Business Description and Plant Tour (Sumitomo Heavy Industries Ion Technology Co., Ltd.)

6/16/2023

Sumitomo Heavy Industries, Ltd.

Sumitomo Heavy Industries Ion Technology Co., Ltd.
Mitsukuni Tsukihara, President and CEO

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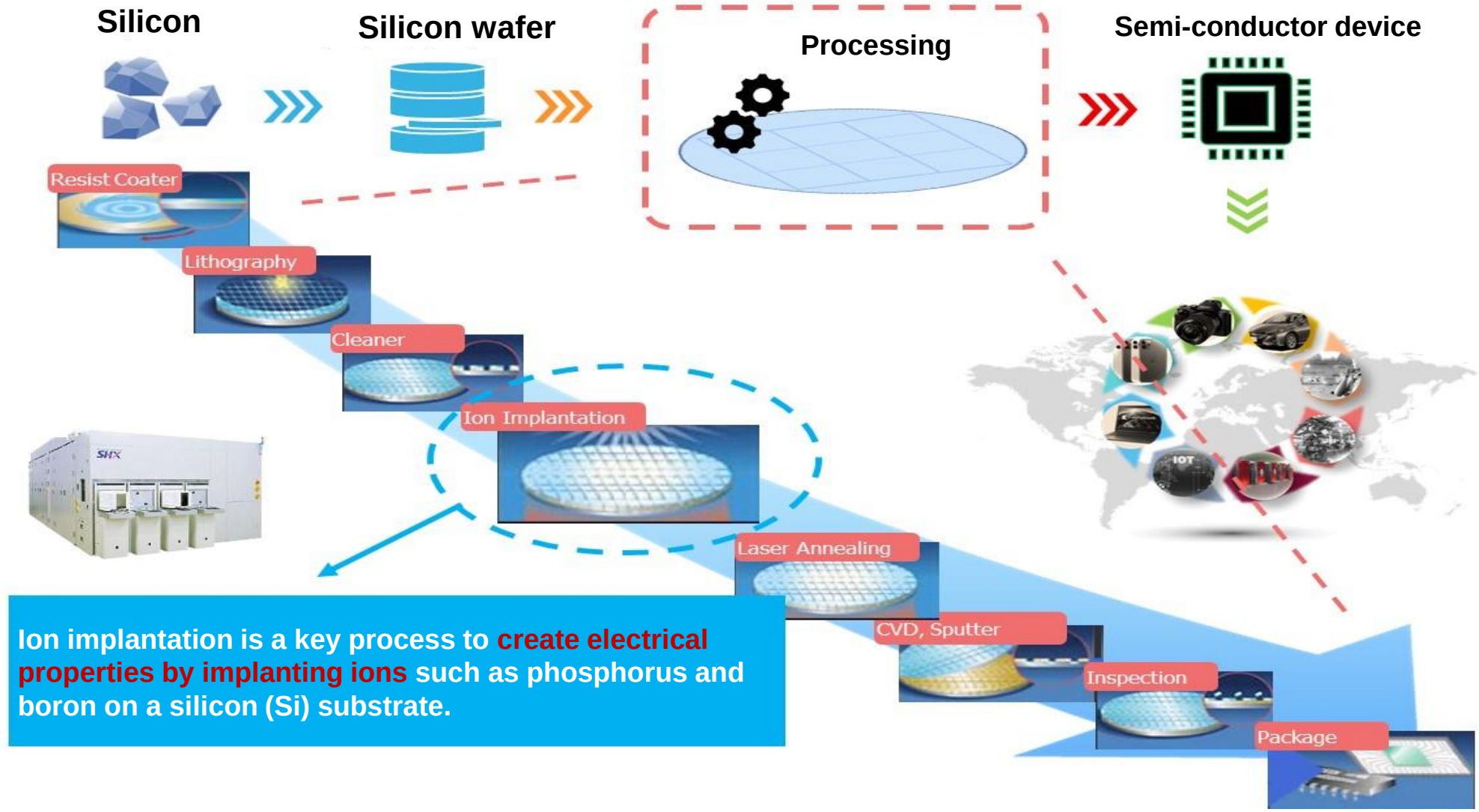
01 Business Overview

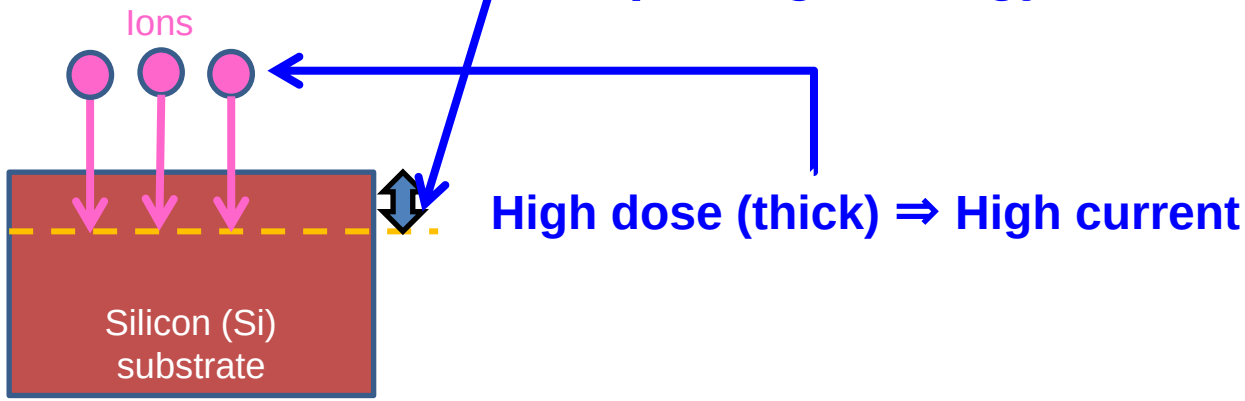
01 Ion Implantation Process in Semi-Conductor Manufacturing

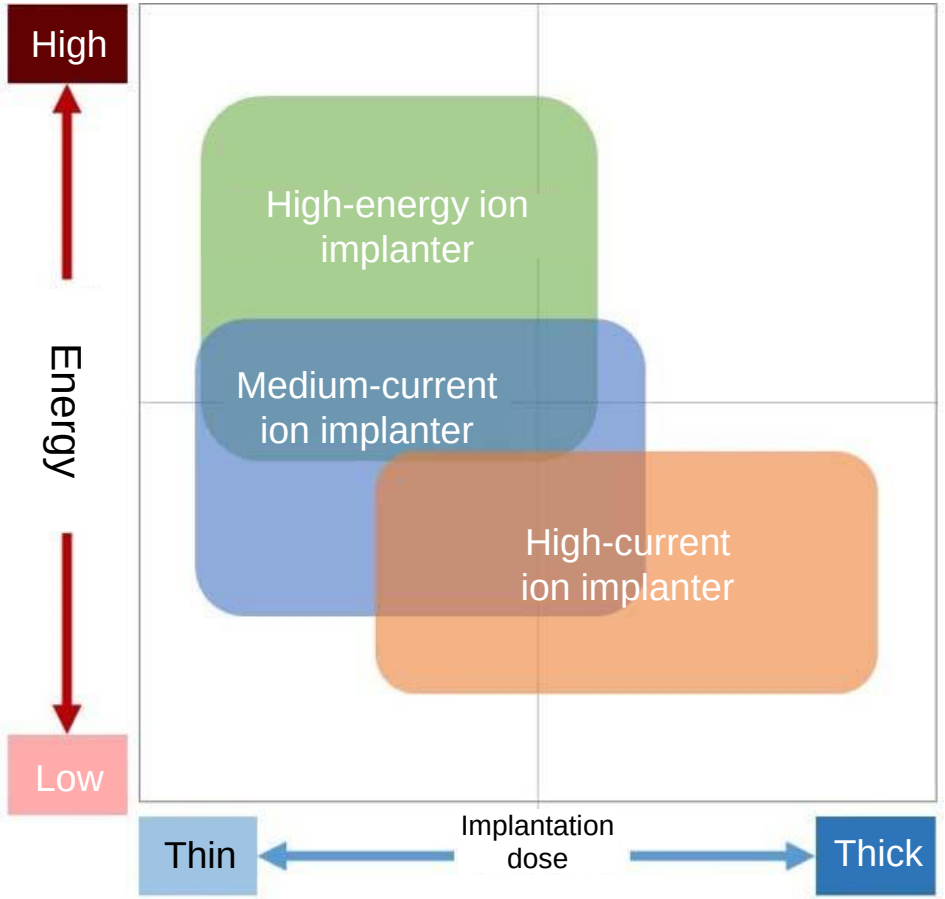


Ion implantation is a key process to create electrical properties by implanting ions such as phosphorus and boron on a silicon (Si) substrate.

01 Ion Implanter Categories

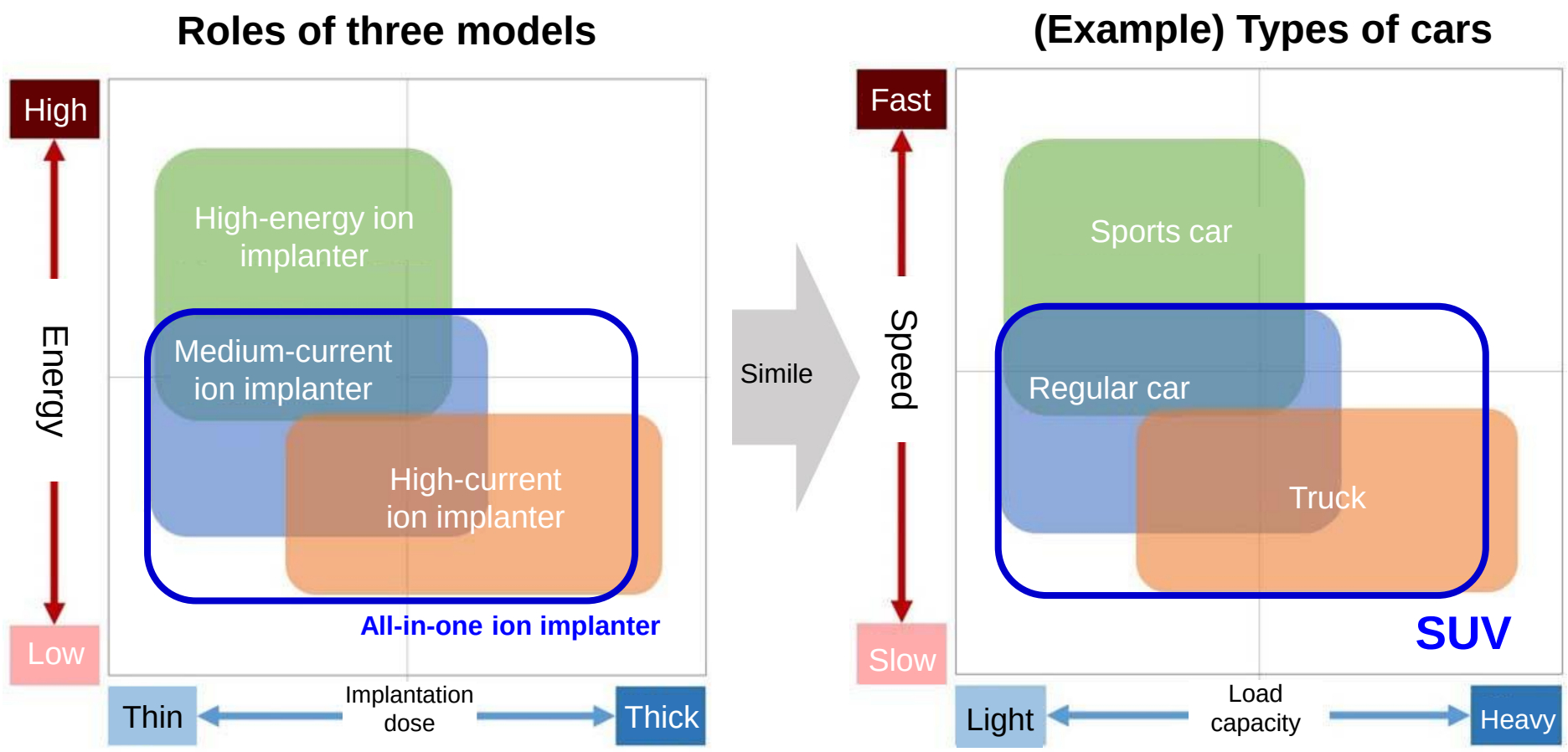
Roughly categorized into three main types depending on the concentration of ions (amount of current) to be implanted and the energy to be given to the ions





In ion implantation,
Depth and thickness: Both contribute to resistance in semi-conductors
Depth: Necessary for building the structure to realize the functions envisioned by the semi-conductor manufacturer in the device

01 Ion Implanter Categories (Image of Each Category)

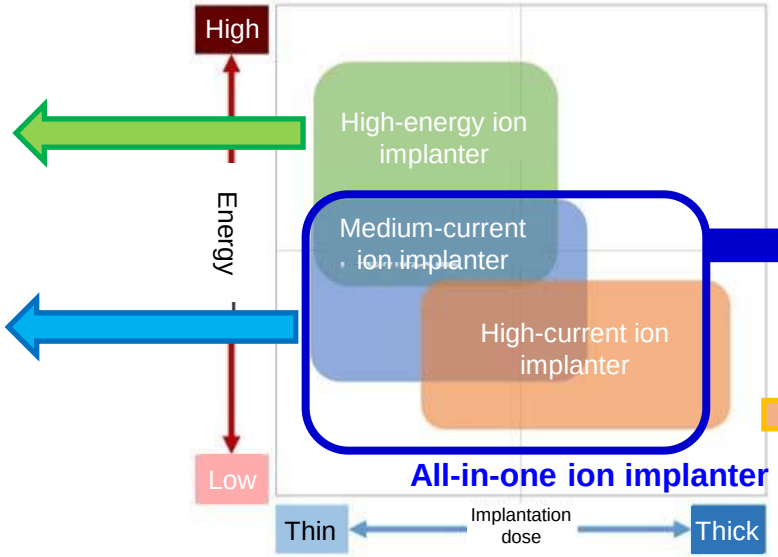


We also manufacture "all-in-one ion implanters," which can cover both ranges of medium-current and high-current implanters.

01 Our Products

High Energy (HE)
S-UHE

Medium Current (MC)
MC3-II/GP



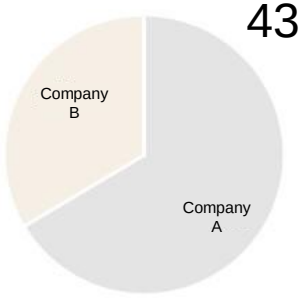
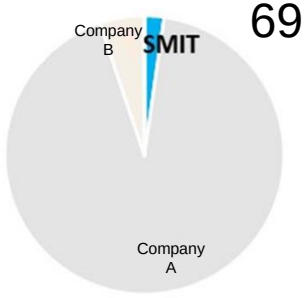
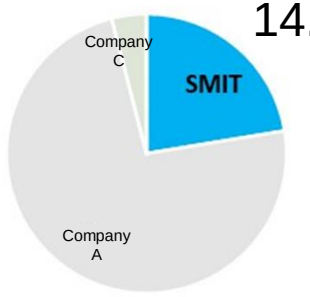
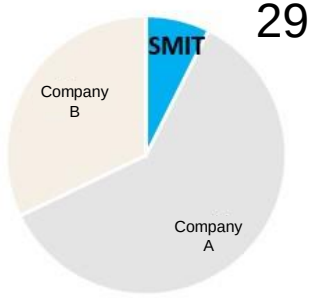
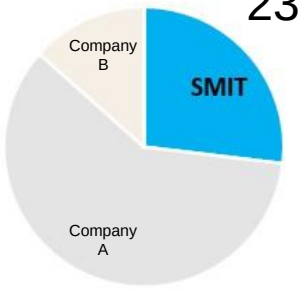
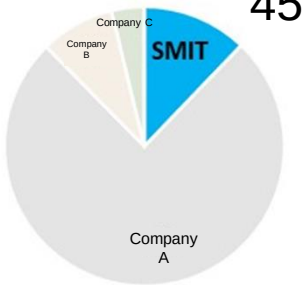
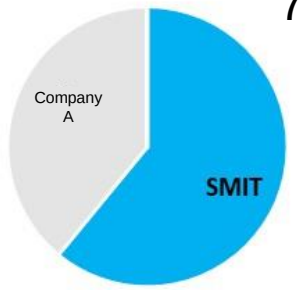
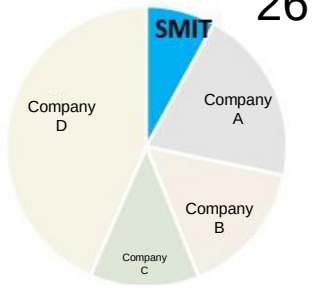
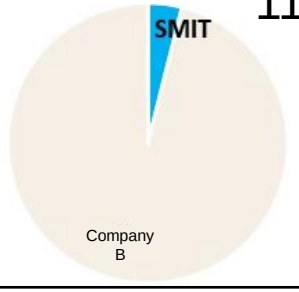
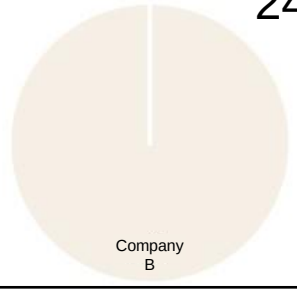
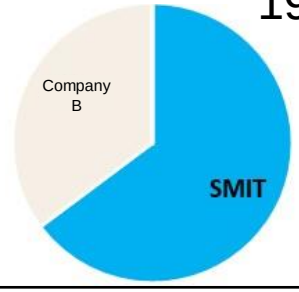
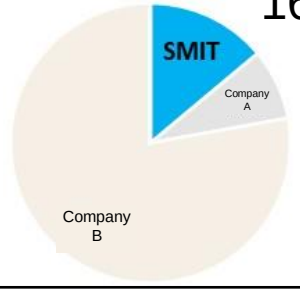
All-in-One (MC&HC)

SAion
ONLY INNOVATION CREATES THE FUTURE

High Current (HC)
SHX-III/S

Models	Features	Main customers	Price level	Profit margin
High-current ion implanter (HC)	- Highly accurate implantation and high productivity with extremely low energy	Image sensor, logic, power	Medium	Medium
Medium-current ion implanter (MC)	- Highly accurate control of a wide range of parameters	Image sensor, memory logic, power	Low	Medium
High-energy ion implanter (HE)	- Covers high energy ranges while simultaneously enabling precise implantation - Uses a multi-stage RF linear accelerator system	Image sensor, power	High	High
All-in-one ion implanter (MC & HC)	- Covers a wide range of medium and high current implantation processes, achieving a significant improvement in productivity - High-quality implantation with advantages such as reduced fine particles and beam angle control	Logic, power	Medium	Low

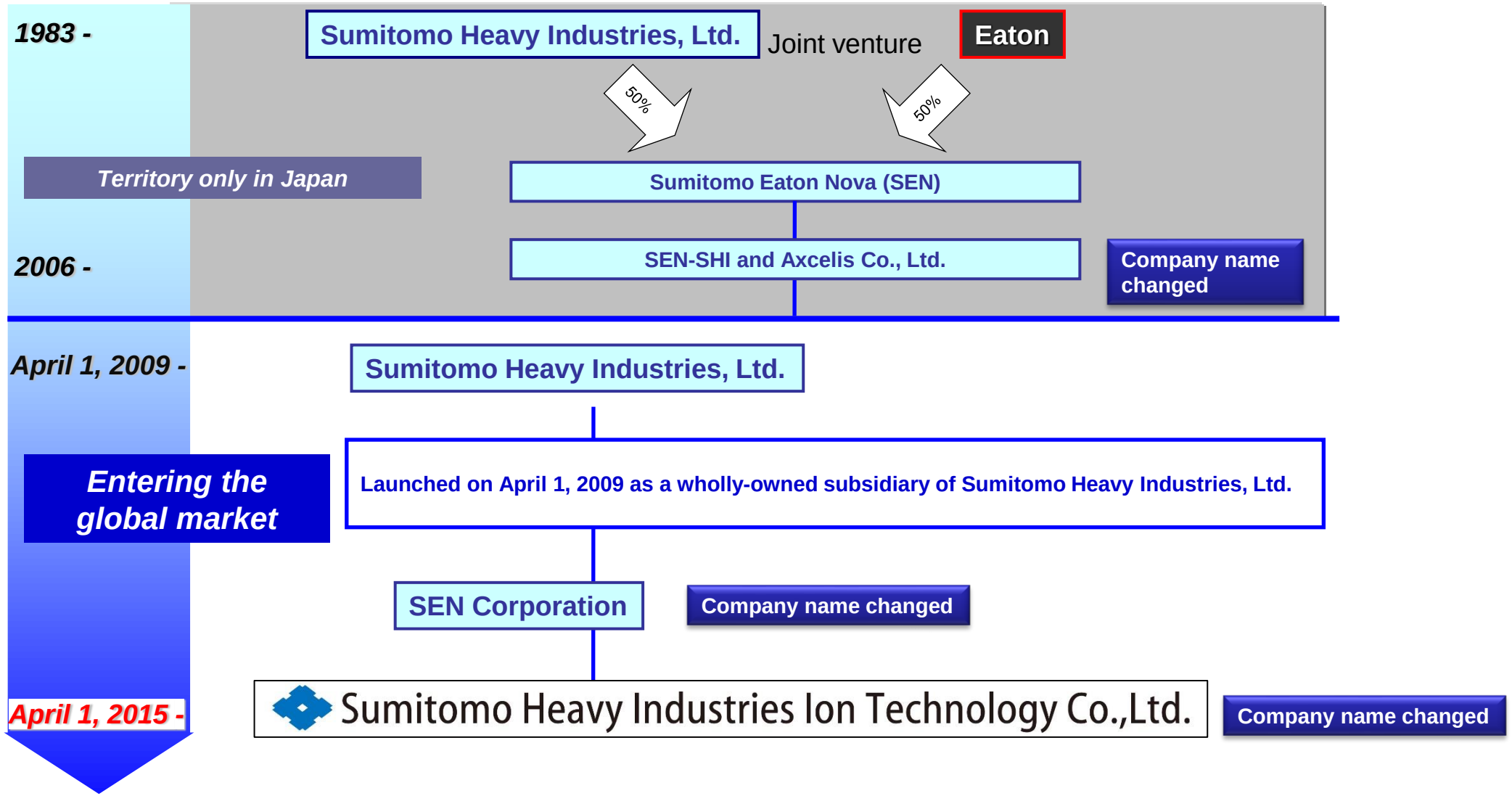
01 Market Share by Semi-Conductor Segment and Model

Models	Memory	Logic	Image sensor	Power
High-current (HC)	43.0 	69.0 	14.0 	29.0 
Medium-current (MC)	23.0 	45.0 	7.0 	26.0 
High-energy (HE)	11.0 	24.0 	19.0 	16.0 
Total market size	77.0	138.0	40.0	71.0

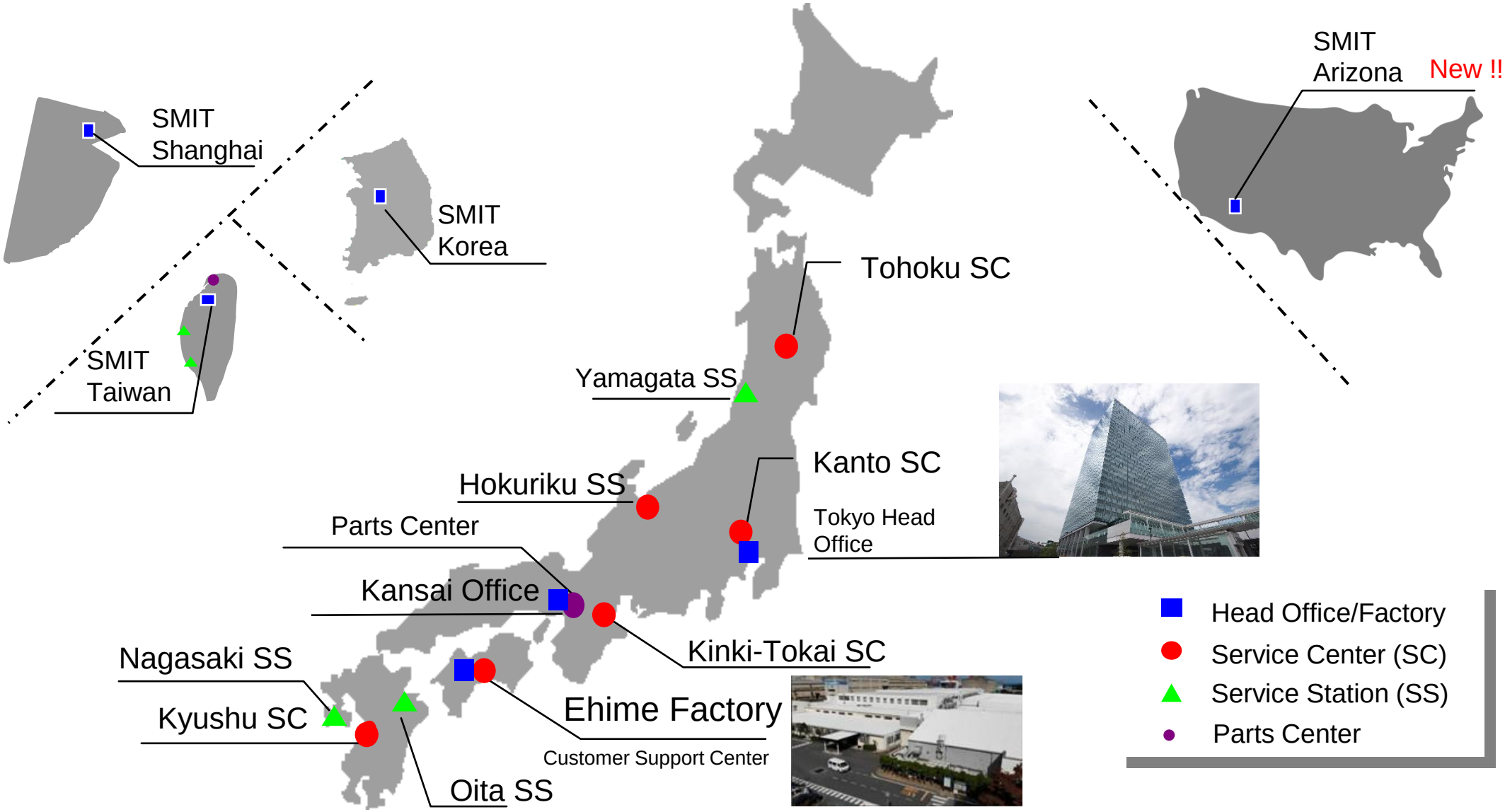
Estimated based on sales in 2022
Figures in boxes are estimates of market size.

Unit: JPY billion

01 Our History



01 Head Office, Offices and Service Center Locations



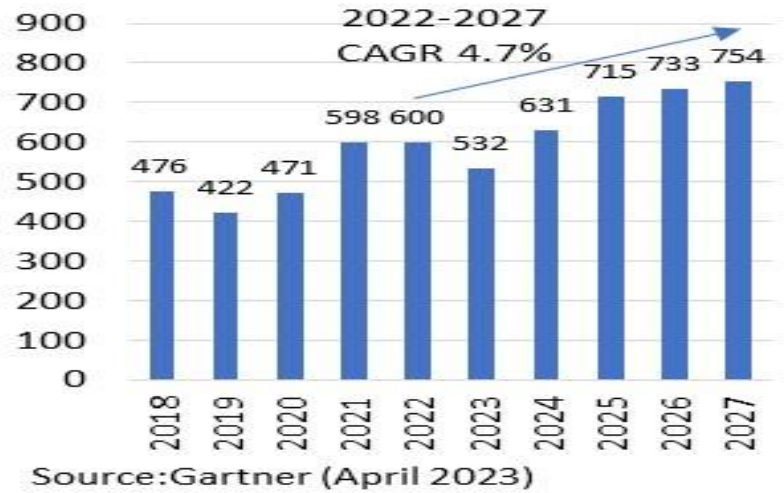
02

“Medium-Term Management Plan 2023” and Long-Term Business Plan

02 Overall Condition of Business Environment

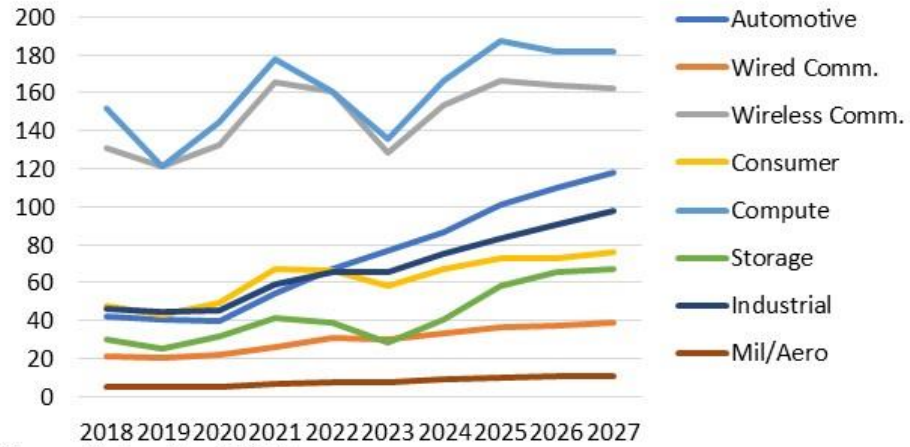
- The effects of rising geopolitical risks and the formation of regional blocs around the world to address economic security issues are spreading throughout the semi-conductor industry.
  While stricter U.S. export restrictions on China have negatively impacted short-term device demand, government subsidies for semi-conductors planned in various regions around the world are supporting overall investment.
- Both sales and orders of Japanese-made semi-conductor manufacturing devices are continuing to see declines. This is because the memory market is in a correction phase due to the decrease in demand for PCs, smartphones, and other end products, causing the overall market to stall in 2023.
- The market is expected to be back on a growth trajectory after 2024 with the acceleration of digitalization, such as cloud, AI, IoT, DX, 5G, and data centers, and green transition, such as carbon neutrality, energy saving, and vehicle electrification, which will increase demand for semi-conductors in the medium to long term.

Changes in semi-conductor market size
(2018-2027: Global, $B)



Source:Gartner (April 2023)

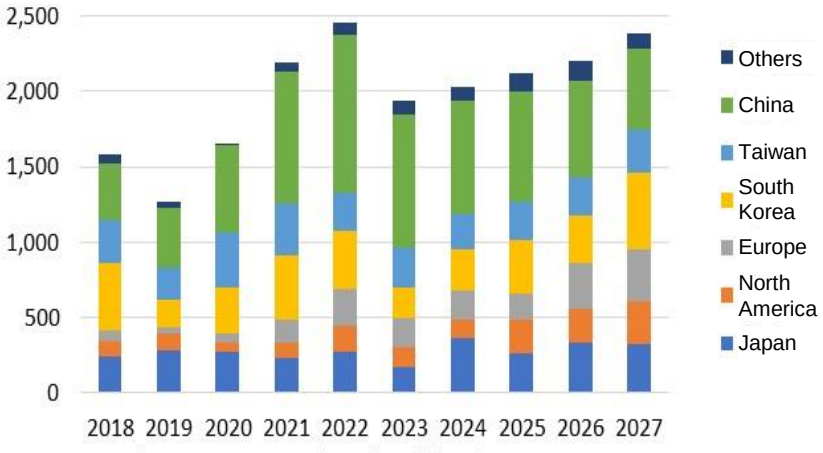
Changes in semi-conductor market size by application
(2018-2027: Global, $B)



Source:Gartner (April 2023)

02 Current Status and Forecast by Area and Segment

Changes in ion implanter market size
(2018-2027: Global, $M)

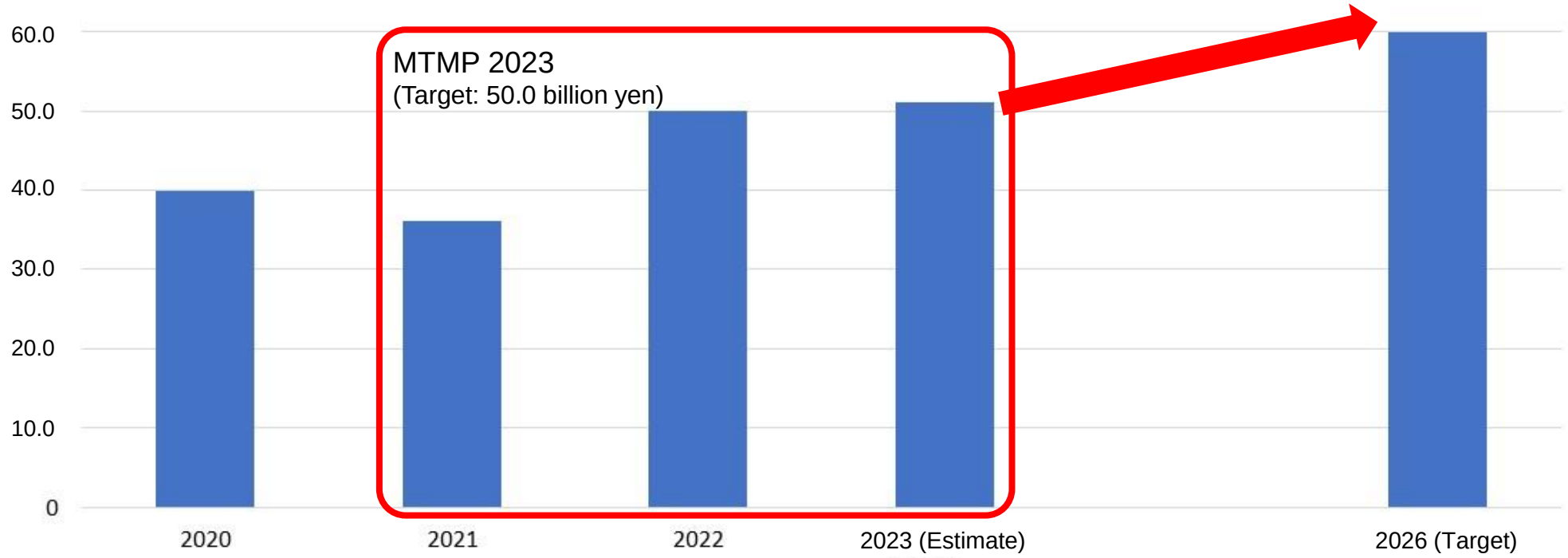


Source: Up to 2021, forecast by SEMI; from 2022 onwards, forecast by the company

Target markets	Conditions
Japan	- Sluggish smartphone sales and falling memory prices led to an overall drop in capital investment. - The automotive semi-conductor market is rapidly expanding, and SiC-related investment is active, using government subsidies. - The Japanese government's regulation, announced in May 2023 by ministerial ordinance, to add 23 items of semi-conductor manufacturing devices to export trade controls is not directly related to ion implanters, but its impact will be closely monitored.
Taiwan	- Due to the global situation, the economic growth rate forecast for 2023 is expected to be low. - Investments in cutting-edge semi-conductors will continue, but the industry has entered a correction phase due to inventory adjustments, and investment plans may be postponed based on a review of investments to increase production capacity.
China	- The year-on-year GDP growth rate was 3% in 2022, falling short of the initial target (growth rate of 5.5%). China has set its annual GDP growth target at around 5% for 2023. - The impact of COVID-19 seems to be calming down, and there are signs of investment for 2024 and beyond in some areas. Given the impact of tighter controls on China by the U.S., the challenge is how to conduct sales activities more carefully in the local market, including assessing the situation of customers.
South Korea	- There are moves to resolve trade frictions, which will ease the headwinds facing Japanese companies. - There is a bullish attitude toward Long-Term investment despite the severe conditions caused by production cutbacks in memory products due to the sluggish market and customer inventory adjustments.

02 Performance (Sales Trends and Target)

Unit: JPY billion



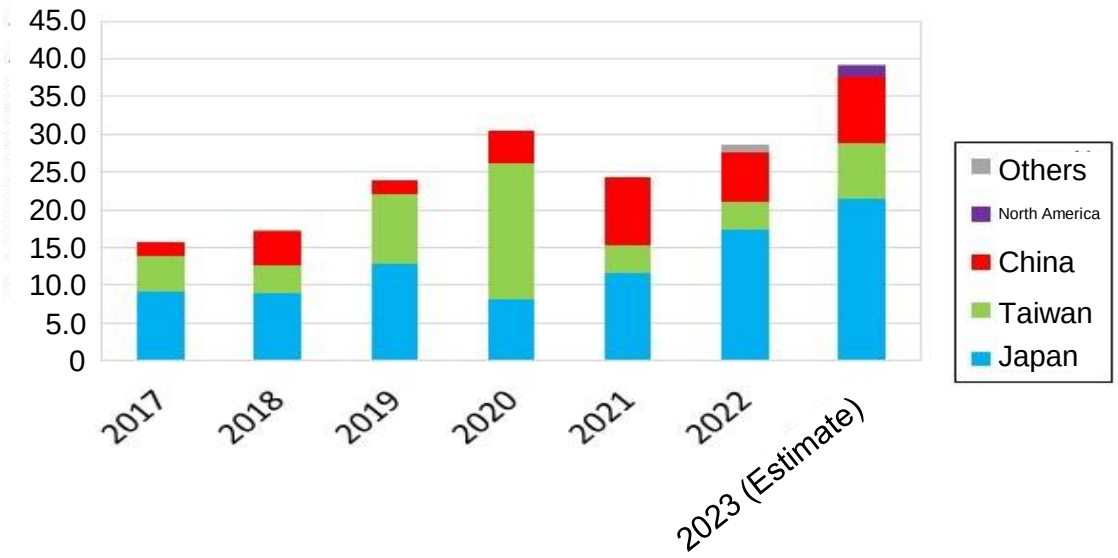
*The FY2022 data in the graph is calculated from January to December 2022 following a change in the fiscal year end.

- Increased demand for semi-conductors driven by growing investment in data centers and automotive semi-conductors and trends such as 5G, IoT, AI, and autonomous driving are expected to motivate semi-conductor companies to invest, which in turn will lead to growth in our performance.

02 Performance (Sales by Region / Sales by Model)

Unit: JPY billion

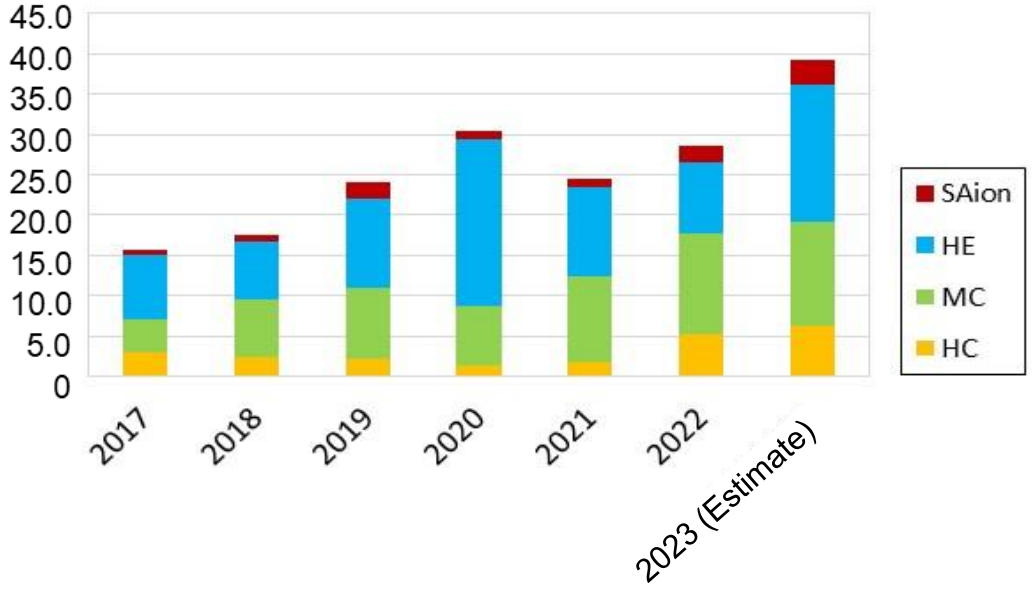
Unit sales by region



- Japan is an important market, accounting for the majority of our sales.
  Overseas sales are also growing, especially in China.

Unit: JPY billion

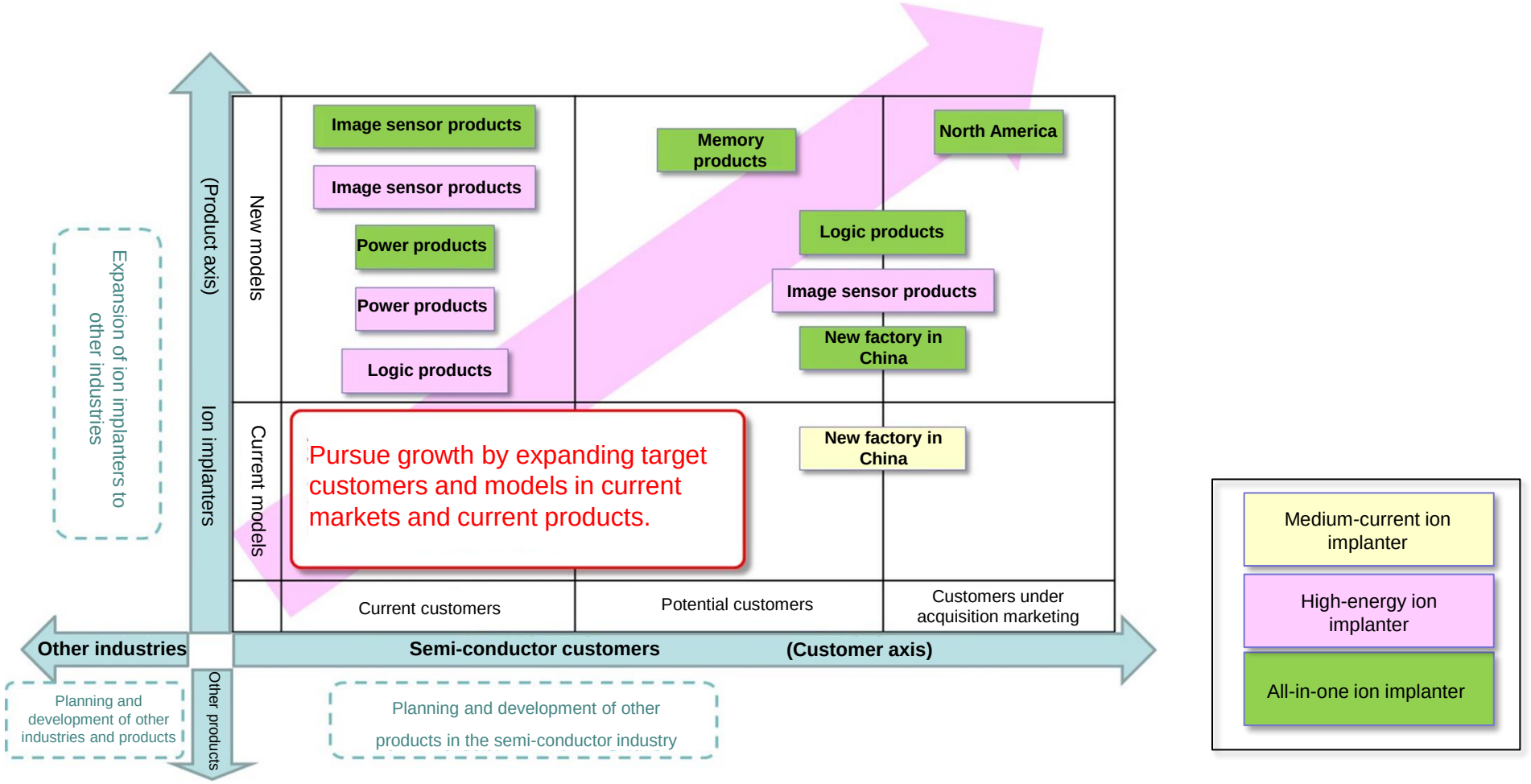
Unit sales by model



- High-energy ion implanters with high equipment prices and medium-current ion implanters with low equipment prices but high unit volumes are the mainstay of our sales.

02 Business Strategy (Business Policy)

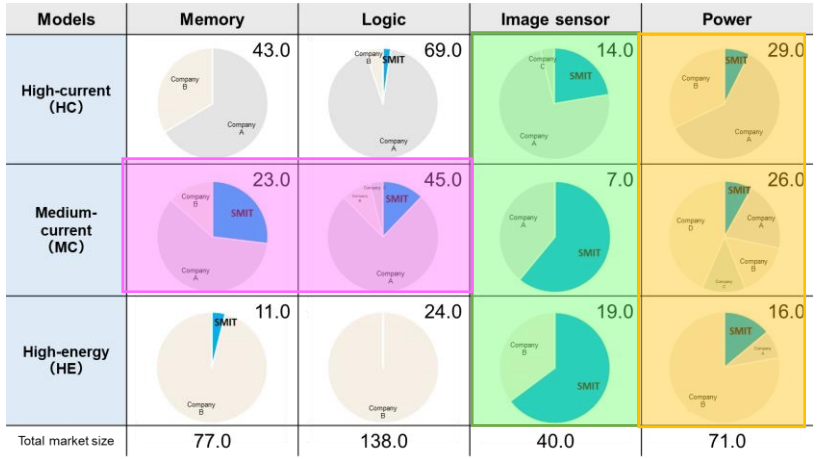
Business policy	Pursue growth by expanding target customers and models in current markets (for semi-conductor customers) and current products (ion implanters)



02 Growth Strategy

- **Currently, the main markets are the image sensor market, and the memory and logic markets for MC models.**
  - Image sensor: Continued repeat orders from leading companies in the market
  - Memory: Adopted by major companies in Japan
  - Logic: Adopted by Taiwanese foundry company as cutting-edge semi-conductor manufacturing device
- **Development of new devices for the memory market, which has a particularly large market size, is underway.**
- **The power market is expanding mainly due to heightened awareness of environmental issues worldwide, and we are implementing measures such as device development to keep up with the expansion.**

- **Increasing and maintaining our market share in the expanding semi-conductor and semi-conductor manufacturing device markets**
  - Increasing production capacity: Construction of a new factory (opened in October 2022), new production system to reduce stagnation of devices
  - Expansion into regions with growing market size: Activities that lead to acquiring market share in China and the U.S.
  - Building a system to capture in-depth information about the markets and customers.



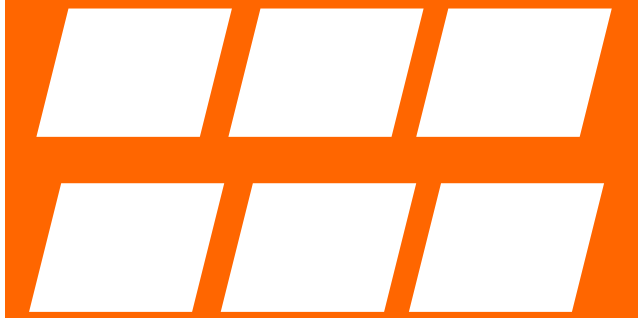
02 Our New Factory

- Constructed a new separate building equipped with all manufacturing functions (from receiving to shipping, + additional floor space requested).
- Opened in October 2022, started device manufacturing in December of the same year.

02 Concept of the New Factory

1 High Capacity

Production base that can handle sudden production increases by customers

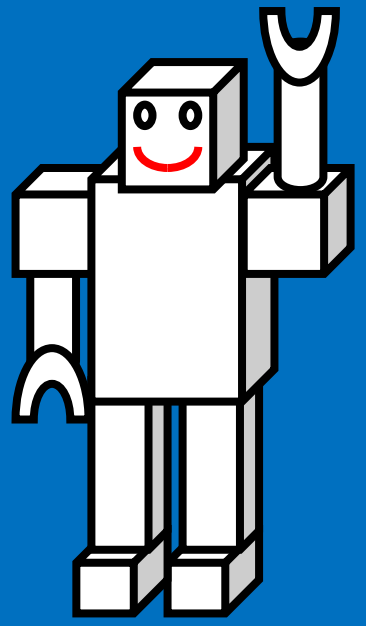


2 One Stroke

Lean traffic flow from receiving to shipping in a single stroke

3 Keep Moving

Production keeps moving with automation



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