Fuji Electric
Innovating Energy Technology

Semiconductor Business Strategies

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Business Overview

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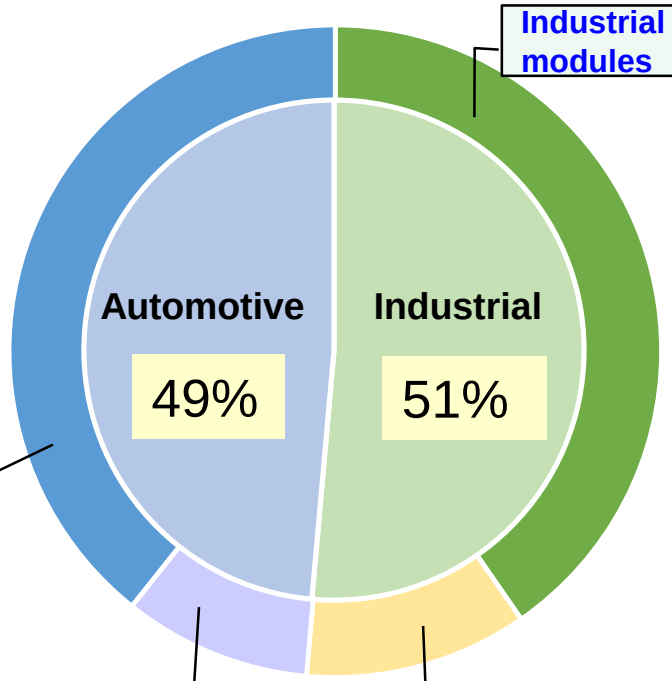
Automotive

xEVs / Gasoline Vehicles

xEV motor control, engine control, transmission control, brake control, steering control, etc.

Net sales (FY2022 Results)
¥206.2 billion
(Domestic sales: 49%; Overseas sales: 51%)



Automotive modules

Automotive discrete devices

Industrial modules

Industrial discrete devices
Photoconductors

Industrial

FA (invertors, servos)

Air conditioners (commercial/household)

Renewables PCSs
(wind power, solar power)

Flat-screen TVs

Miniature UPSs

Printers

Note: Percentages of total net sales figures represent FY2022 results and are calculated before deduction and adjustment for inter-segment sales.

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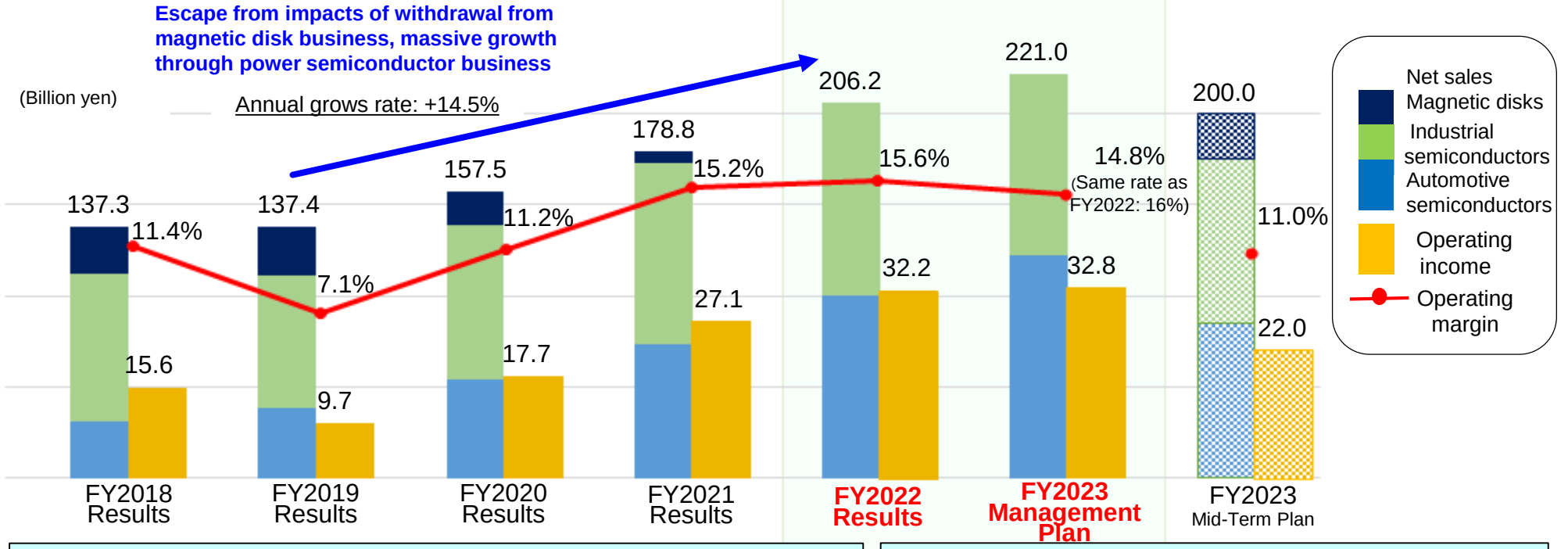
Targets of medium-term management plan accomplished one year in advance, pursuit of record-breaking sales and income in FY2023



FY2019–2022 Results

- Increase in sales from automotive subsegment (FY2022 sales up 30% more from FY2018)
- Increase in ratio of sales accounted for by 7th-generation IGBTs (FY2018: 7% → FY2022: 32%)
- Augmentation of 8-inch Si wafer production capacity (March 31, 2023: Quadruple level from March 31, 2019)

Challenges

- Further expansion of sales in growing xEV market
- Ongoing augmentation of 8-inch Si wafer and SiC device production capacity
- On-schedule advancement of 8th-generation IGBT and 3rd-generation SiC device development plans

Market Outlook

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Industrial: Continuation of favorable trends in regard to renewable energy, despite reduced consumer demand
Automotive: Ongoing expansion of xEV market, declines in demand for products for gasoline vehicles

		Market Outlook (FY2023)	
		YoY Change	Details
Industrial	Factory automation		Continuation of favorable trends in xEV investment, but reduced investment in consumer products
	New energy		Ongoing strong performance amid global decarbonization and other trends
	Consumers, etc.		Sluggish demand for consumer products and air-conditioning systems due to rebound from demand associated with people staying at home amid COVID-19 pandemic
Automotive	xEVs		Constant spread of xEVs
	Gasoline vehicles		Reduced production volumes due to accelerated trend toward xEVs

Note: Factory automation comprises inverters, servo, numerical control machine tools etc.;
Renewal energy comprises wind power and solar power generation-related products; Consumer, etc. comprises products such as household air-conditioners and TVs; and xEVs refers to full hybrid vehicles and electric vehicles (EVs).

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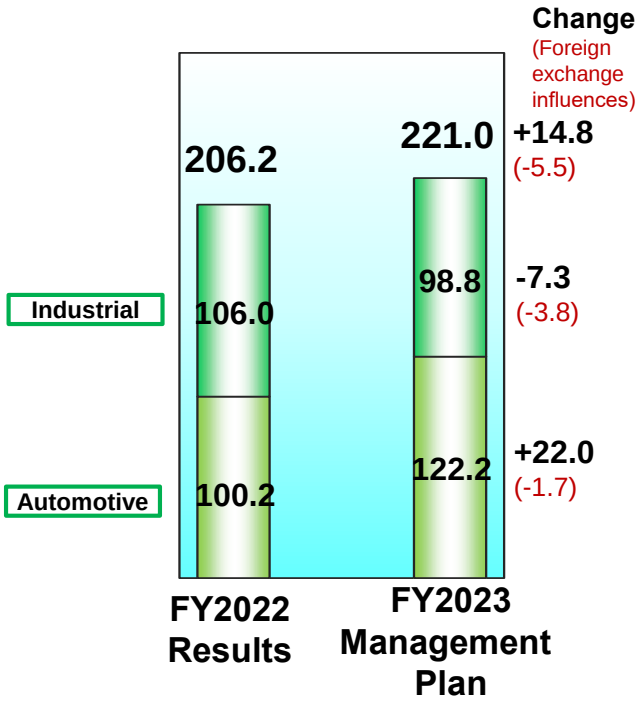
Business Policies

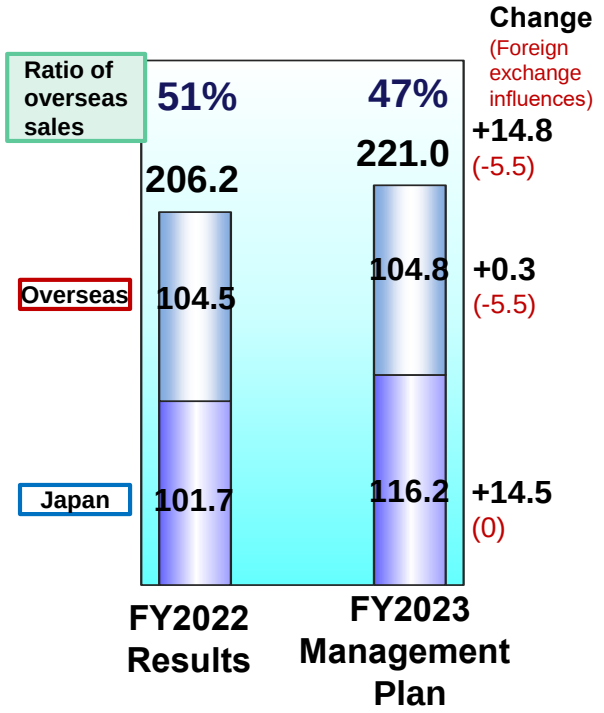
Continuation of proactive investment and pursuit of sales growth centered on semiconductors for xEVs

Business Plan

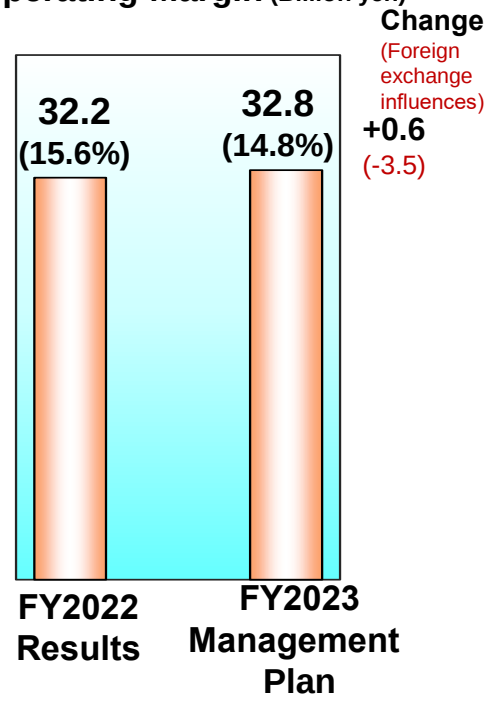
Net Sales by Subsegment (Billion yen)



Net Sales in Japan / Overseas (Billion yen)



Operating Income / Operating Margin (Billion yen)



Power Semiconductor Priority Measures

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- **Automotive field**
  - Expansion of sales in growing xEV market
- **Industrial field**
  - Expansion of sales of 7th-generation IGBTs driven by favorable renewable energy market trends
- **Enhancement of manufacturing**
  - Front-end: Ongoing bolstering of 8-inch Si wafer production capacity
  - Front-end: Construction of SiC device mass production line and augmentation of capacity
  - Back-end: Augmentation of production capacity for automotive IGBT modules and 7th-generation industrial IGBT modules
- **Development of competitive new products**
  - Development of xEV modules and large-capacity industrial modules
  - Development of 3rd-generation SiC-MOSFETs
  - Development of 8th-generation IGBTs

Growing xEV Market and Adoption of New Products

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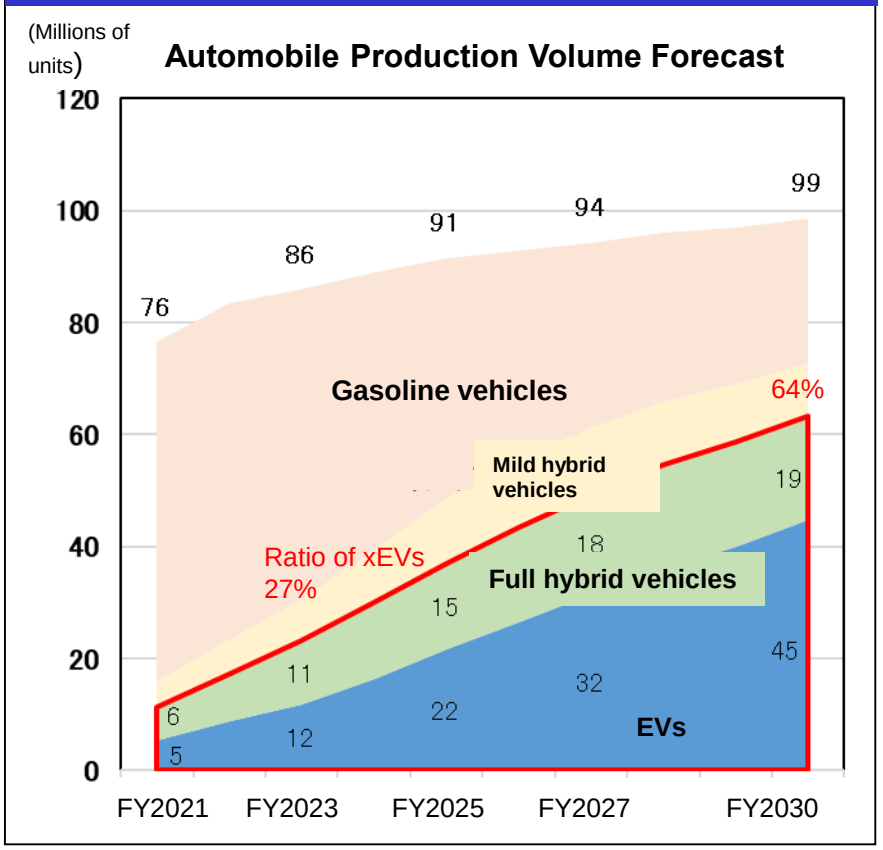
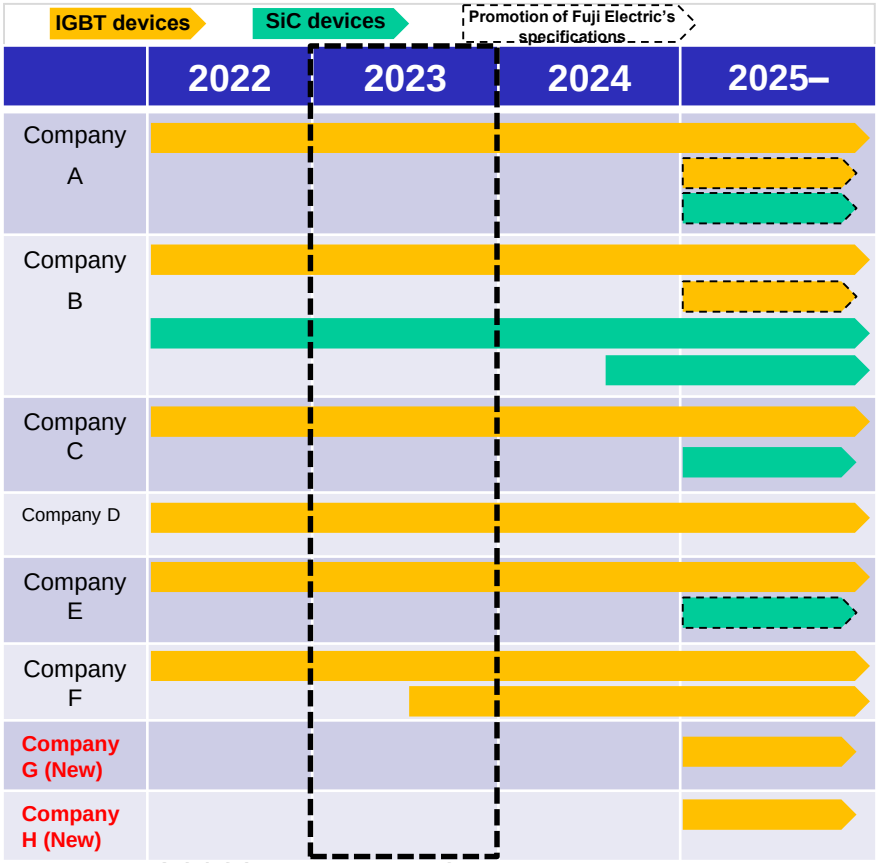
- **Shrinking gasoline vehicle market and ongoing growth of xEV market due to decarbonation trend**
- **Advancement of campaigns to encourage use of Fuji Electric's specifications and expansion of range of models using Fuji Electric's products in FY2023**
  Initiatives underway to carry out new campaigns to encourage use of Fuji Electric's specifications in FY2025 and beyond

xEV Trends



Note: Automobile production represents Fuji Electric's estimates based on projections by investigation firms and uses the total of full hybrid vehicles and EVs.

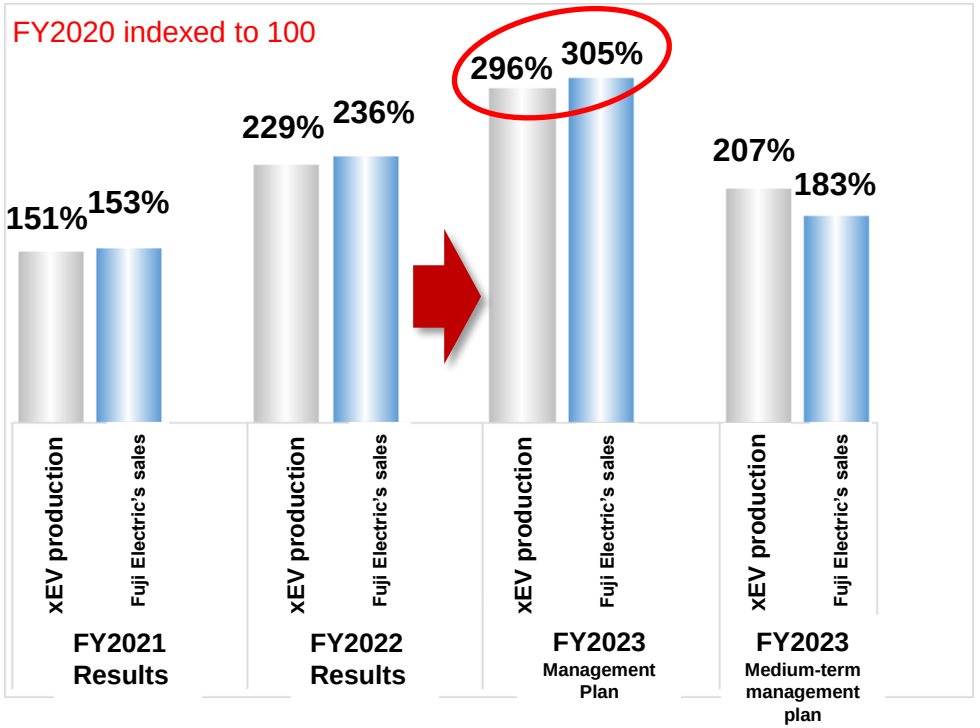
Adoption of New IGBT and SiC Products for xEVs



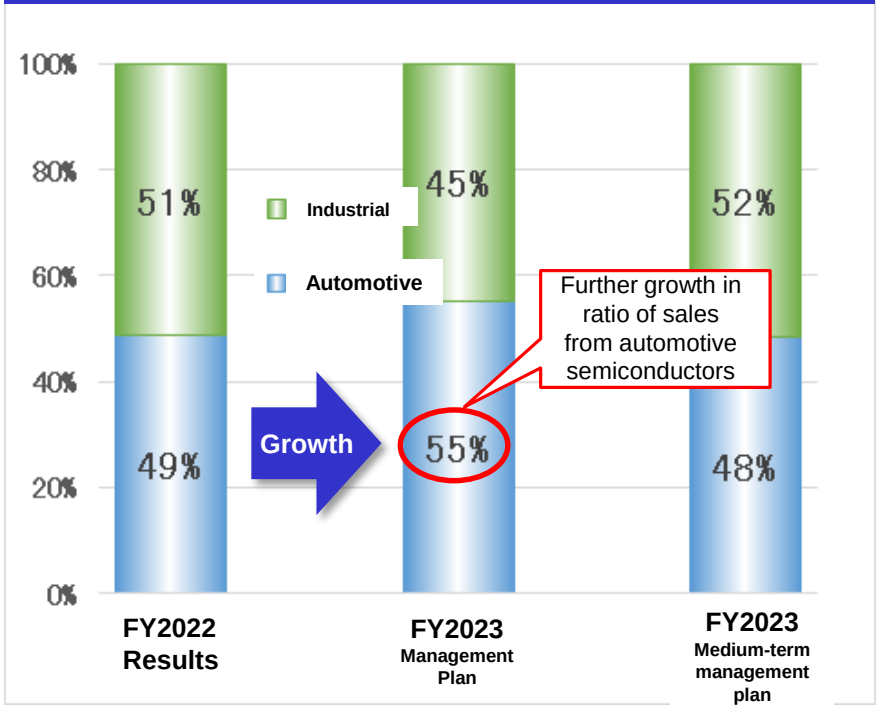
IGBT Sales Plan for xEV

- **Target of sales growth exceeding IGBT-equipped xEV market growth rate**
- **Medium-term management plan target for ratio of sales from automotive semiconductors achieved a year ahead of schedule, FY2023 expected to see ratio of sales from automotive semiconductors rise from 49% to 55%**

xEV Production and Fuji Electric's IGBT Sales Plan



Breakdown of Automotive Sales by Fields (Excluding magnetic disks)

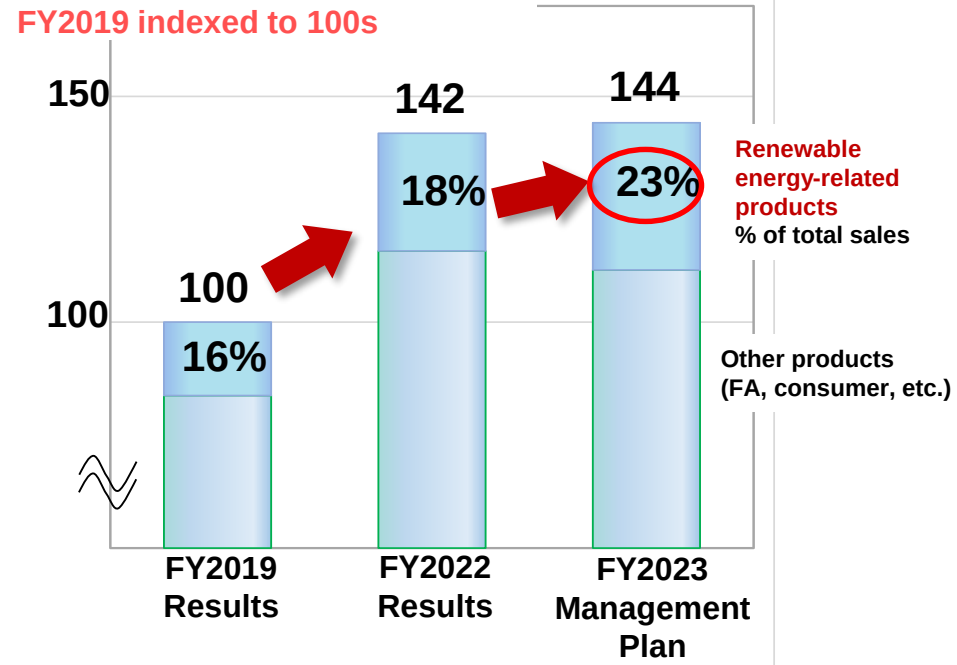


Note: Figures for xEV production use the total of full hybrid vehicles and EVs (those that can be equipped with IGBTs).

Industrial Module Sales Plan

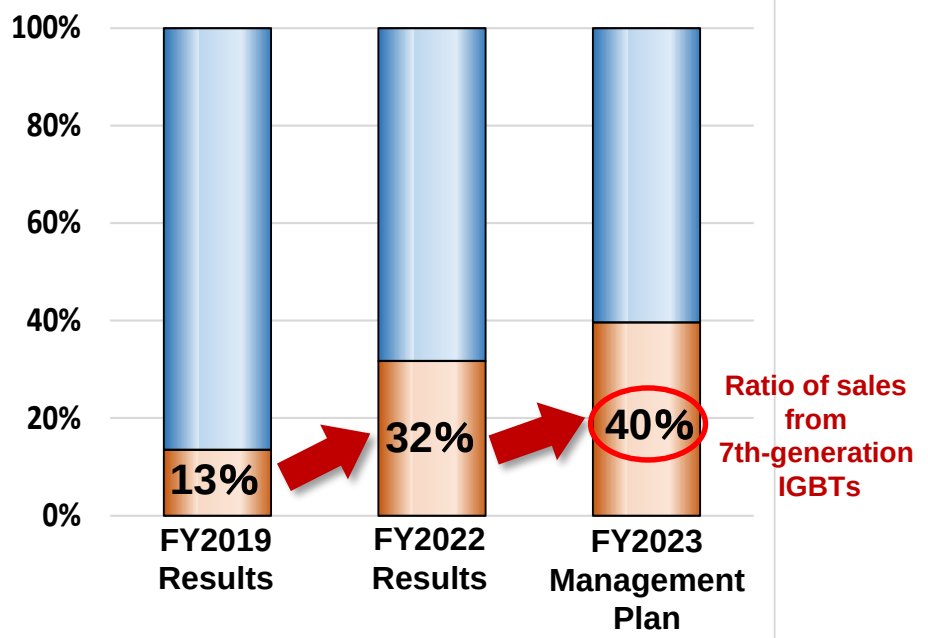
- Growth in demand for strong-performing renewable energy-related products leading to ongoing increases in sales
  (Ratio of sales from renewable energy-related products of 23% in FY2023, sales double the level in FY2019)
- Expansion of sales from 7th-generation IGBTs (ratio of total sales of 40% in FY2023)

Sales by Application



Note: Figures exclude impacts of foreign exchange influences on net sales.

Ratio of Sales from 7th-Generation IGBTs



Note: Figures exclude impacts of foreign exchange influences on net sales.

Enhancement of Manufacturing — Production Bases and Measures (Front-End)

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Bases

Japan (Matsumoto)

- Mother factory
- Expansion of 8-inch wafer production capacity
- SiC device production base

Japan(Yamanashi)

- Principal 8-inch wafer factory
- Production of automotive IGBTs and 7th-generation IGBTs

Japan (Tsugaru)

- Production of 8-inch wafer
- SiC device production base (mass production scheduled to begin in FY2024)

Malaysia

- Production of 6th-generation IGBTs
- Production of 8-inch wafers (mass production scheduled to begin in FY2023) Expansion of production capacity in FY2024

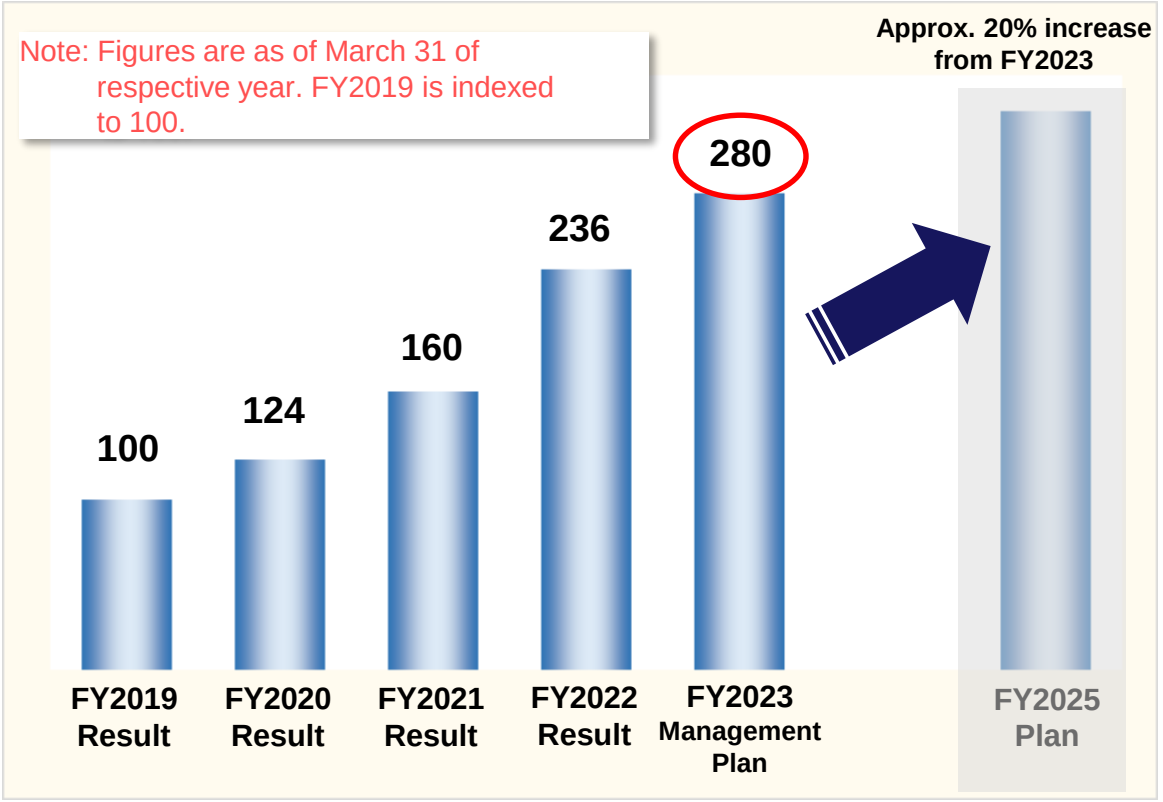
Measures

- **Ongoing expansion of 8-inch Si wafer production capacity (Approx. 20% year-on-year increase by March 31, 2024)**
- **Augmentation of production capacity for 6-inch SiC wafers in FY2024 and beyond**

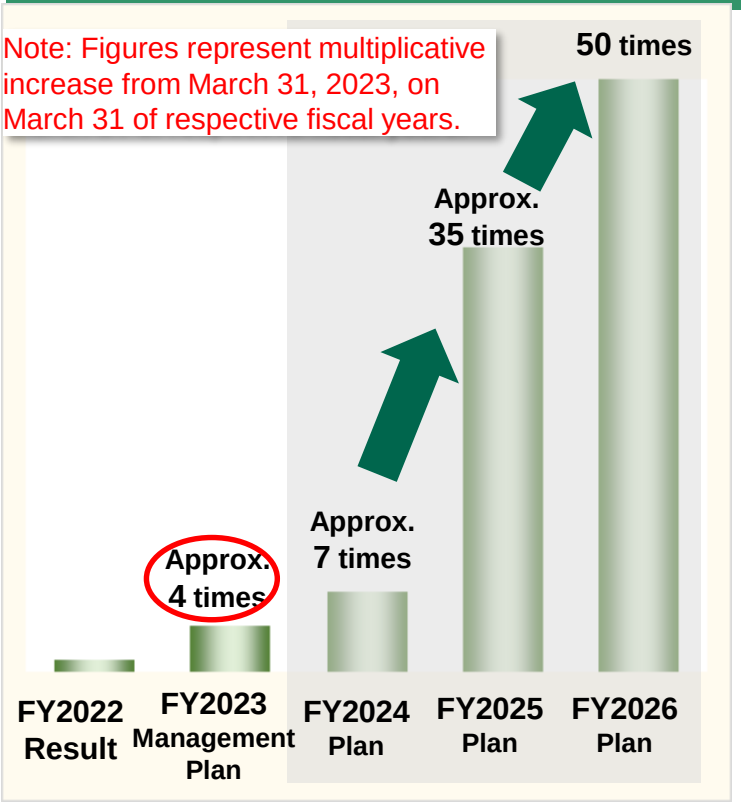
8-Inch Si and SiC Wafer Production Capacity Plan

- **Plans to triple 8-inch Si wafer production capacity from FY2019's level in FY2023 and bolster certain capabilities pertaining to SiC wafers at end of FY2023 to prepare for mass production in FY2024**
- **Ongoing augmentation of 8-inch Si wafer production capacity and rapid expansion of SiC wafer production capacity beginning in FY2024**

Front-End 8-Inch Si Wafer Production Capacity



Front-End SiC Wafer Production Capacity



Enhancement of Manufacturing — Production Bases and Measures (Back-End)

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Bases

Japan (3 bases)

・Mother base for assembly products, manufacturing of products for domestic customers
: Augmentation of production capacity for industrial and automotive modules

Philippines

・Principal discrete device production base, production of automotive pressure sensors and air-conditioner modules

China (Shenzhen)

・Production base for IGBT modules for Chinese market, expansion of 7th-generaiton IGBT production capacity

Malaysia

・Industrial IGBT module production base, expansion of 7th-generaiton IGBT production capacity

Measures

- **Expansion of automotive product production capacity**
  xEV modules (15% year-on-year increase in FY2023 →
  35% year-on-year increase in FY2024) (*Compared with end of the FY)

- **Expansion of production capacity and range of models manufactured for industrial modules**
  7th-generation IGBTs (50% year-on-year increase in FY2023)
  (*Compared with end of the FY)

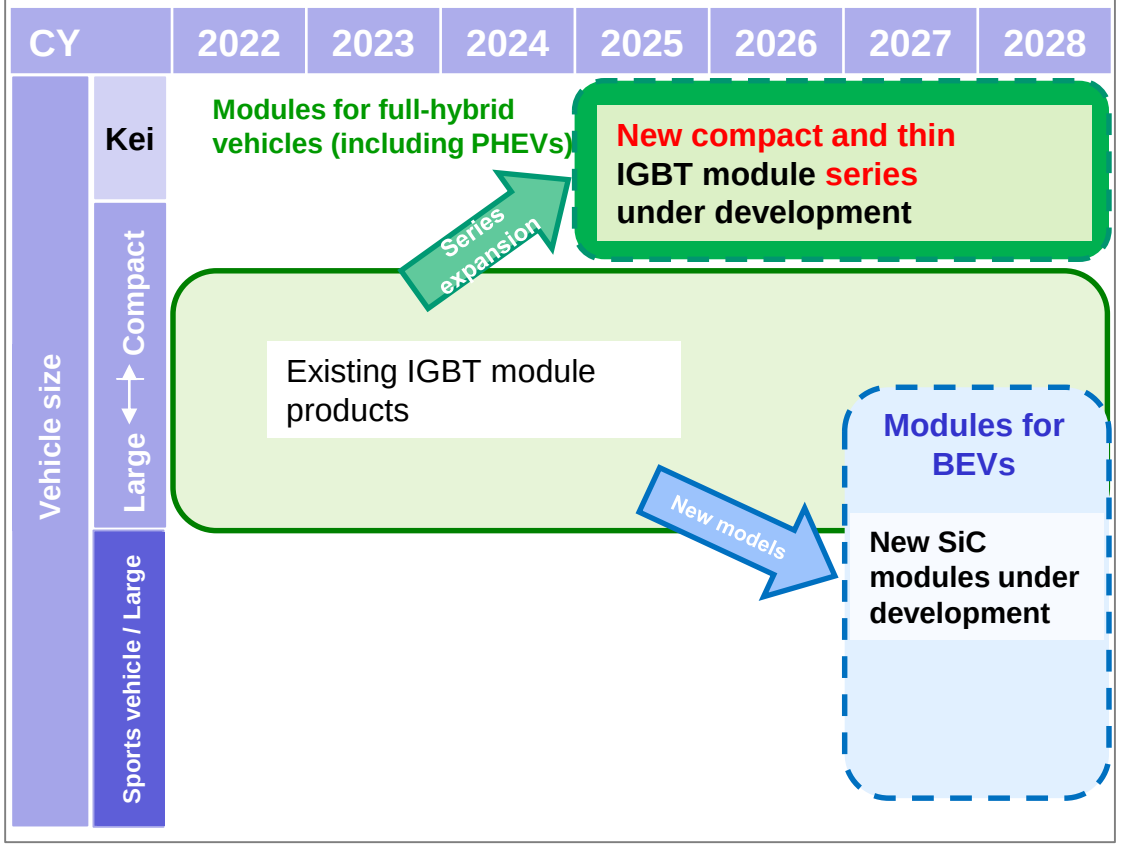
Development of Competitive New Products 1 — xEV Modules

- **Increase in use of automotive power semiconductors for BEVs and kei and compact vehicles**
- **Development of new IGBT modules for kei and compact vehicles and SiC modules for BEVs**

Characteristics of Compact, Thin IGBT Modules

- Mass production scheduled to commence in FY2025
- Equipped with RC-IGBTs and on-chip sensors
- Compact and thin packages
  - 77% reduction in size compared to prior Fuji Electric offerings
  - → Ideal for thin inverters
- Output density 1.7 times higher than competitors

xEV Module Series Development Plan



Development of Competitive New Products 2 — Large-Capacity Industrial Modules

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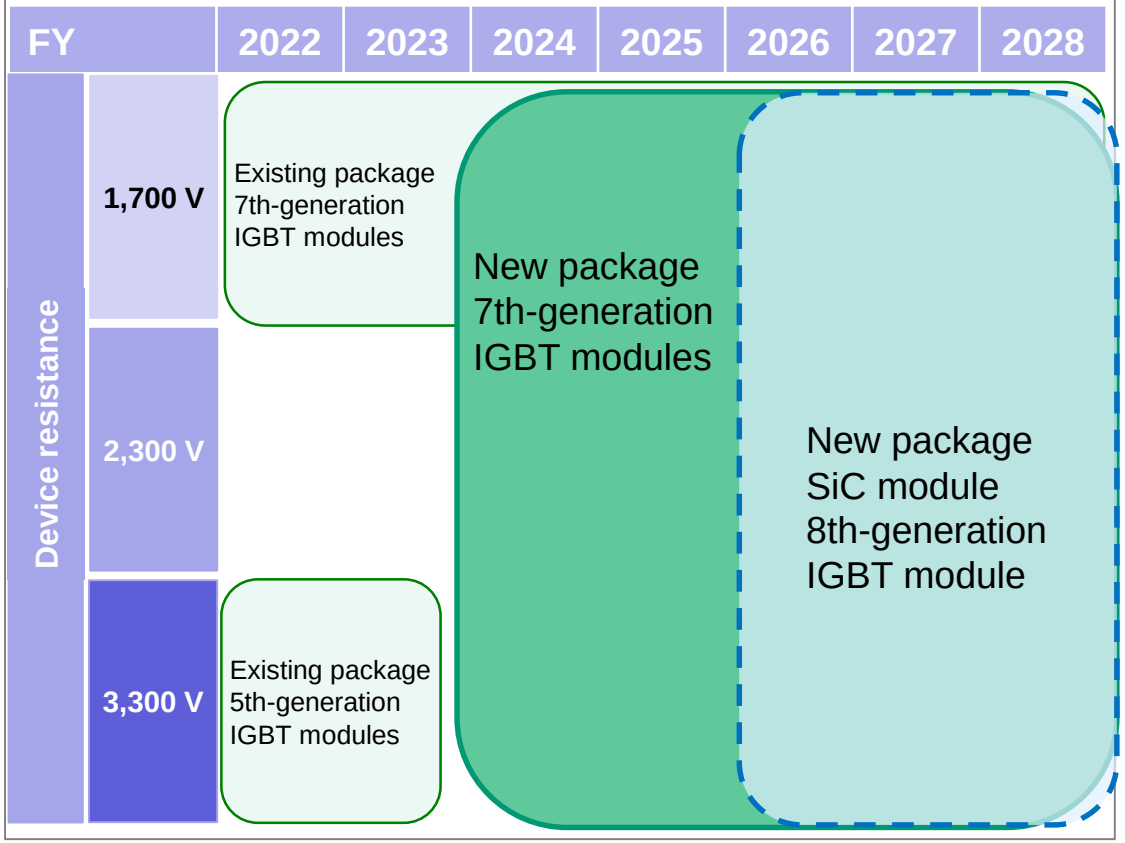
- **Transition to higher voltages in renewable energy market in light of lower system losses**
- **Expansion of share by developing new package products equipped with 8th-generation IGBTs and 3rd-generation SiC devices**

Characteristics of Large-Volume Modules

- High-voltage-resistant series (1,700 V, 2,300 V, 3,300V)
  - Introduction of additional 2,300 V series for renewable energy market
- High efficiency and high output
  - Models using 8th-generation IGBTs
  - Models using 3rd-generation SiC MOSFETs
- Lower number of modules used through development of high-voltage-resistant series
  - Reduction in space use by 68% in comparison to prior Fuji Electric offerings when combined with new package
  - Lower system costs

Large-Capacity Module Series Development Plan



Development of Competitive New Products 3 — 3rd-Generation SiC MOSFETs

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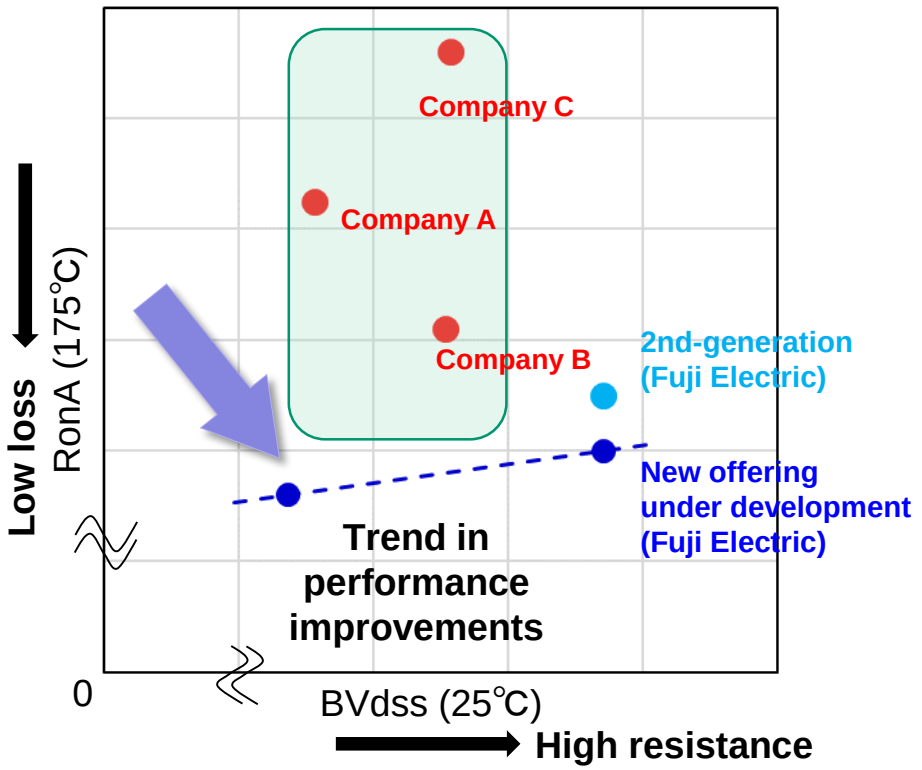
- **Low-loss, easy-to-use SiC MOSFETs under development**
- **Plans to commenced mass production of xEV and large-capacity industrial SiC modules in FY2025 and beyond**

Characteristics of 3rd-Generation SiC-MOSFETs

- Lower loss achieved more precise design
  → 15% reduction in loss compared with 2nd-generation SiC MOSFETs
- Optimized surface structure contributing to ease of use
  → Reduced interference from external noise
- Improvement of productivity through process rationalization

Loss Reductions Achieved by 3rd-Generation MOSFETs



Development of Competitive New Products 4 — 8th-Generation IGBTs

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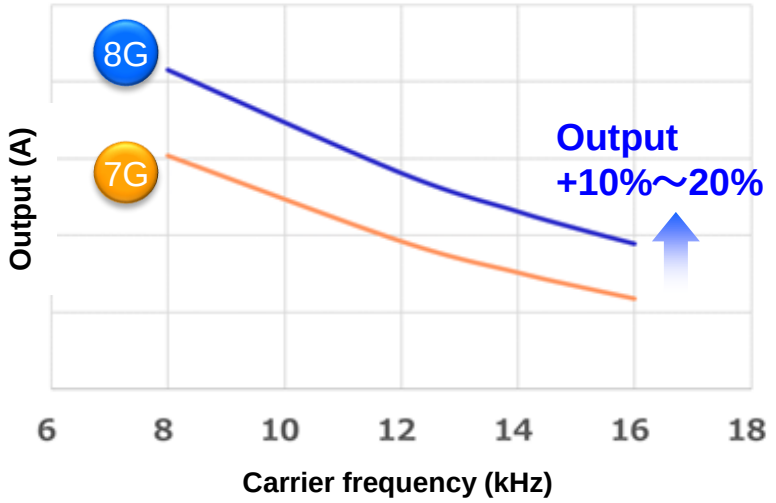
- **Accommodation of market needs for compact and longer lasting equipment with lower system costs**
- **Technology development underway targeting mass production after FY2024**

Characteristics of 8th-Generation IGBTs

- Chip technologies
  - —Low loss achieved through ideal structure (more precise design, thinner wafers)
  - —Improved heat exhaust properties through use of RC-IGBT
- Package technologies
  - —Improved reliability in high-temperature environments through new material technologies
  - —Higher reliability in corrosive environments through application of new technologies

Goals for 8th-Generation IGBTs

- More compact systems and reduced system costs through increased output
- Higher efficiency due to reduced losses
- Compatibility with high frequencies made possible by reduced switching loss
- Longer lifespans due to improved heat cycle and environmental resistance characteristics



Capital Investment / Research and Development

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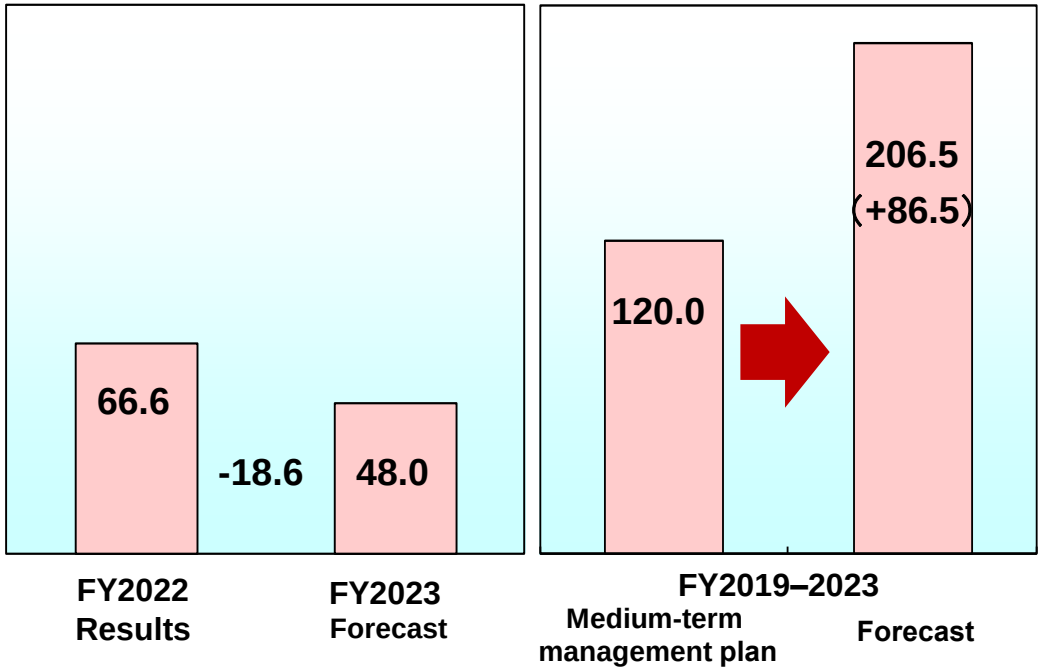
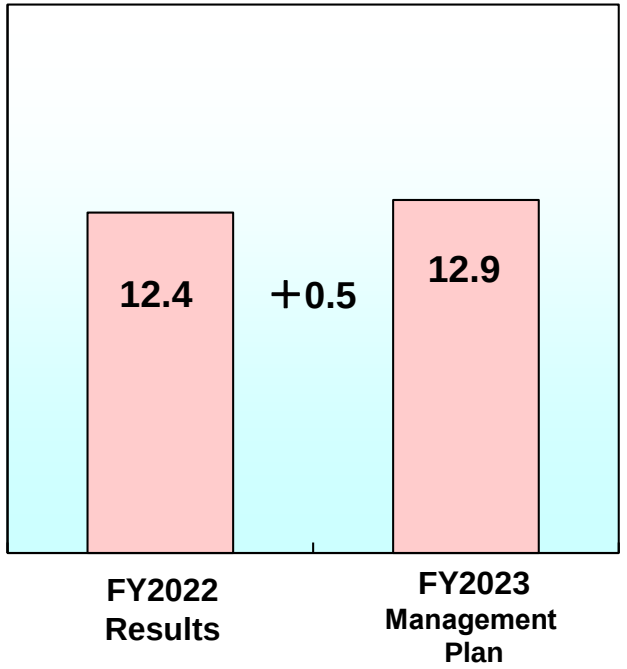
Capital Investment (Billion yen)



Research and Development (Billion yen)



- Expansion of front-end (SiC, 8-inch wafer) production capacity
- Expansion of back-end (automotive module) production capacity

- xEV and Industrial SiC/IGBT modules
- Technological development for 8th-generation IGBTs and 3rd-generation SiC-MOSFETs
- Technology development for mass-production of 8-inch SiC wafers

Note: The R&D expenditure figures above represent expenditures that have been allocated to segments based on theme and may therefore differ from figures contained in consolidated financial reports.

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