

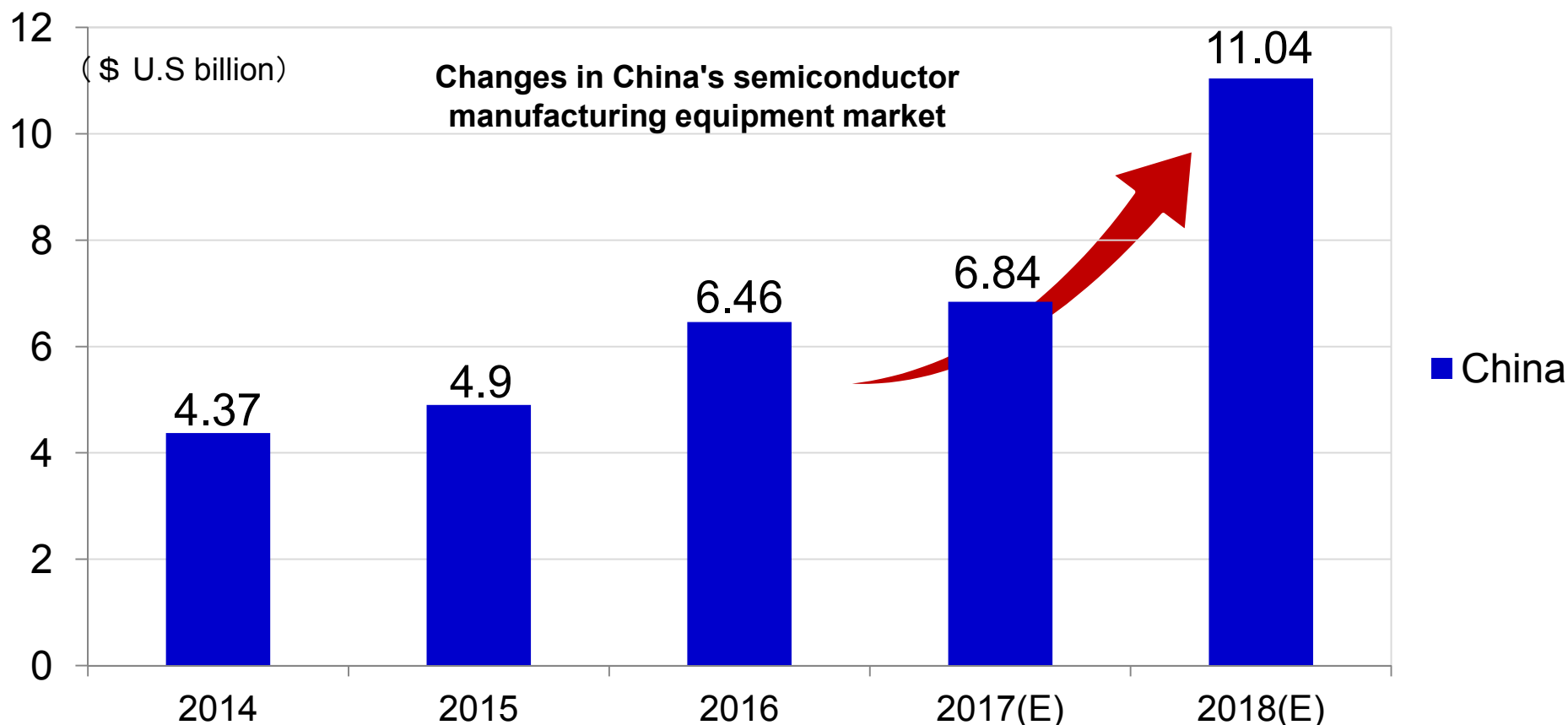


Ferrotec Holdings Corporation








Medium- to Long-term Growth Strategy /Progress Reports

November 27, 2017

- ◆ In particular, **China's growth rate will rise to the top level in 2018**
 - The effects of the 'China Production 2025' national policy
 - There is also the possibility that **China will take over second place in the world share**, outstripping Taiwan



Due to technological trends,
semiconductor demand is sure to continue into the long term

	Technological trends	Influence to semiconductor market
	IoT	Lots of different devices are being newly connected to the network ⇒ Increase in semiconductor demand (discrete, power system) in new fields
	3D-NAND	Demand for miniaturization, and for the replacement of high-speed large-capacity devices is emerging ⇒ Increase in demand for consumable supplies due to complicated process stages
	Big data	Demand for semiconductor memory increasing for enormous data analysis applications
	AI	Increase in integrated data volume due to utilization of big data ⇒ Increased demand for memory, sensors, etc.
	Automatic driving	Increase in demand for parts accompanying the addition of new functions
	Mobile communications system (5G)	High speed and large capacity, increased number of terminal connections ⇒ Increase in demand for memory for use in edge servers and for sensors
	Power semiconductor	Trend toward worldwide power saving ⇒ Expansion of demand deriving from increased adoption of inverters

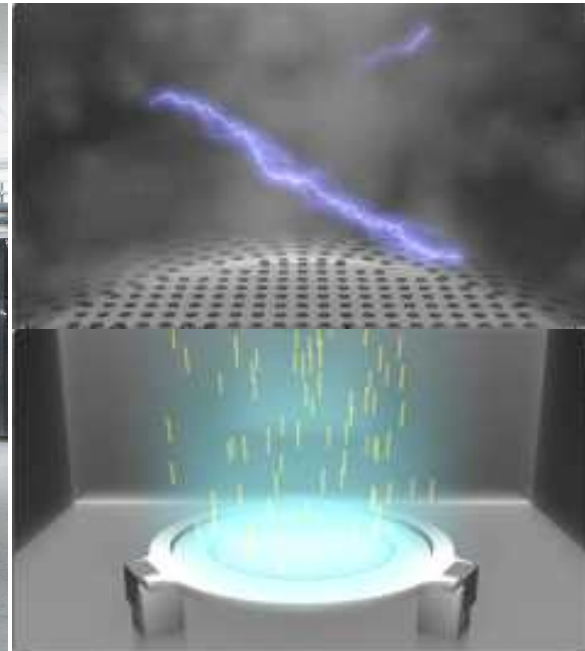
Continuing capital investment in order to capture demand

1. OEM production for semiconductor manufacturing equipment
 - Contract production in special fields
2. Increase production of semiconductor material products
 - Establish new factories in highly profitable fields
3. Establishment of a new company in Hangzhou, China
 - To increase production of 8-inch wafers
4. Capturing market for the utilization of EV vehicles and industrial power semiconductors
 - Demand for semiconductors accompanying shift towards adoption of EV

Continuing capital investment in order to capture demand

1. OEM production for semiconductor manufacturing equipment

•••contract production in special fields



2. Increase production of semiconductor material products

- Establish new factories in highly profitable fields

➤ Won the "Best Supplier Award" from a major US equipment manufacturer

Our semiconductor-related products

CVD-SiC



Contract processing



Quartz



Ceramics



Vacuum feedthroughs



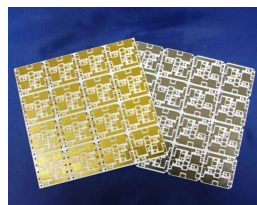
Silicon parts



Equipment cleaning



Power semiconductors



Next generation technologies

IoT

3D-NAND

Big data

Communications

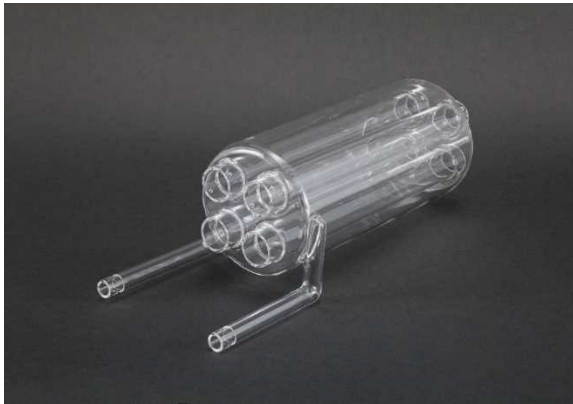
Power semiconductors

etc...

2. Increase production of semiconductor material products

◆ Establish new production base

- Expand production capacity by establishing new production line



Quartz products



CVD-SiC products



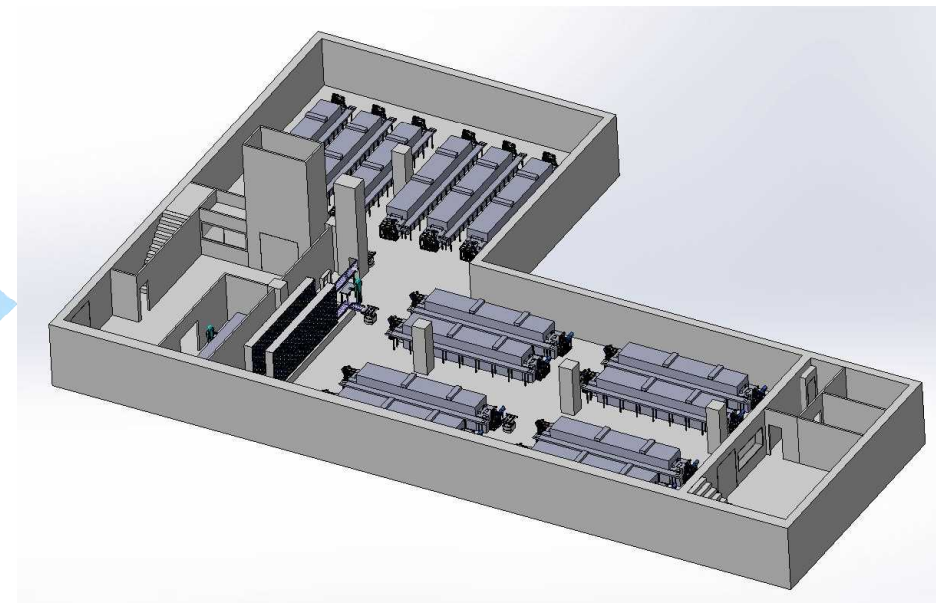
Silicon products



Ceramics products

2. Increase production of semiconductor material products

- Increase productivity with smart factory utilizing the IoT



The smart factory project is underway
(DCB production line)

2. Increase production of semiconductor material products (cleaning business)

- ◆ Demands from customers' factories for increased production of semiconductors, FPDs, and organic EL
 - Factories located in regions in which semiconductor makers tend to gather
 - Fourth factory in Dalian completed



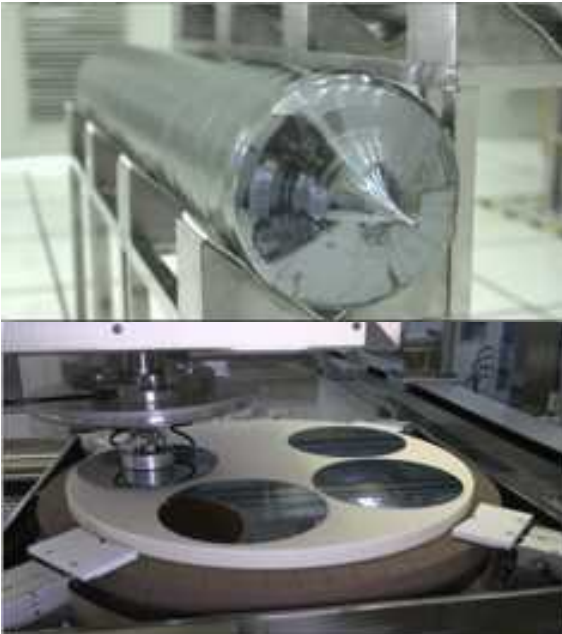
Dalian Factory which is completed in March

Future development of cleaning business



◆ Started operations at 8-inch wafer factory in China

- Construction of Yinchuan plant and Shanghai plant completed in July, in accordance with the business alliance concluded with GWC Co., Ltd., the third largest manufacturer of wafers in Taiwan
- Started mass production targeting monthly volumes of 50,000 units in October, 80,000 units in November, and 100,000 units in December
- Aiming for monthly production of 150,000 units by the beginning of the new year



Yinchuan plant

3. Establishment of a new company in Hangzhou, China, for the production of 8-inch wafers

- With Hangzhou City as a partner, aiming at monthly production of 300,000 wafers for 8-inch wafers
- Capital investment requirements to be funded by cash on hand, borrowings, and a subsidy from the city of Hangzhou

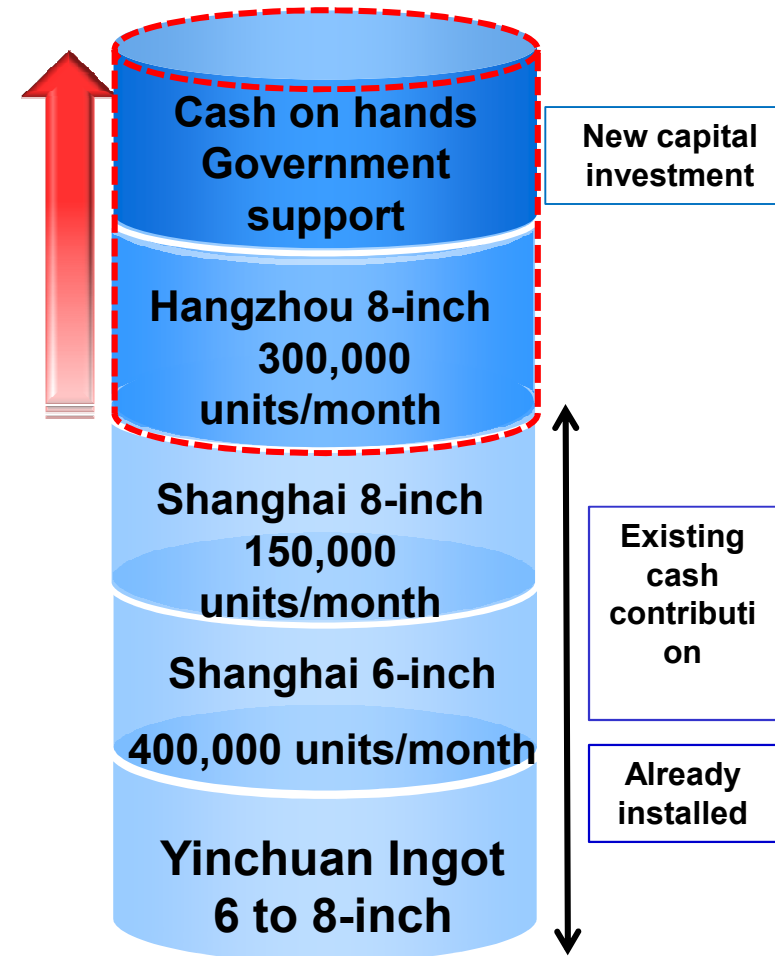
FerroTec



Strengthen customer relationship with Global Wafers

■ Greatest emphasis on semiconductor wafer products

- Top runner in China with 8-inch wafer
- The construction of the new 8-inch factory is scheduled to start within the year
- 8-inch market potential of 5.8 million units/month
- Cost competitive advantage with the in-house production of pulling apparatus and crucibles
- ▶ Towards a monthly production volume of 850,000 wafers including small diameter wafers

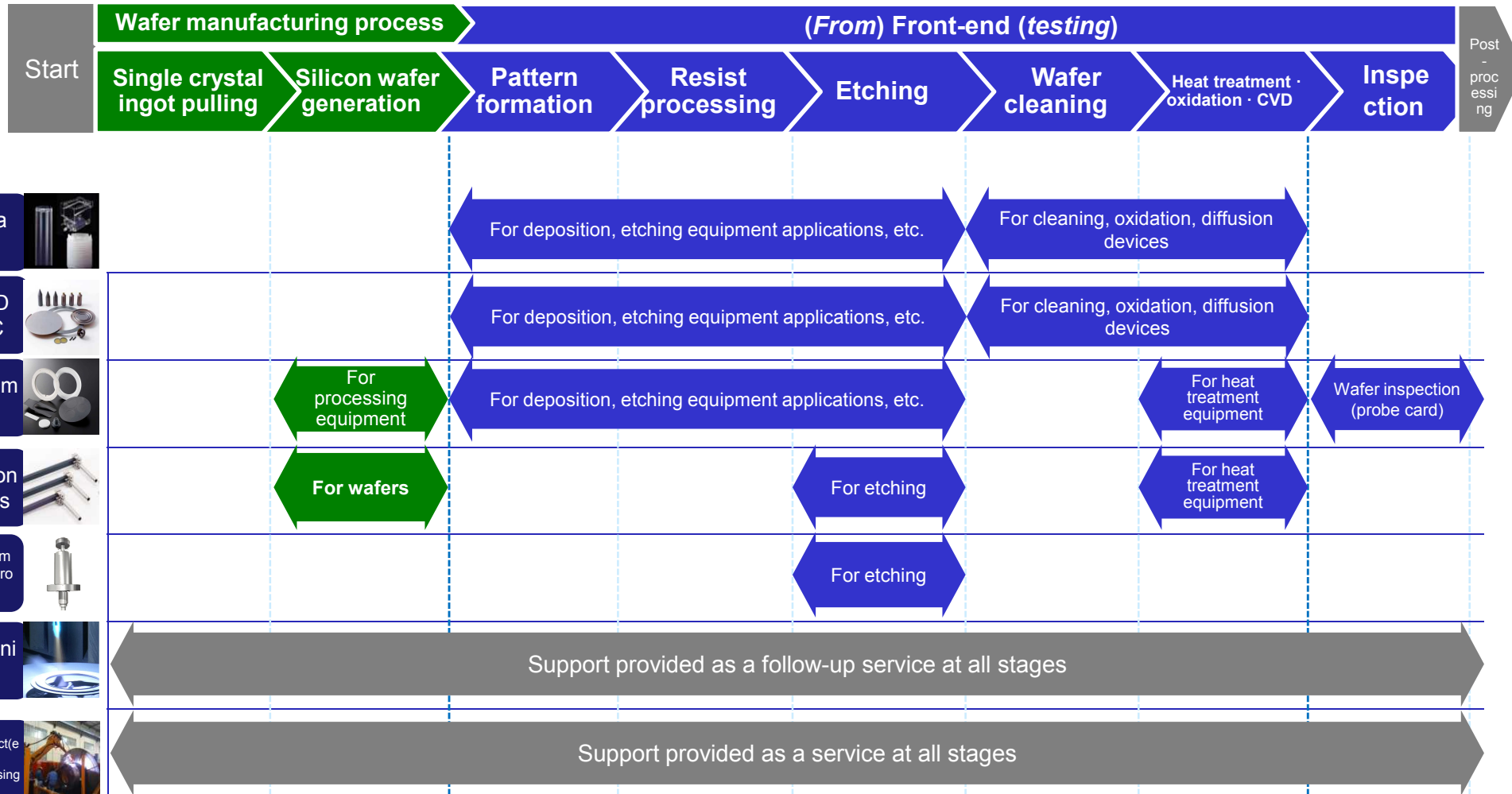


Semiconductor process coverage area of our products



Our products are used in almost all semiconductor manufacturing processes

~ General semiconductor manufacturing process (partly omitted)~



- ◆ Structural reform of photovoltaic-related business
 - Demand in emerging countries is steady. **Improve profitability with higher value-added products**
 - **Implement structural reforms** for the current fiscal year to the next fiscal year
 - **Pulling device** is in operation for our own 8-inch semiconductor
 - **About 50% of crucibles was shifted** to semiconductor applications



Shifted the photovoltaic applications into the semiconductor applications

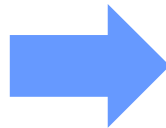
Transition to 5G standard for communications in Japan ongoing
- with 2020 as target

Anticipate an increase in demand for semiconductors for optical communications

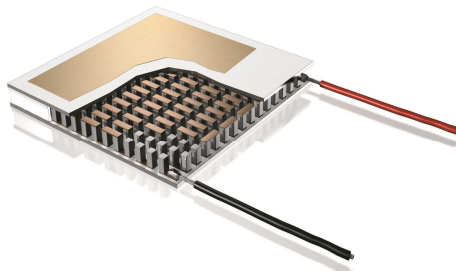
The mobile industry market predicts market size to be twice as large in 2020
(460 trillion yen) * 1

Source: * 1 Quoted from the Ministry of Public Management, Home Affairs, Posts and Telecommunications' report '5G as a Revitalization Strategy for Japan'

**Thermo-electric
Module**



Constant temperatures in
communications laser diodes,
repeaters, antennas etc.



4. Capturing market for the utilization of EV vehicles and industrial power semiconductors

- Anticipate a growth rate in excess of 30% and 3 trillion yen of market size by 2025
- Demand also increases in the automotive field due to the development of Electric Vehicles (EV)
- Continue to increase production Toward 1.8 times of production capacity



Bullet trains



Electric Vehicle



Welding robots



Temperature controlled seats for automobiles



Air conditioners

In 100 millions

35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

The world market for power semiconductors

24,239

31,799

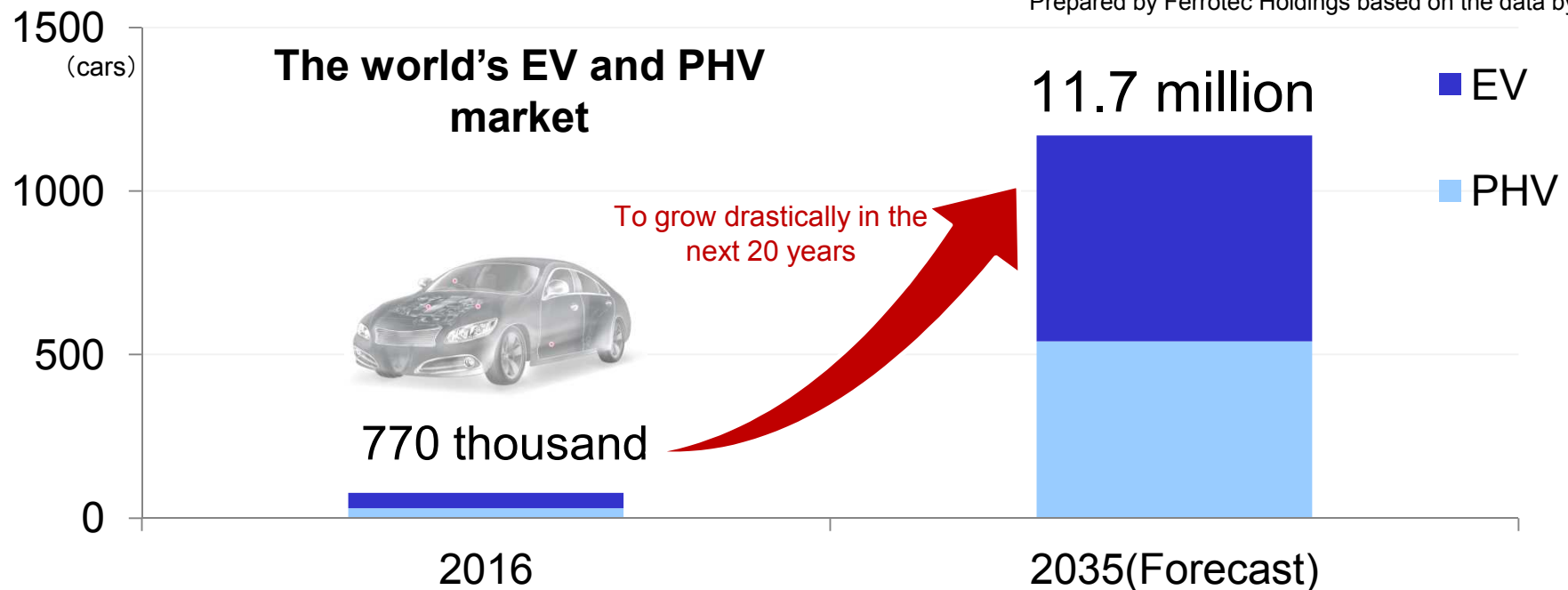
More than
30%

2016

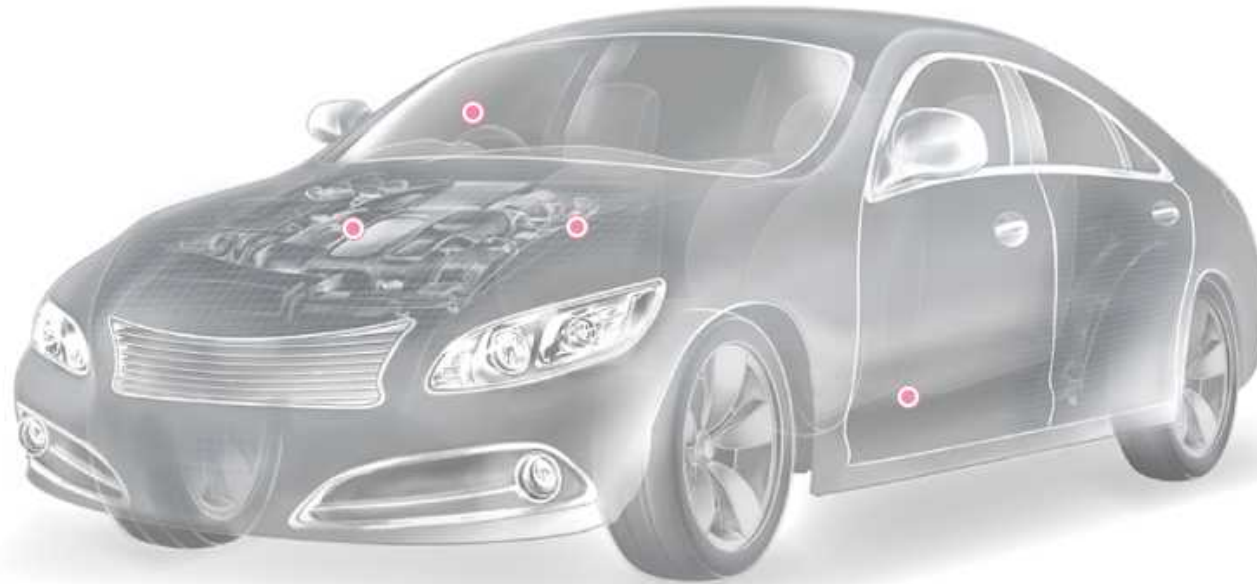
2025
(Forecast)

- ◆ Increase in automobile products in response to the spread of EV
 - Including combined electric and gasoline PHV vehicles, the market for EV will exceed 10 million units in 2035*
 - In addition to Britain and France, China is also going to restrict gasoline-powered vehicles
 - Demand is surely set to rise in response to the increase in assemblies

*Prepared by Ferrotec Holdings based on the data by Fujitsu SEMI



- Start automobile-related project with the development of EV
Target 20 billion of sales for 3 years



↓ Potential products ↓

Related products of current
sensor for EV

Battery cooling system for EV

Head-up display

Magnetorheological
suspension

Sub air conditioner for EV

Rider communication chip



Sales target

With continuing its capital investments,
we target **net sales at 100 billion yen** and **operating margin at 10% level** for FY3/19.

