100% renewable energy

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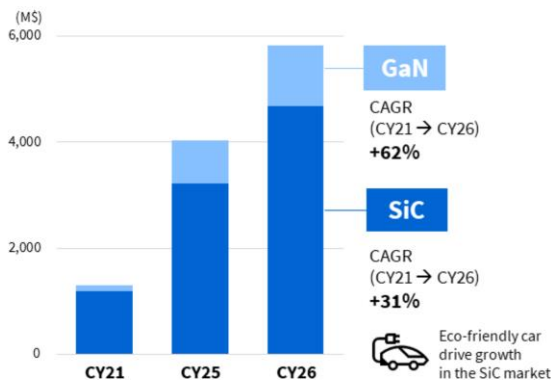
#### (Increase Production Capacity)

- In terms of production capacity, we plan to invest twice as much as over the next five years as we did in the previous five.
- Our first 300 mm line is already installed in the existing clean room at the Kaga Toshiba factory.
  - The original plan was to start mass production in FY23, but we are bringing forward the schedule to the second half of FY22.
- In addition, as we explained in our press release last week, our production capacity will increase by 2.5 times once the first phase of the new building reaches full production.
- Capacity will also increase 3.5 times when the new clean room is fully loaded.
- We plan to start mass production in the new clean room in FY24.
- We will also apply the technology established on the first 300mm line to the new line specialized for 300mm wafer-based production to pursue production efficiency.
  - At the same time, we plan to realize 100% use of renewable energy from the beginning of start of mass production.

## Initiatives for Compound Semiconductors (SiC & GaN)

Contribute to the realization of carbon neutrality with the technology and assets cultivated by Toshiba Group

Outlook for SiC & GaN markets<sup>\*1</sup>



<sup>\*1</sup> Source: Yole Développement, "Compound Semiconductor Quarterly Market Monitor Module1 Q42021"

Application and our initiatives

<b>SiC Railways</b> Energy saving, Weight saving	<b>SiC Wind power</b> Conversion loss reduction, Weight saving
<b>SiC xEV</b> Weight saving, Extended mileage	<b>SiC Data center</b> Enlarge capacity, Miniaturization, Relief construction requirement

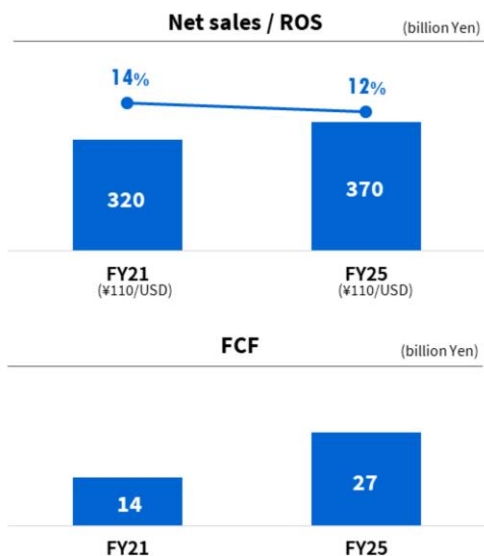
- ✓ **Technology**: Apply know-how cultivated in high-voltage SiC for railways to automotive products
- ✓ **Accelerate development**: Fully utilize NuFlare's epitaxial growth system
- ✓ **Large-diameter**: Accelerate to launch 200mm wafer line
- ✓ **Key material**: LTA with wafer maker

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(Initiatives for Compound Semiconductors)

- On this slide, we detail our plans for the next-generation high-performance semiconductors.
  - The graph on the left is the market outlook for next-generation compound semiconductors.
    - SiC is expected to grow by 31% between this fiscal year and FY26, and GaN is expected to grow by 62%.
  - We have already produced and shipped high-voltage SiC for railways, and we intend to use this know-how for automotive applications.
  - We will also leverage NuFlare's epitaxial growth system to achieve vertical integration.
  - SiC is currently manufactured on 6-inch wafers and we will use our 200mm production lines to efficiently promote production efficiency.
- With regards to key materials for next-generation semiconductors, we have entered long-term purchasing agreements with material manufacturers in an effort to secure supply.

## Semiconductor Growth Plan



### Net Sales

- ✓ Expect 50 billion yen increase (FY21→25)
- ✓ Structure to expand product capacity flexibly with the new 300mm clean room

### ROS

- ✓ Expect 2% improvement in marginal profits (FY21→25) by shifting to higher value added products and cost reductions
- ✓ Increase R&D investments by 1.4x (FY21→25) mainly for power semiconductors

### FCF

- ✓ Expect 13 billion yen increase with sales increase (FY21→25)
- ✓ Generate 70 billion yen FCF (FY21→25 cumulative total)  
Cumulative total of CF from operating activities 240 billion yen  
Cumulative total of CF from investment activities ▲170 billion yen

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(Semiconductor Growth Plan)

- Outlined here is our semiconductor growth plan.
- We are focused on increasing our sales from ¥320 billion in FY21 to ¥370 billion in FY25 - a ¥50 billion increase.
  - This includes pursuing higher sales with agile investments in the new 300mm clean room.
  - As we bring the new facility online, we expect operating margin to decrease slightly from 14% to 12% from FY21 to FY 25.
  - Over the same period, our free cash flow is expected to increase from 14 billion yen in FY21 to 27 billion yen in FY25, despite the offset associated with the investments in the 300mm production capacity expansion and additional investments in compound semiconductors – both of which will contribute to free cash flow after the initial investment period.

# 03

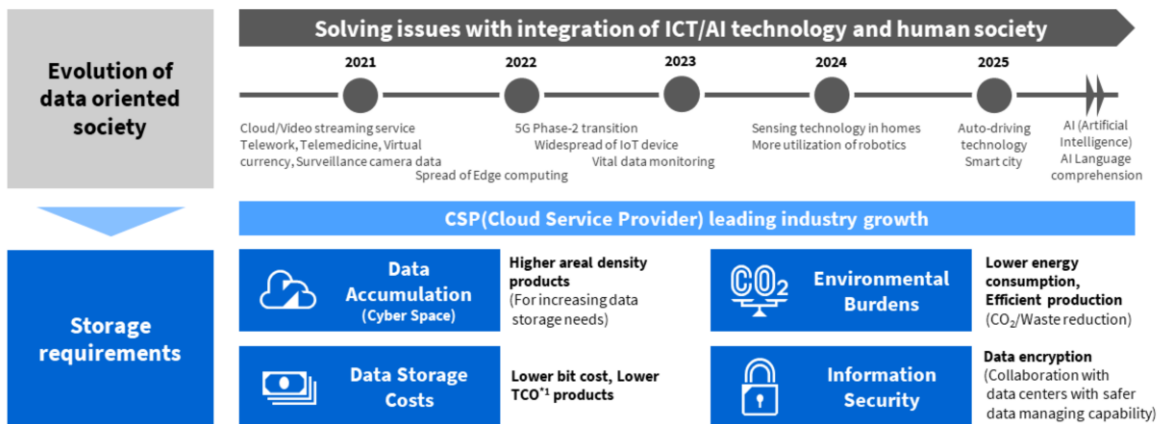
## Storage Business Strategy

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Next, I will discuss our storage business strategy.

## Storage Business Environment Trends

**Data storage is critical to a society where all information and people are connected**



\*1: TCO: Total Cost of Ownership (Total cost required from system installation to disposal)

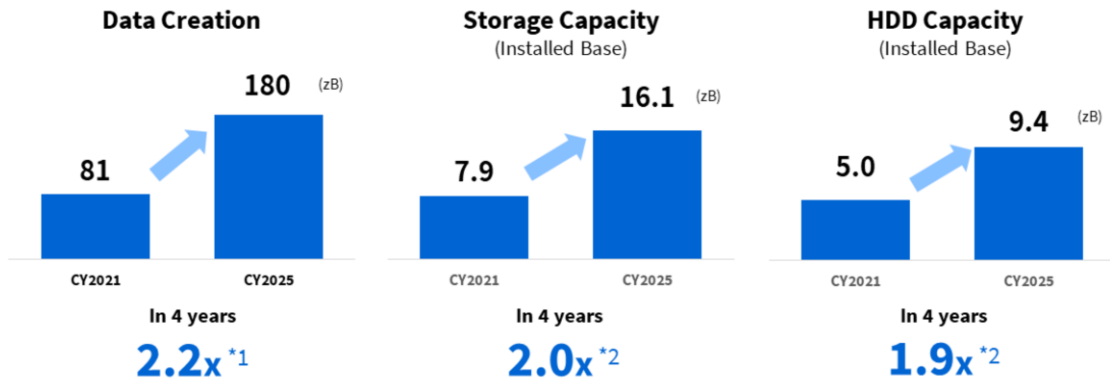
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(Environmental changes in storage)

- Data storage has never been more important to our connected society today in the age of digitalization. The cyber and physical worlds are colliding, and data storage is at the nexus of the two.
- Increases in data storage and enhancements in data storage technology are supporting new services, many of which will increase the size of the cloud service providers (CSPs) markets.
  - In this new world, it is vital for businesses to ensure they have sufficient large-scale data storage and server space, reduced data storage costs, while minimizing their impact on the environment and keeping critical information safe via encryption.

## Storage Market Forecast

The 2020's is decade of data; data creation boosts storage demand



\*1: Source: IDC Worldwide Global DataSphere Forecast, 2021–2025 March, 2021

\*2: Source: IDC Worldwide Global StorageSphere Forecast, 2021–2025 March, 2021

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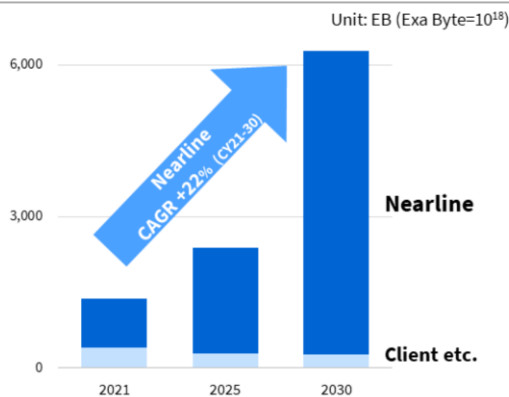
### (Storage Market Outlook)

- We refer to the 2020s as the “Decade of Data”. As you can see on the slide, the amount of data created, storage capacity and HDD capacity are all expected to increase substantially over the next four years.
- I’d like to draw your attention to the bar chart on the right which shows HDD Capacity installed base increasing 1.9x from 5.0zBs in FY21 to 9.4zBs in FY25. This will be critical to the growth of our HDD business.

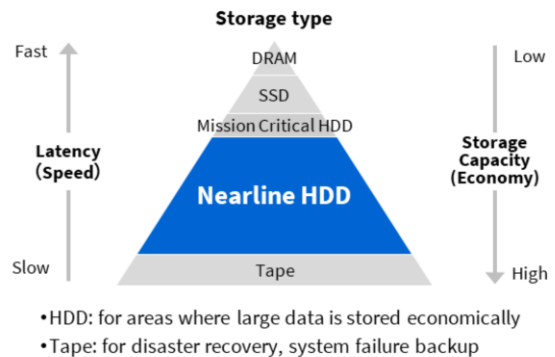
## Nearline HDD for Data Center and CSP

Strong Mass storage needs continue to grow Nearline HDD market

Global HDD Demand (Bytes Shipped)<sup>\*1</sup>



Mass capacity storage type & features<sup>\*2</sup>



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### (Near-line HDD Market)

- The vast majority of the global HDD demand market growth from 2021 to 2030 is expected to be in nearline HDD. In other words, in global data centers and cloud service providers. This segment is expected to grow at a 22% CAGR on a bytes shipped basis from FY21 to FY30.
- The chart on the right shows that nearline HDD occupies a significant portion of the total storage configuration market. Nearline HDDs are at the sweetspot of latency and storage capacity – this makes them truly indispensable to storing large volumes of data economically.

## Nearline HDD Customer Recording Needs

### HDD achieves both mass capacity storing and bit cost balance

#### Creating CSP Customer Value

##### Performance requirements for HDD

##### Store ever increasing data efficiently & economically

- Higher Capacity - Area density improvement with technology breakthrough
- Economical Efficiency - Low power consumption (HDD is superior in mass storage)
- Durability - 24/365 continuous operation

##### Higher Storage Capacity

##### Accelerate development of higher capacity products

- Capacity increase, multi stacking
- Assist recording technology

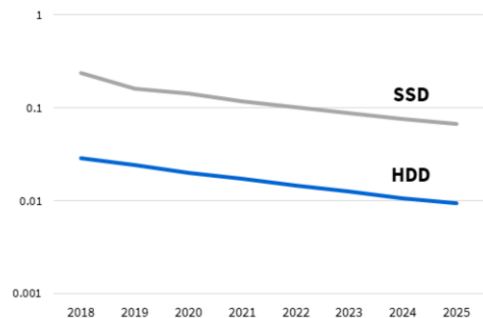
##### Data Storage Cost

##### Product planning with total cost perspective

- Lower storage system installation fees
- HDD operation cost improvement

#### HDD/SSD bit cost comparison<sup>\*1</sup> Unit: \$/GB

##### HDD bit cost is 1/7 of SSD



\*1: Source: Techno System Research Co., Ltd. HDD/SSD Market Trend(Annual) Dec. 2021

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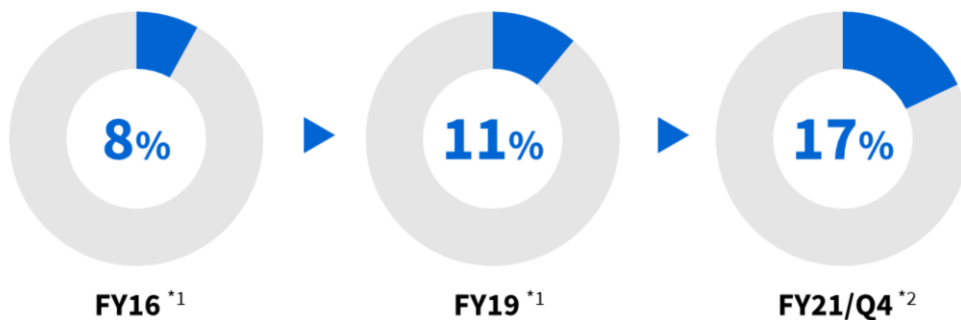
#### (Recording Needs for Nearline HDDs)

- Let's now discuss the HDD needs of cloud service providers.
  - Their biggest concerns are continuing technological innovation that allows for them to process huge volumes of data and ensuring that the power per storage capacity is as low as possible. This ensures the cloud service providers can support stable data center operations 24 hours a day, 7 days a week.
- Device Co. has the ability to realize higher capacity data storage by leveraging multi-stacking technology and assisted recording technology.
- For data storage costs, it is necessary to consider both initial installation costs - which are determined by bit costs - and running costs, such as power consumption.
- For installation costs in particular, the graph on the right is a comparison of HDD and SSD bit costs – which predicts that HDDs will continuously realize 1/7 of the cost of SSDs.
- It is anticipated that HDDs and SSDs will coexist in the data center market by taking advantage of their respective product characteristics.

## Nearline HDD Market Share (Unit Base)

Increasing share with enhanced lineup and major CSP engagement

Launched World first “9 Platter 14TB HDD” in 2017



\*1: Source: IDC Storage Mechanisms: Disk quarterly forecast data, 2021

\*2: Source: Toshiba

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(History of market share increase)

- We are focusing on Nearline HDDs. Our market share in fiscal 16 was just around 8%.
- Since then, we have developed the world's first technologies and products, achieved the quality standards required of our data centers customers, and steadily increased our market share.

## Nearline HDD Growth Strategy

Provide greater customer values in expanding Nearline HDD market

### 1. Higher Capacity Technology

- ✓ Leading technology products (Multi stacking, Assist technology)
- ✓ Technical R&D collaboration with key suppliers

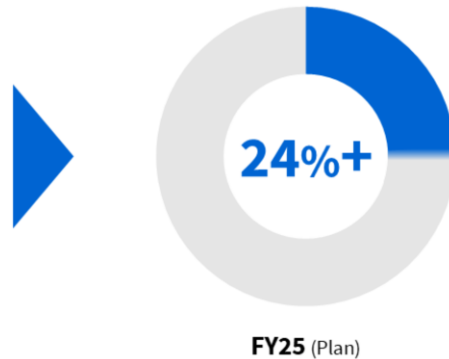
### 2. Customer Relations

- ✓ Local technical support enhancement, analysis TAT<sup>\*1</sup> improvement
- ✓ Further customer portfolio expansion through sales organization enhancement

### 3. Production Capacity Expansion

- ✓ Continuous investment to Philippines factory
- ✓ Start Nearline HDD production at 2<sup>nd</sup> factory in China

Nearline HDD Market share (Unit Base)



\*1: Turn Around Time

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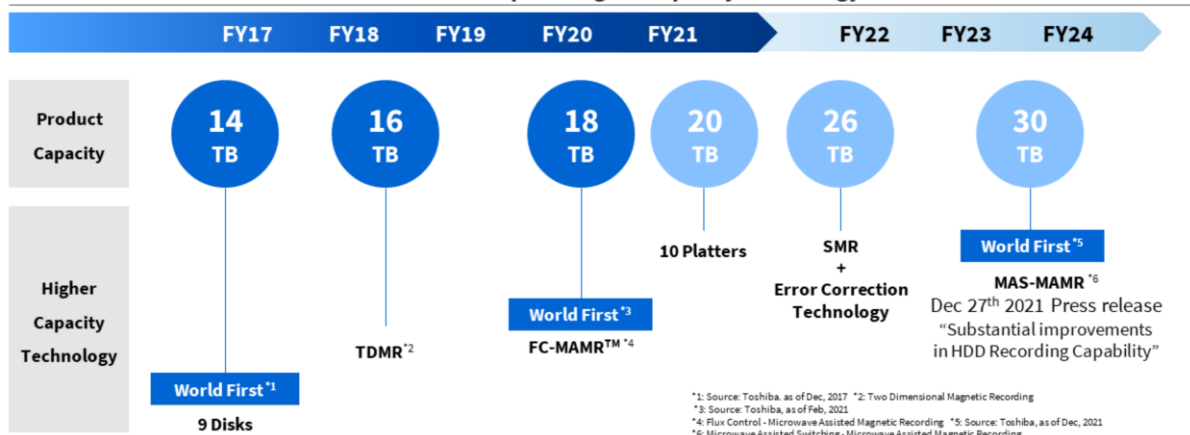
(Growth Strategy)

- Device Co.'s nearline HDD strategy is very simple: provide our customers greater value through higher capacity technology, expanded customer relations, and production capacity expansion.
- If we successfully execute our strategy, we expect to increase our market share from 17% in the fourth quarter of FY21 to at least 24% by FY25.
- We will discuss our detailed strategies on the following slides.

## 1. Higher Capacity Technology

Proposing vast capacity increases and TCO reductions through technology breakthroughs

Product Roadmap and Higher Capacity Technology



(Larger Capacity Technology)

- First, let's discuss higher capacity technology.
- This diagram shows our product roadmap through FY24, with the product capacity increasing from 14TB in FY17 to 30TB in FY24. Each product we introduce to market increases capacity, yielding benefits for our clients.
- As you may recall, we touched on the MAS-MAMR technology in our Dec 27<sup>th</sup> press release.

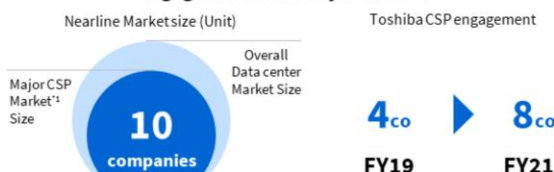
## 2. Customer Relations

### Firmly engaging an increasing number of major CSP companies by building solid supply record of high capacity products

#### Achievement

- ✓ Major CSP engagement with high capacity products
- ✓ Built credibility by demonstrating high quality
- ✓ Expand production capacity to support growing Nearline demand
- ✓ Signed long term agreements

#### Engagement with Major 10 CSPs



\*1: Source: Toshiba

#### Future Plan

- ✓ Local technical collaboration enhancement and analysis
- ✓ TAT improvement
- ✓ Customer expansion with salesforce increase

#### Number of Datacenters\* by region\*\* (2025) \*2



\*2: Source: Gartner, Forecast: Data Centers, Worldwide, 2018-2025, 2021 Update, Adrian O'Connell, 1 Dec 2021

\* Number of Datacenters: Added up Enterprise DC and Large DC from Single, Rack/Computer room, Midsize DC, Enterprise DC and Large DC

\*\* Region: Asia/Pacific, Eastern Europe, Japan, Latin America, Middle East & Africa, North America and Western Europe

Chart created by Toshiba Electronic Devices & Storage Corporation based on Gartner research. Device Forecast, Revenue basis

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#### (Customer Relations)

- The second part of our strategy is a focused on expanding our customer relations.
- Key to working with more major CSPs is having local technical expertise and higher capacity drive technology.
- Over the past few years, we have been focused on building a system that earns the trust of customers, including by improving analytical TAT in the event of failures.
- Our efforts have already yielded results: we have successfully received orders from eight of the ten major CSP companies that account for the majority of the nearline HDD demands.
- Even though we were a latecomer, we have already achieved great recognition in the market.
- Going forward, we plan to continue launching high-capacity products and promoting our local technical expertise to drive customer acquisitions.
  - In addition, we will continue to increase production capacity and strengthen our sales structure.

### 3. Production Capacity Expansion

#### Continuous production capacity investment to support vastly increasing high capacity Nearline demand

##### Continuous production capacity expansion

- Philippines continuous investment
- Opening Nearline HDD 2<sup>nd</sup> factory in China

##### Advantage of Nearline HDD production at 2<sup>nd</sup> factory (China)

- ✓ BCP reinforcement by multi-country production
- ✓ Logistics cost reductions for Chinese customers
- ✓ Enhanced collaboration with Chinese head supplier

##### Toshiba HDD business model



##### Nearline HDD production capacity



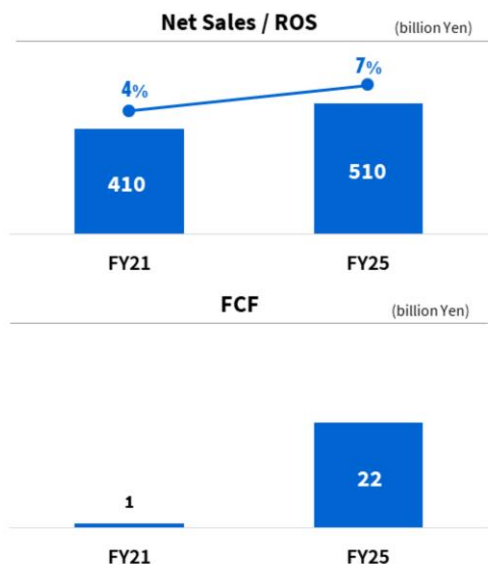
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#### (Expansion of Production Capacity)

- The third leg of our strategy is to expand the production capacity of our products.
- It is critical that we continuously enhance our technology and the production capacity of our products to capture share of the expanding nearline HDD market.
- We currently have a production facility in the Philippines, which is our key HDD production site. We recently decided to establish a second production facility in China. We will invest in both production facilities going forward.
- One of the reasons we decided to establish a production facility in China is because the Chinese nearly HDD market is expected to grow significantly over the next few years.
  - Establishing a new manufacturing base in China provides us advantages, including strengthening BCP by becoming a two-factory system in China and in the Philippines, reducing logistics costs to our Chinese customers, and strengthening cooperation with Chinese magnetic head suppliers.
- Our production capacity across our two factories in FY25 is expected to be nearly double what it was with just the Philippines factory in FY20.
- The business model of our HDD business is shown at the lower left.

- Device Co. is one of three global HDD manufacturers in the world. Unlike the others, we are horizontally organized and have been for more than 50 years. This means the purchase of Media and Head focuses on development and manufacturing.
- While our technical collaboration with these key suppliers is critical, we recognize that one of our strengths is a business model that aims to achieve optimized capital efficiency by sharing development investment and capital investment.

## HDD Growth Plan



### Net Sales

- ✓ Expect sales increase by 100 billion yen (FY21→25)
  - Sales decline in Mobile HDD, sales increase in Nearline HDD

### ROS

- ✓ Improve marginal profit ratio +2% (FY21→25)
  - Improved product mix in Nearline HDD, cost reduction

### FCF

- ✓ Secure +22 billion yen (+21 billion yen compared to FY21)
  - Continue stable investment to increase production capacity
  - Improve operating CF thanks to sales increase and improved profitability

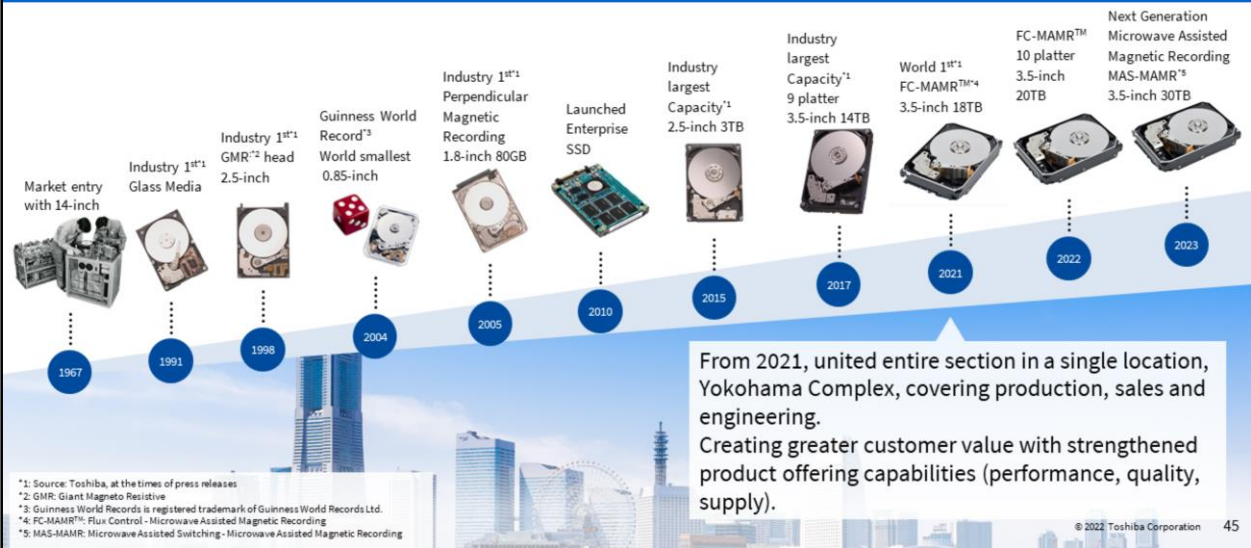
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### (HDD Growth Plan)

- This slide outlines our HDD growth plan.
- We expect HDD sales to grow by 100 billion yen from FY21 to FY25. Growth in the nearline HDD segment is expected to more than offset decreases in the mobile and other HDD markets, which are expected to experience lower sales as they are replaced by SSDs.
- We expect our operating margin to improve from 4% to 7% over the same period, primarily as a result of an increase in the proportion of nearline HDDs and improved marginal profits as a result of cost reductions.
- FCF is expected to increase to ¥22 billion in FY25, from 1 billion yen in FY21. While we need to continue some investments, we expect operating CF will improve thanks to increased sales volume and profitability.

## Toshiba HDD Business History: Products & Technology

Supporting industry needs with leading-edge HDDs since 1967



### (HDD History)

- For more than half a century, Toshiba has developed HDDs powered by cutting-edge technologies which have evolved to adapt to societal demands.
- Going forward, we will continue our history of innovation to continue offering new products for storage applications, including data centers.

# 04

## NuFlare Technology Business Strategy

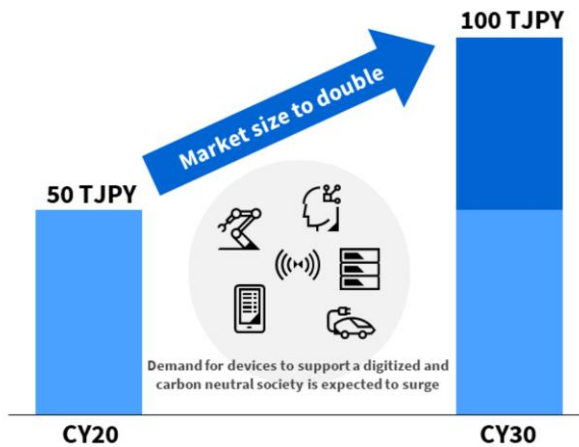
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Let us now move on to NuFlare Technology's semiconductor manufacturing equipment business strategy.

## Semiconductor Market

Semiconductor market drives the progress of social and information infrastructure

### Semiconductor market size



\* Source: METI, 4th Semiconductor and Digital Industry Strategy Review Conference  
"Progress and outlook of semiconductor strategy"

- ✓ The semiconductor market, an industry that supports the progress of social and information infrastructure, is expected to reach 100 trillion JPY in CY30, creating an additional 50 trillion JPY sized market.
- ✓ In particular, demand for leading edge semiconductors and high efficiency compound semiconductors, the driving forces of digitalization and carbon neutrality, is expected to surge.

### (NuFlare's Focus Markets)

- We believe the semiconductor is crucial to social and information infrastructure.
- The market is currently approximately 50 trillion yen, and is expected to double in size to 100 trillion yen by 2030.
- This market will be comprised of advanced miniaturized semiconductors and high efficiency compound semiconductors that drive digitalization and carbon neutrality.

## Semiconductor Manufacturing Equipment



**NuFlare specializes in mask related and epitaxial growth equipment**

### NuFlare's main semiconductor manuf. equipment



#### Electron beam mask writer

Manufacturing equipment for photomasks, plates of semiconductor circuit patterns that are projected onto wafers

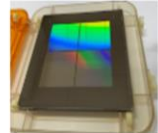


#### Epitaxial growth system

Equipment for forming single crystal thin films with aligned orientation onto wafers

### Customers

- Memory and leading-edge logic manufacturers
- Foundries
- Merchant mask shops



- Semiconductor wafer manufacturers
- Epi wafer manufacturers
- Semiconductor device manufacturers



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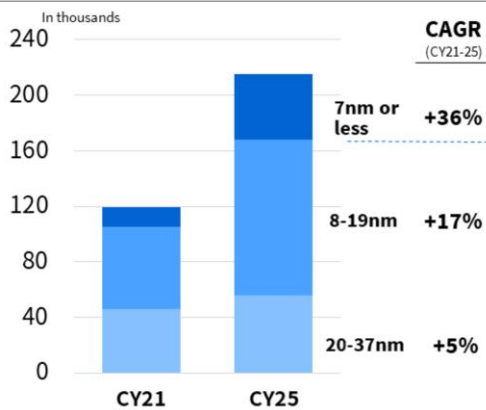
### (Introduction of NuFlare's Products)

- NuFlare's focused semiconductor manufacturing equipment includes electron beam mask writers and epitaxial growth systems.
  - Electron beam mask writers manufacture photomasks used as plates for transferring semiconductor circuit patterns.
  - Epitaxial growth systems are equipment to form single crystal thin films with aligned orientation on wafers.
- Both of these products offer technological advantages including process time and accuracy; increased productivity, including yield and reduced downtime; and a reduction in total cost of ownership with an eye to the customers' production phase.
- In order to achieve this, we provide comprehensive support to our customers at all stages, from specification determination, evaluation, production planning, installation, after-sales service and maintenance.

## Mask Writer Market

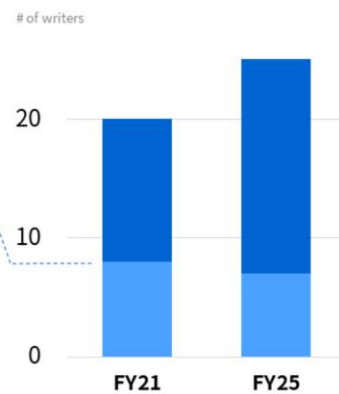
**New demand for multi beam and single beam mask writers is expanding on semiconductor scaling and increase in production volumes**

**Photomask demand (37nm or less) \*1**



\*1: Source: VLSI Research powered by Techninsights "Worldwide Demand for Reticles" October 2021

**Electron beam mask writer demand \*2**



\*2: Source: Toshiba

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### (Mask Writer Market)

- Demand for mask writers is expanding due to the miniaturization of semiconductors and an increase in the scale of production.
- Demand for single beam writers, which has traditionally led the market, is expected to remain stable as a result of the expanding demand for corresponding masks.
- In addition, new demand for multi beam writers is expected to grow significantly in line with the demand for masks required to manufacture semiconductors on finer processes.

## Mask Writers



**Expand multi beam mask writer share by leveraging the relationship with customers and technology fostered by marketing the single beam writer**

### Single beam mask writer



EBM-9500PLUS

**100% market share**

Current mainstream leading edge electron beam mask writers for 20nm or less  
(As of Dec.2021, according to our research)

- ✓ Good relations with major semiconductor manufacturers
- ✓ High productivity and reliability
- ✓ On site support at customer sites (US, EU, Taiwan, Korea, China, Japan)
- ✓ Expansion of support and maintenance; recurring revenues

### Multi beam mask writer



MBM™-2000

**Installation start and revenue recognition in FY21**

**Several writers to be shipped to customers in Asia and US in FY22**

**50% share in FY23 (target)**

- ✓ Good relations and trust from customers fostered by the single beam mask writer business
- ✓ Key components developed by technological expertise within company group. (BAA\*)
- ✓ High productivity and reliability

\* BAA: Blanking Aperture Array  
Semiconductor device to switch on/off of each beamlet in multi beam

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(NuFlare mask writers)

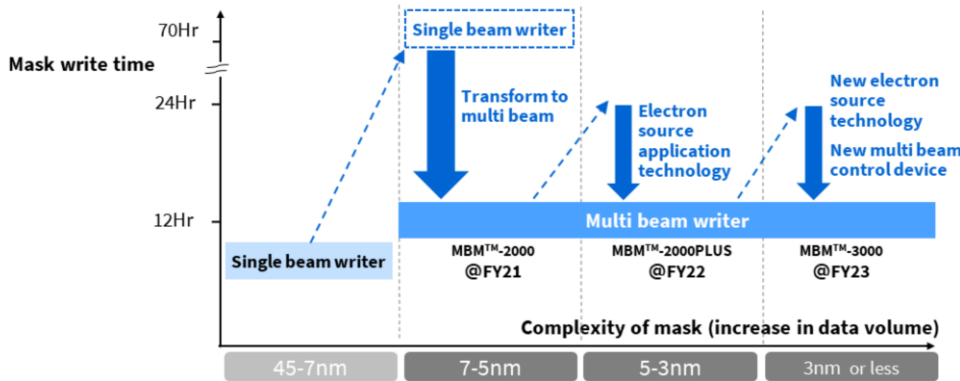
- NuFlare's single beam mask writers have been well received in the market, and thus, we have garnered a 100% market share in the leading-edge node markets. We maintain good relations with almost all semiconductor manufacturers and provide on-site support to customers at various global locations.
- Going forward, we will focus on recurring revenues with existing customers by extending our support and maintenance capabilities.
- In addition to the equipment we have already shipped, we have received orders from multiple customers in Asia and North America and plan to ship more equipment in the next fiscal year.
- We also plan to increase our share in the multi beam mask writer market to 50% in FY23, making full use of the reliability and customer relations we have cultivated in single beam, in-house manufacturing, and high production efficiency and reliability.

## Advantages of the Multi Beam Mask Writer Over Competitor



Contribute to customers' productivity by combining original technology with foundational mask writing technology fostered by developing the single beam

- Mask pattern data volume increases dramatically as scaling progresses
- Contributes to customers' productivity by using NuFlare's unique technology to write masks within a predetermined time



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(Competitive advantage of multi beam mask writers)

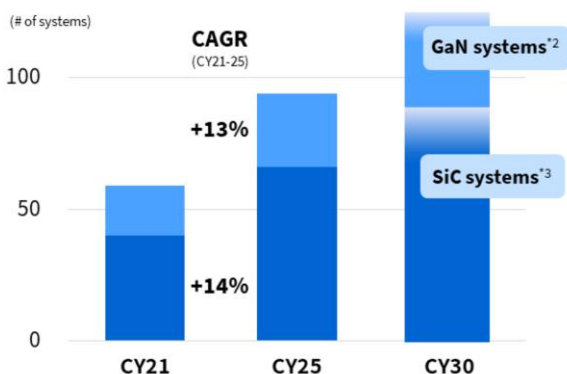
- I will now explain the competitive advantages of our multi-beam mask writers.
- NuFlare contributes to improving productivity for customers by combining original technologies with drawing element technologies cultivated with single beams.
- The vertical axis of this chart shows mask write time, and the horizontal axis shows a degree of miniaturization, or complexity of the mask.
  - As miniaturization advances and masks become more complicated, the amount of data increases dramatically, and mask write time also increases dramatically.
  - This problem can be solved by using a multi beam mask writer or by suppressing the problem within a certain period of time by applying proprietary technologies.
- We will continue to meet the customers' needs by introducing highly productive products.

## Epitaxial Growth System Market



**SiC, GaN market expected to surge on demand for high breakdown voltage and high frequency power semiconductors in xEV and next generation communications standards**

**Epitaxial growth system demand (compound semiconductor)\*<sup>1</sup>**



\*1: Source: Fujii Keizai Co., Ltd. "2021 edition: current status and future prospects of mechatronics market for next generation power devices & power electronics" CY21 is forecast, CY25 and CY30 are projections

\*2: GaN systems: GaN MOCVD

\*3: SiC systems: SiC epitaxial growth system for power devices

- ✓ In addition to 150mm wafers, 200mm wafers are currently marketed.
- ✓ Demand expected to increase for high efficiency power sources to advance carbon neutrality.
- ✓ 150mm wafers are the mainstream.
- ✓ Demand for systems is expected to grow further due to demand in xEV and shift towards larger, 200mm wafers.

FY	20	21	22	23	24	25
150mm	Production					
200mm		Development				Production

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### (Epitaxial growth system market)

- The epitaxial growth system market for compound semiconductors, developed by NuFlare, is expected to grow significantly as the market of SiC and GaN power semiconductors for electric vehicles and next-generation communications standards expand.
- At this point, 150mm wafers are largely used for compound device production.
- Once semiconductor manufacturers start using 200mm wafers to realize better production efficiency, the epitaxial growth system market is expected to grow.

## Advantages of Epitaxial Growth System over Competitors

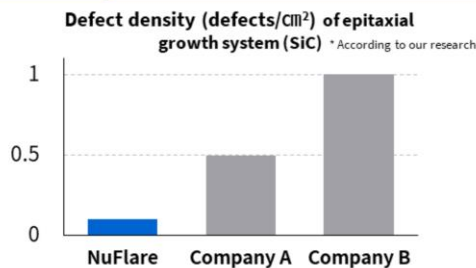


**Contribute to improving productivity in the compound semicon industry by providing film formation technology that is faster, more uniform, capable of processing larger wafers**

**Capable of forming high quality film with low defect density**

**NuFlare's advantage**

- ✓ Reduced surface defects during film formation
- ✓ Good surface uniformity



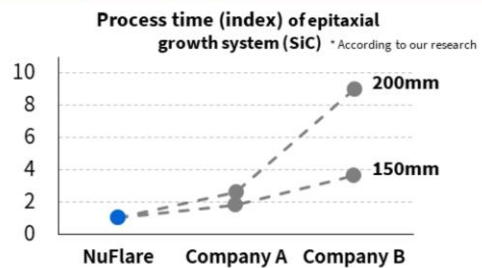
**Advantage over competitors**

Received excellent reviews from customers at demonstrations

**Allows rapid process while maintaining high quality even with high speed rotation**

**NuFlare's advantage**

- ✓ High throughput by high speed rotation
- ✓ Allows support of both 150mm and 200mm wafer with same reactor



**Share (target) 10% (FY20) → 30%+ (FY25)**

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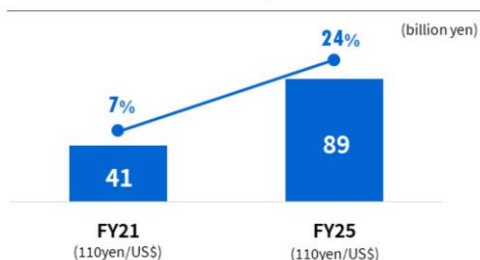
(Competitive advantages of epitaxial growth system)

- Next, I'll discuss the competitive advantages of our epitaxial growth system.
- Our epitaxial growth system possesses high film formation technology and boasts extremely low surface defect density and high surface uniformity.
- Therefore, high quality can be maintained even in a manufacturing process that rotates at high speed, which enables a shorter processing time.
- We have received excellent reviews from customers.
- We aim to increase our market share from 10% in FY20 to over 30% in FY25.

## NuFlare Growth Plan



### Net Sales / ROS



#### Net Sales

- ✓ Increase sales by +48 billion yen as a result of sales increase in multi beam mask writers and epitaxial growth systems (FY21→25)

#### ROS

- ✓ Expect 24% as profitability improves as increased Net sales and cost reductions.

### FCF



#### FCF

- ✓ FCF increases to 15 billion yen thanks to increased profits, etc. (+10 billion yen compared to FY21)

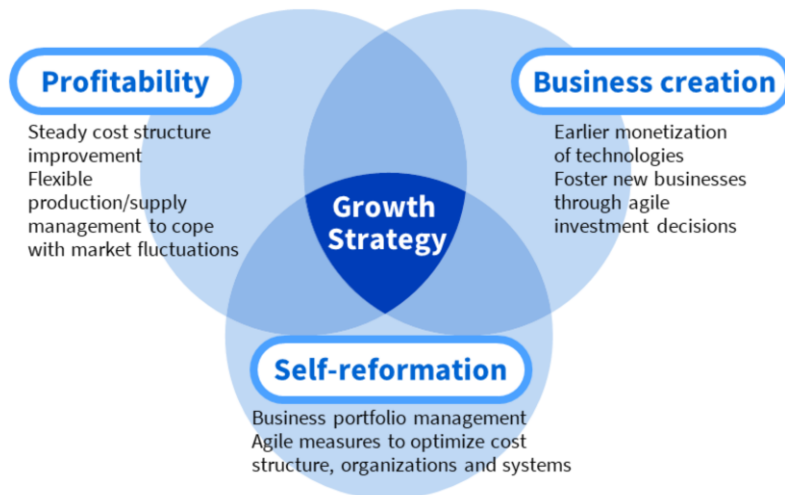
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### (NuFlare Growth Plan)

- This is our growth plan for NuFlare.
- We plan to increase sales by about 2 times, or 48 billion yen, from this fiscal year to FY25 by expanding the sales of multi beam mask writers and epitaxial growth systems I have already explained today.
- The operating income margin is also expected to grow from 7% to 24%, as profitability improves due to the contribution of new highly value-added products and the curtailment of increases in fixed costs.
- FCF is also forecasted to increase to ¥15.0 billion in FY25, mainly due to an increase in profit before income taxes.

## Driving Growth

Promote growth by grasping changes in global customers needs  
with technologies accumulated over many decades



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(Driving Growth)

- Devices Co. aims to further improve its core profitability by steadily reducing costs and responding to market fluctuations in supply and demand balance.
- We will also quickly monetize technologies and cultivate new businesses through agile investment decisions.
- Furthermore, we will manage our business portfolio and swiftly implement cost structure, organizational and institutional reforms.
- We will achieve our growth strategy through the synergy of profitability, business creation capabilities and self-reformation capabilities.
- Next, Mr. Mori, our Chief Technology Officer, will discuss the technologies and products that support Device Co.'s growth.

# 05

## Technologies and Products to support Device Co.

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Thank you, Mr. Sato. I am now going to explain the key technologies and products that will enhance our competitiveness in the space.

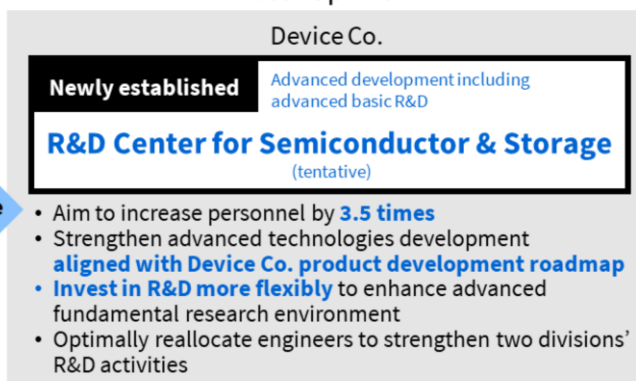
## Enhance Device Co.'s R&D Strategy

Establish new R&D center leveraging combined capabilities of two R&D resources.

Before Spin-off (Current Status)



After Spin-off



Contract common basic technologies including AI algorithm and production efficiency technology to Toshiba/Infrastructure Service Co. Lab.

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(Strengthen Device Co.'s R&D System)

- First, let's look at our R&D and our plans to strengthen this part of the business.
- Following the separation, we plan to combine Corporate Lab's R&D resources who are currently dedicated to Device Co.'s business domains with those in our Devices & Storage Development Center, which is currently responsible for cutting-edge technological development in Toshiba Electronic Devices & Storage.
- We will then establish the Semiconductors & Storage R&D Center in Device Co., where we will promote advanced development, including cutting-edge basic research, based on the medium-to long-term Roadmap of Devices Co.
- We also intend to strengthen the R&D organization of our business divisions.
- With regard to cutting-edge infrastructure technologies common to AI algorithms development, advanced production technologies, and other Toshiba/Infrastructure Service Co., we plan to promote research and development by working closely with the research team of Toshiba/Infrastructure Service Co.

## R&D Sites for Device Co.



(Device Co. R&D Base)

- This slide provides an overview of the R&D locations for Device Co.
  - The new Semiconductor & Storage R&D Center and Semiconductor Division will be consolidated at the Semiconductor Systems Engineering Center in Kawasaki.
  - For the Advanced Semiconductor Device Development Center, which is responsible for product development in the Semiconductor Division, we plan to build a new center at Kaga Toshiba.
  - The Storage Products Division of HDDs and NuFlare Technology remain in Yokohama.
  - Technicians of advanced basic development will merge with Device Co. from the Corporation Laboratory, but we are considering preparing a place to conduct basic research, including material development for compound semiconductors, and we plan to lay a new R&D space for semiconductors in Yokohama, where there is a clean room, to improve and strengthen the R&D environment.
  - As a result of the spin-off, we plan to make timely management decisions based on Roadmap of the business and implement the optimal allocation of engineer resources.
  - In addition, we plan to fully invest in development to improve the

development environment in order to strengthen advanced technological development for semiconductors.

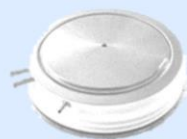
# Provide Strategic Products for Infrastructure Business

**Maintain collaboration with Toshiba/Infrastructure Service Co.  
in development and provide core parts**

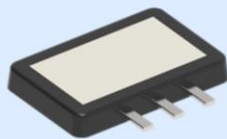
## Device Co.



SiC Module



Pressure welding type  
high power module



High voltage  
Multi-chip package  
(under development)

## Toshiba/Infrastructure Service Co.



All-SiC  
VVVF Inverter<sup>\*1</sup>



HVDC Converter  
(DC power transmission)

**Automotive &  
Industrial Customer**

## Application

### Railway Business



### Renewable Energy, Power Transmission and Distribution Business



\*1: VVVF: Variable Voltage Variable Frequency control

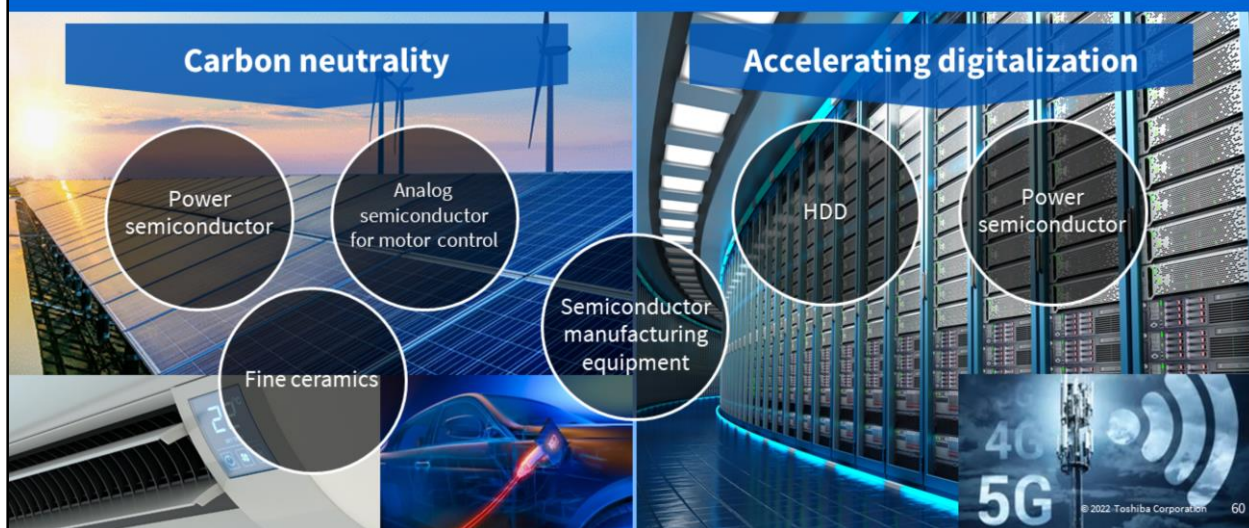
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(Strategic Products for Toshiba's Infrastructure Businesses)

- Next, I will explain how Device Co. will continue to work closely with the Toshiba/Infrastructure Service Co. business after the spin-off to supply key components.
- We plan to continue to promote the development of products equipped with power semiconductors, which are necessary for the railway businesses, renewable energy, power transmission and distribution business.
- Based on the specifications required by Toshiba/Infrastructure Service Co., Device Co. will provide power modules equipped with Si and SiC power devices.
- These will then be incorporated into inverters and converters and deployed to customers.
- Device Co. will expand its business scale in this field by expanding its products and customer-base using the technology developed for Toshiba/Infrastructure Service Co.

## Device Co.'s Businesses in Global Trends

Committed to offering key devices to contribute to a carbon neutrality and accelerated digitalization

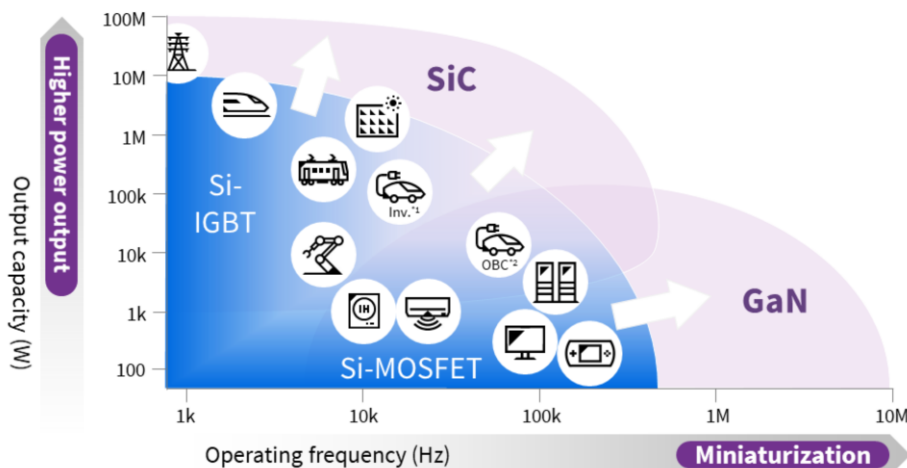


(Global Trends and Device Co.'s Business)

- We will also provide the core products that support carbon neutrality and the acceleration of digitization, two major global trends.
- We continue to launch power semiconductors that contribute to carbon neutrality, as well as analog semiconductors that focus primarily on the motor control applications, fine ceramics for automotive and other applications.
- We also focus on large capacity hard disk drives as the main storage device for data centers and power semiconductors for data centers and telecommunications base stations, as well as NuFlare's semiconductor manufacturing equipment for the manufacturing of leading-edge semiconductors and compound power semiconductors.

## Types & Features of Power Semiconductor Devices

Major products include low-to medium voltage Si-MOSFET & high voltage IGBT. In future, compound semiconductor devices such as SiC and GaN are expected to be popular for high power output and miniaturization respectively



\*1: Inv.: Inverter \*2: OBC: On Board Charger

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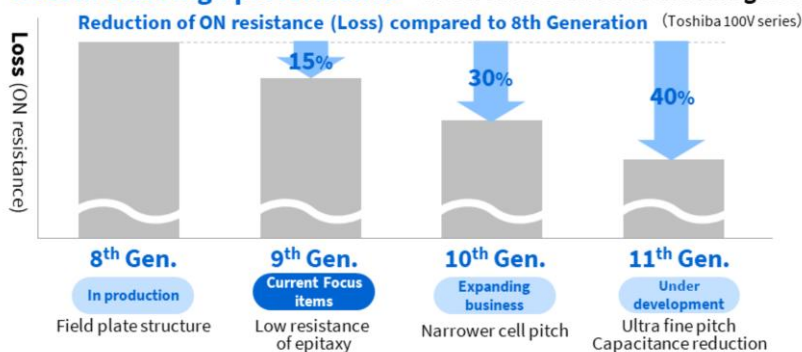
(Types and Features of Power Semiconductors)

- This diagram provides more detail around the types and applications of power semiconductors.
- As you likely know, power semiconductors control the powering on and off function of electricity.
- Electric circuits composed of power semiconductors convert direct current and alternating current, frequency of alternating current, voltage and so on.
- Today's mainstay is silicon power semiconductors.
- IGBTs are used in the high voltage, high current areas, and MOSFETs are used in other areas, as they are suitable for miniaturizing the system.
- Compound semiconductors, which have been developed in recent years, are suitable for the region of high voltage, while SiC and GaN are suitable for the region of high efficiency and miniaturization.
- While compound semiconductors have superior characteristics compared to Si, there are still issues in manufacturing costs and reliability.
- However, as these issues are overcome in future research and development, the market is expected to expand.

## Power Semiconductor: MOSFET

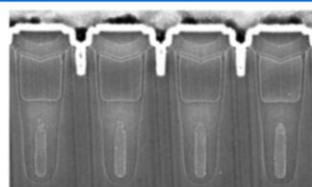
Launch world's top class products by continuously developing next-generation products

**Best in class high performance<sup>\*1</sup> : Low ON resistance & switching loss**



- Offer an extensive portfolio from 20V to 650V for automotive, industrial and consumer applications.
- Strengthen product development to double line up of products in FY23 (packaging, specifications)
- Front-end : Expand 300mm capacity;  
Back-end : Further expand Thailand production to significantly increase supply

\*1: As to 80V N-channel power MOSFET, compared its On-resistance x switching characteristics (Ron x Qoss) among product with the same rating, as of January, 2022. Toshiba survey.



Cross section of 300mm-based prototype



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(Power Semiconductor: MOSFET)

- First, this is a diagram of silicon-based power MOSFETs, Toshiba's mainstay power semiconductors.
- We have continuously aimed to improve performance of power MOSFETs and introduce best in class products to the market.
- One of the most critical indicators of performance is the reduction of the power dissipation when the power ON/OFF is controlled.
- The on-resistance is the parameter that indicates the power dissipation.
- Currently, for automotive applications, the eighth-generation products are the mainstay products the ninth-generation products are for the consumer and industrial applications, which reduce on-resistance by 15% and have the largest production volume.
- We have completed the development of 10th generation products, which have reduced resistance by 30% and are selling more and more. We are currently developing 11th-generation products, which will further reduce resistance by 40%.
- Our power MOSFET covers a variety of applications with a wide range of voltage-ranging lineups from 20V to 650V. We plan to double the number of products by FY23 to accommodate for the surge in demand and the spread of applications.

- We will expand production capacity for the front-end process with 300mm wafer production lines for all generations, together with 200mm production.
- As shown in the cross-sectional photograph on the upper right, we have already developed a prototype for 300 mm products, and plan to start mass production in the second half of FY22.
- In addition to our existing capacity, we will expand our back-end assembly capacity in Thailand and work to increase production.

## Si Power MOSFET : Wide Product Offering for Various Applications

### Automotive high quality packaging

Produce diverse highly heat-dissipating reliable products under strict quality control in Japan



Electric Pump



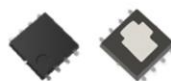
Electronic power Steering



Battery management

### High-Speed Switching Devices (150V, 650V)

World's best in class<sup>\*1</sup> low ON resistance devices with lifetime control technology to realize high speed operations



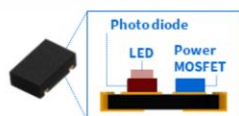
Power supply for base stations



Power supply for servers

### Photo relay (insulation device)

Implement power MOSFET in a package fully utilizing world's top share optocoupler technology



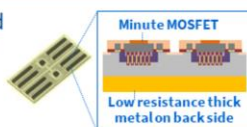
Semiconductor testers



Battery management for EVs

### MOSFET for Li-ion battery protection circuit

Low On-resistance Die and packaging technology for fast charging for mobile devices



Wearables



Mobile



Gaming

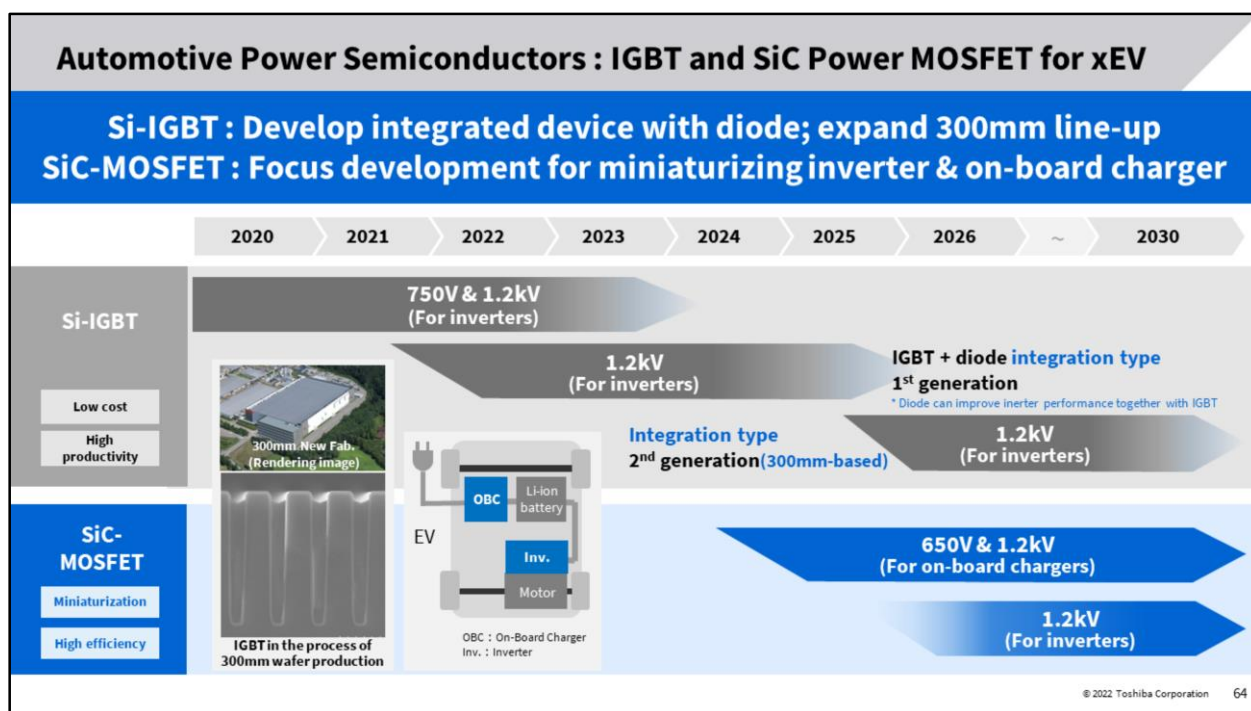
<sup>\*1</sup>: As to 650V power MOSFET, compared its On-resistance × switching characteristics ( $R_{on} \times Q_{gd}$ ) among product with the same rating, as of January, 2022. Toshiba survey.

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### (Si Power MOSFET: a Variety of Applications)

- We develop a variety of products based on the core technologies of power MOSFETs.
- Our domestic plants produce various automotive products in a variety of packages based on advanced quality control.
- For 150V and 650V products, lifetime control technology is applied to best in class low-on-resistance products, and high-speed operation is realized for the power supply for communications base stations and servers.
- We are the world leader in optocoupler technology. Utilizing this technology, we offer photorelays that integrate power MOSFETs in the same package, which we sell to the market as semiconductor testers and battery management systems for vehicles.
- For the consumer market, we are developing power MOSFETs that are used to protect the batteries of smartphones and other mobile devices.
- We will strengthen our lineup of products with lower resistivity through our technologies of tiny MOSFETs and thick-film metals on the back side of the chip.



(Power Semiconductors for Automotive Applications: IGBT for xEVs, SiC-Power MOSFET)

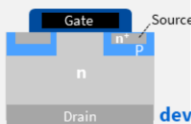
- Next, I would like to explain Si-IGBT and SiC MOSFET for automotive applications in addition to our power MOSFETs.
- We are currently mass-producing 750V and 1.2kV Si-IGBT products.
- In order to improve the performance of inverters, we have completed the development of new products that integrate diodes with IGBT, which will begin mass production this year. The second generation of the integrated product is planned to be produced on 300mm lines from FY26.
- Meanwhile, the use of SiC MOSFET for on-board chargers and inverters, which make them more compact and efficient, is also expected to begin in the near-term.
- For the time being, the cost will be higher than Si-IGBT, so we assume either Si IGBT or SiC MOSFET will be used depending on vehicle models. When the performance of SiC increases and the cost decreases, the ratio of SiC adoption will increase.
- We plan to start production of SiC products for on-board chargers in FY24.
- We intend to produce Si IGBT on the 300mm lines, creating a production system that can produce large quantities at lower cost. At the same time, we will focus on developing SiC-products for automotive applications.

## SiC Device Development : Expand Business by Utilizing Advanced Technologies

Penetrate automotive, renewable energy and power T&D markets based on high voltage technologies over 3kV (for railways, etc)

### 3.3kV module for railways

In production



New development

Technologies to manage defects, high voltage, high current

Device structure Inspection technology

Using Showa Denko's high grade epitaxial wafers (HGE GEN.2)

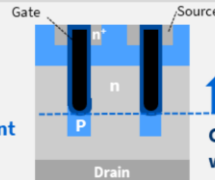
LTA signed in September 2021

Expand businesses fully utilizing above technical advantages

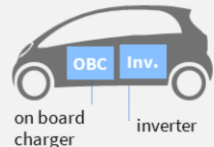
### 650V, 1.2kV : MOSFET (discrete)

Sample shipment started for industrial use incl. power supply in 2021. Devices for automotive under dev.

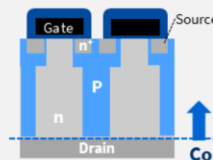
### Up to 1.2kV: high quality/reliability device for automotive



In-process epitaxial  
Co-development with Nuflare



### Higher than 3.3kV: higher voltage, lower loss with super junction structure; suitable for renewable energy, HVDC, etc.



In-process epitaxial  
Co-development with Nuflare



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(Develop SiC Devices: Expand Business Domains by Leveraging Advanced Technology Foundations)

- Next, I will explain SiC device development.
- To date, we have been mass-producing modular components with 3.3kV SiC MOSFET and Schottky Barrier Diodes (SBDs) primarily for railway inverters for domestic railways.
- High-voltage, high-current specifications for railway applications are susceptible to crystal defects, which pose a problem for SiC as producing a stable product requires technologies to control defects to a low level.
- Showa Denko, with whom we have a long-term supply agreement, supplies the high quality epitaxial wafers to us.
- Based on the technologies we have cultivated in the railway industry, we are rapidly expanding our business to other applications.
- We began shipping samples of 650V and 1.2kV MOSFET products, mainly for power supply applications, in November last year.
- We are also focusing on developing SiC-MOSFET for use in vehicles, which we explained earlier in the presentation.
- In the future, as shown in the top right, we will develop a performance-improving device, in which the gate structure will be embedded in the wafer for automotive applications. We will also introduce a structure called Super

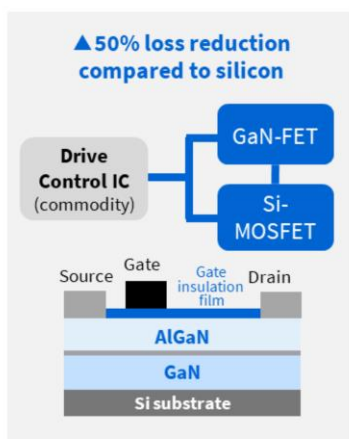
Junction, which will be adopted in Si MOSFETs, for high-voltage applications, such as power transmission and distribution and renewable energy.

- The two structures shown on the right require the epitaxial growth process, which we refer to as the in-process epitaxial during the manufacturing process. This will be jointly developed with NuFlare in equipment and process development.

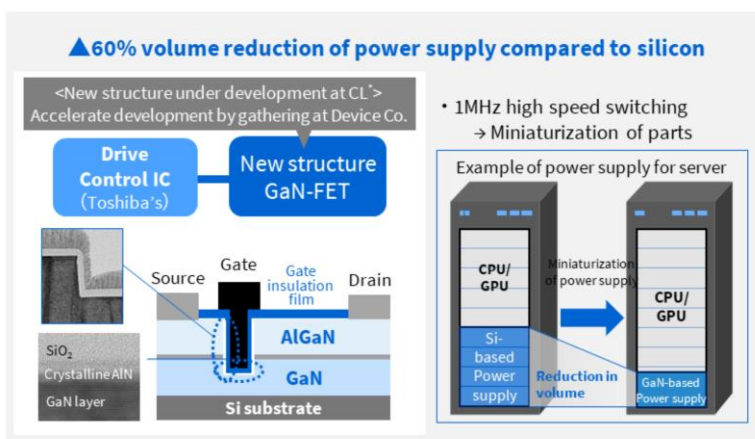
## GaN-FET: Aim to Downsize Power Supply by Developing New Structure Device

Develop 2nd generation GaN power device with new structure that contributes to higher efficiency & miniaturization.; Offer them to customers with optimized control IC

### 1<sup>st</sup> Generation (CY23)



### 2<sup>nd</sup> Generation (from CY26)



\* CL: Corporate Lab.

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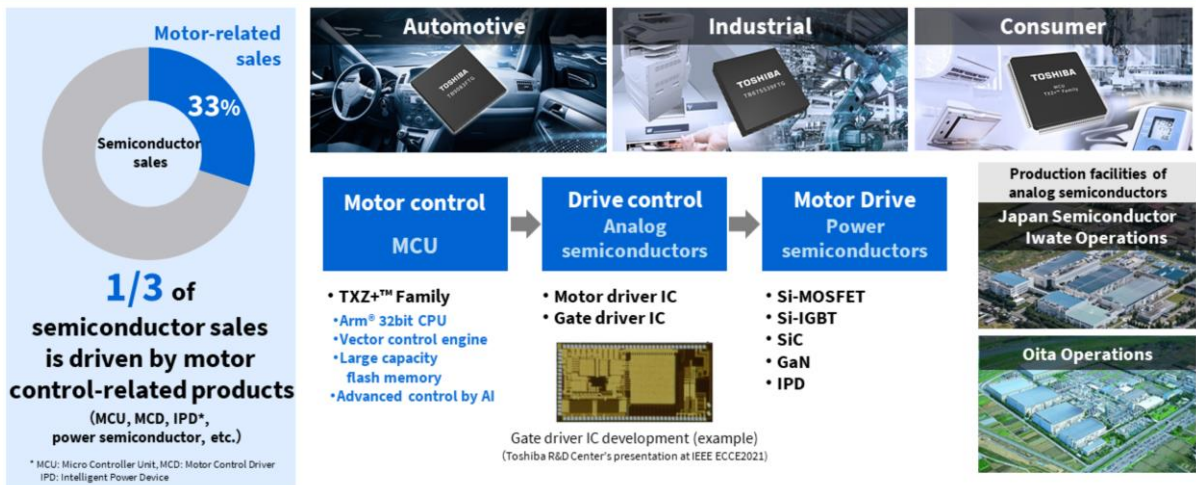
66

(GaN-FET: Aiming to reduce the size of power supplies by developing new structural devices)

- Next, I will walk through GaN of compound semiconductors.
- We plan to begin offering products in FY23 that reduce losses by half for Si-only devices.
- We will do this by combining GaN and Si power MOSFET as a first-generation combination with conventional control ICs.
- Major applications are switching power supplies for consumer and industrial use.
- In addition, we will develop a device structure of GaN to realize high-speed switching, which is a characteristic of GaN by itself, and provide it in combination with IC.
- This reduces the volume by about 60% compared to Si and reduces the size of the power supply units.
- This also reduces the exclusive area of servers installed in data centers.
- We will work together with domestic and overseas power supply manufacturers to develop these products.

## Motor Area: Proactively Support MCU, Analog and Power Semiconductors

Offer highly efficient systems for various motor-related applications; Realize low noise and low heat dissipation with vector control technology and automatic adjustment function, etc



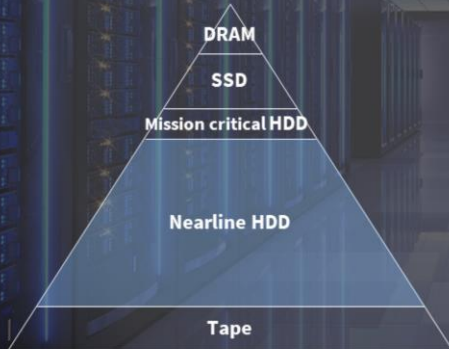
(Motor area: Strongly Supported by Microcomputer, Analog, and Power Semiconductors)

- One-third of our semiconductor product sales are driven by motor control-related areas.
- Motor control is required in a wide range of automotive, industrial, and consumer applications, and its control methods vary. We provide our customers with power semiconductors, including motor-controlled microcomputers, analog semiconductors that drive motors, and intelligent power devices (IPDs), which enable motors to generate less noise and heat, thereby contributing to power savings and higher performance.
- We have a long history in the development of motor control technologies and have developed products incorporating advanced control technologies such as vector control engines and automatic adjustment functions.
- In the future, we will also consider products equipped with AI-based controls.

## Storage Devices Supporting Data Centers

Nearline HDDs, a core of data centers, remain as a key storage product; Continue to share the market with SSDs by playing a different role

Hierarchical structure of storage for Data centers



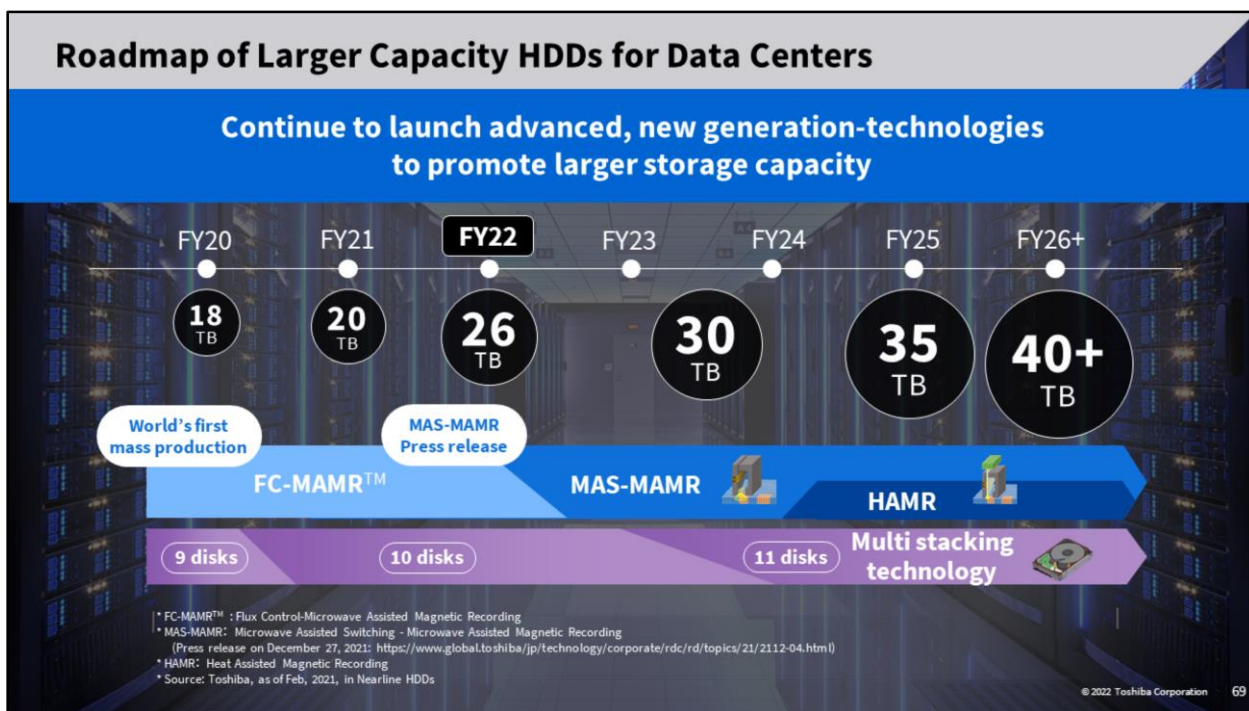
Comparison of bit costs



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(Storage Devices Supporting Data Centers)

- The following slides will delve into the hard disk products.
- The left shows the hierarchy of storage devices in the data center.
- DRAM is used for parts that require high speed data processing.
- SSDs are used for areas where high-speed processing is also required for storage.
- On the other hand, for high capacity storage, Nearline HDDs are the main devices, and magnetic tapes may be used in areas that rarely rewrite data.
- The cost difference between SSDs and HDDs is a little less than one digit for high-capacity storage. Therefore, in the future, HDDs that are suitable for long-term storage of data will continue to be used for the main storage device at a low cost.
- In terms of HDD cost per storage capacity is due to the continued introduction of new technologies. We expect to continue to reduce them.

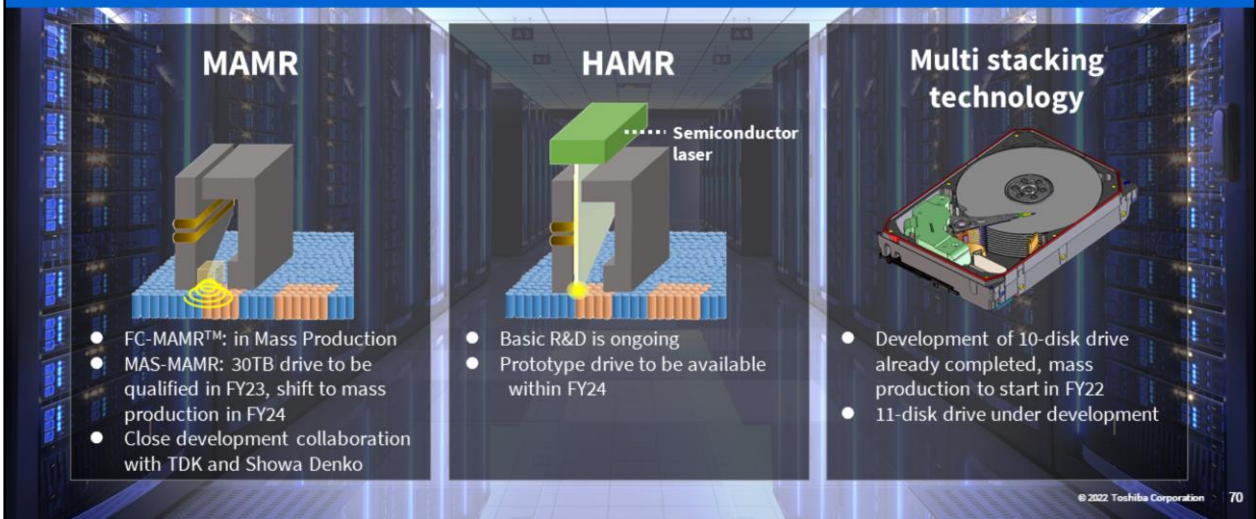


### (Roadmap of High Capacity HDDs for Data Centers)

- This slide demonstrates our roadmap of implementation techniques for higher capacity HDDs.
- In FY20, we commercialized the world's first 18TB, a technology called MAMR that uses microwaves to increase recording density.
- In FY21, we completed the development of 20TB with 10 diss.
- We plan to release 26TB next year, which is a shingled magnetic recording technology (called SMR) that overlays data into a track and increases the recording density.
- We have already completed the technical verification of MAS-MAMR technology – which is a further evolved MAMR technology – which was outlined in a press release we issued last year. Using this technology, development of 30TB drives will be completed by the end of FY23.
- We will further enhance the effectiveness of MAS-MAMR and aim for 35TB or higher in order to further increase capacity. At the same time, we will develop the new HAMR technology aimed at improving recording density through thermal assistance.

## HDD Capacity Enhancement Technologies

Unique assist magnetic recording technologies to achieve higher density;  
Technologies to allow more disks to achieve higher capacity



(HDD Capacity Enhancement Technology)

- Moreover, this slide illustrates the new technologies under development that will realize a higher storage capacity.
- The leftmost MAMR technology generates microwaves, allowing for an easy increase in recording density. The first FC-MAMR, which has already been mass-produced, promotes a highly effective method to increase the strength of magnetic flux.
- MAS-MAMR is a technique that generates microwaves more powerfully, making writing easier and recording denser.
- We work with Showa Denko, which manufactures media, and TDK, which manufactures heads very closely together to promote development. In FY23, we aim to acquire customers' qualifications of 30TB drives. By further evolving this technology, we seek to realize high-capacity drives from 35TB onward. We also seek to add a HAMR-based drives.
- We will also conduct a study in tandem with the evolution of MAMR technologies to solve sophisticated technological issues such as securing the long-term reliability of heads. We intend to complete making prototypes equipped with HAMR in FY24.
- As for the number of disks, we believe it is possible to mount up to 11 disks using the current 1-inch thickness form factor, and we have already realized

up to 10 disks. We are currently developing technology to stack 11 disks.

## NuFlare Technology : Electron Beam Mask Writer



**Launching the multi beam mask writer, combining NuFlare's equipment technology and Toshiba's device technology; Will respond to customers' needs by continuing to develop key technologies for next generation equipment**

### Multi beam mask writer

**Foundational technologies to realize high accuracy and productivity**

MBM™-2000

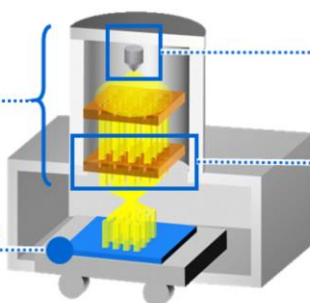


High reliability electron optics system

High reliability stage mechanics

High speed data control technology

Various writing accuracy correction technology



### High brightness electron source (1.5x brighter than competitor's)

- Unique technology fostered by developing single beam writer
- Realizes overwhelmingly higher throughput than competitor
- Developing new electron source for MBM™-3000

### Aperture for controlling multi beam (BAA\*)

- Realizes high performance control of 260,000 beams using Toshiba's device technology
- Realizes high accuracy and high stability by electron optics of 50kV one-stage acceleration and robust BAA device
- Developing higher resolution and larger scale BAA device for MBM™-3000

\* BAA: Blanking Aperture Array

**Demonstrates effectiveness in writing leading edge semiconductor EUV masks by the writer's high accuracy and high productivity**

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(NuFlare Technology: Electron Beam Mask Writer)

- Next, I will explain NuFlare Technology's products and technologies.
- The first is an electronic beam mask writer.
- The picture on the left is the state-of-the-art multi-beam writer, MBM-2000. In order to achieve high precision and high productivity, the device is based on highly reliable electron optics systems, stage mechanisms, high-speed data control technology, and a variety of writing accuracy correction technologies that have been cultivated through the development of single-beam equipment for more than 20 years.
- Specifically, the device contains ① high-brightness electron sources originally developed by NuFlare and ② Toshiba's device technology.
- This device's original one-stage acceleration system can realize high-precision and high-stability writing.
- MBM-3000 is a next-generation machine that complies with the design rules for advanced semiconductors of 2nm or less. We are developing new electron sources to obtain even higher currents and brightness, as well as multi-beam control elements of higher accuracy and larger scale.
- We intend to proceed with these developments as planned and start shipments within FY23 in order to meet our customers' development roadmaps.

- NFT's multi beam technology can demonstrate its major power in EUV lithography mask lithography, which is being introduced into the most advanced micro semiconductor manufacturing due to its high precision and high productivity.

## NuFlare Technology : Epitaxial Growth System



**Expects surging compound power semiconductor market; low defect, high grade film is formed with high throughput; positive reviews from customers worldwide with a steady flow of orders**

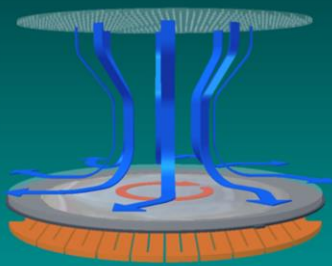
### High performance epitaxial growth system

The EPIREVO™ series system realizes high speed film growth and high uniformity by rotating the wafer at high speed; positive reviews from the compound semiconductor market

Vertical Gas Flow  
reduces surface defects

Uniform Gas Concentration  
realizes high uniformity

High Speed Wafer Rotation  
realizes high speed growth;  
easily adaptable to larger wafer



Developing a system with a gas spec for Toshiba, for GaN film formation

#### EPIREVO™ S6/S8

SiC epitaxial growth system



#### EPIREVO™ G8

GaN epitaxial growth system



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(NuFlare Technology: Epitaxial Growth System)

- Next, we will explain the epitaxial growth system, which is essential for compound power semiconductor production.
- NuFlare's epitaxial growth system is a single wafer processing system that processes wafers one at a time. As shown in the schematic diagram at the center, the process gas flows uniformly, vertically and downward toward the wafer rotating at high speed in the reactor. This causes the wafer to realize low defect density, high film formation uniformity, and high-speed film formation on the surface.
- For reference, the top right photo shows an epitaxial growth system for SiC, and the bottom right photo shows an epitaxial growth system for GaN.
- Our proprietary deposition method maintains a high deposition rate even for 200mm wafers, which we believe will become mainstream in the future, achieving a throughput equivalent to that of current 150mm wafers.
- We will also work together with the Semiconductor Division within the Device Co. Group to develop equipment based on the specifications required for device development, such as in-process epitaxial growth during the device manufacturing process and low-defect deposition technology for GaN.
- Demand for epitaxial wafers is rising as we move toward the realization of

carbon neutrality. It is indispensable to produce epitaxial wafers with less defects for widespread use. We believe that this equipment can meet these needs; and as a result, we have earned a high reputation worldwide from many of our customers.

## Summary: Toward Device Co's Growth

### Semicon- ductor

- Grow business by aggressively investing in development and production of power semiconductors; the market is expected to expand significantly thanks to carbon neutrality

### HDD

- Focus on storage products for Data Centers; the market expands significantly
- Aim at 24%+ market share in FY25, 30%+ in the near term by launching larger capacity drives


### Semicon Manufac. Equipment

- Further enhance position in the market with very competitive mask writers and epitaxial growth systems; grow as a highly profitable business

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### (Summary: Toward Device Co's Growth)

- I want to conclude by reviewing Device Co's core strategy as we move forward:
  - In semiconductor, we will make timely and agile business decisions. After the spin-off, we will aggressively invest in the development and production of power semiconductors as the market expands significantly due to the carbon neutrality trend.
  - In HDD, the data center market will also expand significantly and we will focus our efforts within that market. We will continue launching higher capacity drives to secure a market share of 24%+ in FY25, and 30% in the near term.
  - And, last but not least, in NuFlare Technology, we have very competitive mask writers and a best in class epitaxial growth system. In conjunction with the mega-trends of miniaturization of semiconductors and carbon neutrality, we will pursue a higher position and grow as a highly profitable business.
- With that, we conclude today's presentation.
- Thank you for joining us!



## Our Semiconductor and Storage products will always be a driving force to change the world

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Toshiba Electronic Devices and Storage, together with our customers, will accelerate our future journey.  
We aim to be a company that will be chosen for our pioneering technology and spirit embedded in our products.

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**TOSHIBA**

# APPENDIX

FY25 Forecast : Net Sales 1.01 T-yen, ROS 7.9%, Operating income 80bil. yen

	FY22 Forecast	FY23 Forecast	FY25 Forecast
Net Sales	860 bil. yen	910 bil. yen	1.01 T-yen
Operating Income (ROS%)	56 bil. yen (6.5%)	60 bil. yen (6.6%)	80 bil. yen (7.9%)
EBITDA <sup>*1</sup>	88 bil. yen	98 bil. yen	125 bil. yen
ROE	Average of FY22 to FY25 15%+		
FCF <sup>*2</sup>	5 bil. yen	29 bil. yen	55 bil. yen

<sup>\*1</sup> EBITDA=Operating income + Depreciation expense    <sup>\*2</sup> Free Cash Flow