COMPANY RESEARCH AND ANALYSIS REPORT

Ferrotec Holdings Corporation

6890

TSE JASDAQ

9-Jul.-2018

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Summary

Leading manufacturer of quartz, silicon, ceramic, and other inorganic parts and products
Core customers are major semiconductor manufacturing equipment firms

Ferrotec Holdings Corporation <6890> has a very unique history. It was initially established as the Japanese entity of a US company, but later became independent from the parent, expanded its product line-up, and registered shares with the Japan Securities Dealers Association as an OTC stock. It subsequently acquired the former US parent company as a subsidiary and accelerated business expansion and began production in China. It is an international company with manufacturing subsidiaries and sales companies in 11 countries besides Japan, including Europe, America, China, and Southeast Asia.

Today, the Company manufactures vacuum seals, quartz products, ceramic products, CVD-SiC products, ferrofluids, thermo-electric modules, silicon wafers, solar-cell silicon, and other various products, equipment, parts, and materials. It also handles cleaning services, polishes silicon wafers and consignment processing and assembly of various parts and products for semiconductor manufacturing equipment firms. Primary customers thus are global major semiconductor manufacturing equipment firms. Ferrotec plans large-scale capital investments from 2018 as well. We think its business trends should be closely watched along with the global semiconductor market over the next few years.

1. FY3/18 (results): Operating profit climbed sharply with a 48.6% YoY gain

The Company reported ¥90,597mn in net sales (+22.7% YoY), ¥8,437mn in operating profit (+48.6%), ¥7,157mn in ordinary profit (+26.1%), and ¥2,678mn in net income attributable to owners of parent (-17.8%). Despite weakness in solar cells, mainstay semiconductor equipment booked steep sales and profit increases amid a vibrant global semiconductor market. Others business, which handles cleaning and equipment assembly, was also upbeat. Operating profit hence rose significantly YoY. Ordinary profit, however, climbed by less because of forex losses. Net income attributable to owners of parent fell due to booking an allowance for lawsuit losses (¥1,114mn).

2. FY3/19 (outlook): 16.2% YoY increase in operating profit even with high capital investments

For FT3/19, the Company projects ¥98,000mn in net sales (+8.2% YoY), ¥9,800mn in operating profit (+16.2%), ¥8,500mn in ordinary profit (+18.8%), and ¥5,300mn in net income attributable to owners of parent (+97.9%). Device manufacturers are actively investing and manufacturing equipment firms are enjoying robust business too amid anticipated continuation of semiconductor shortages globally for the time being. Ferrotec, which supplies products and services to semiconductor manufacturing equipment firms as its main customers, hence is likely to continue realizing vibrant results. We believe it is capable of attaining FY3/19 forecast and might even raise targets further depending on subsequent trends, given these conditions.

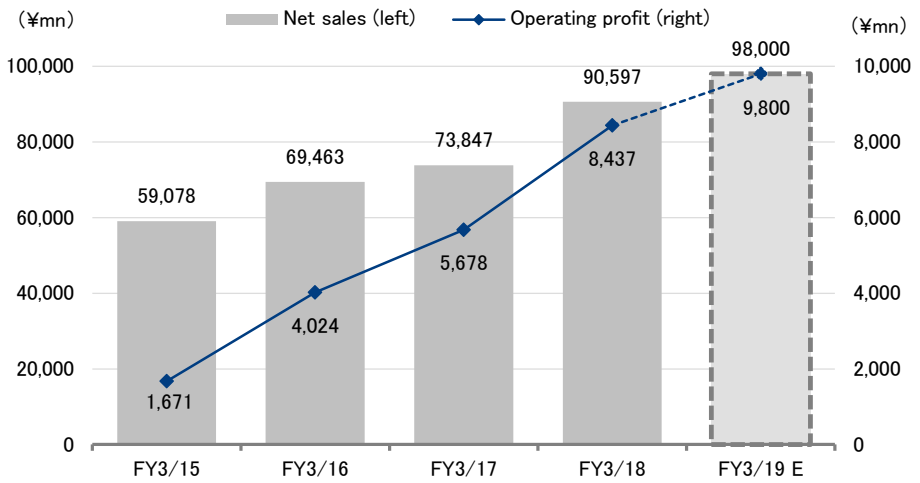
3. Longer-term outlook: Implementing robust capital investments

While the Company has not announced quantitative goals, it plans to make substantial additions to production facilities for key products over the next few years and capital investments are budgeted to reach ¥40bn in FY3/19. The Company intends to rapidly broaden business scope by capitalizing on vibrant conditions in semiconductor and manufacturing equipment industries, its main targets. It aims to focus on automotive business too and has already created an internal project team. Management is placing emphasis on ESG activities as well. We think it is necessary to closely monitor changes, including quantitative and qualitative aspects.

Key Points

- Leading manufacturer of quartz, ceramic, and other inorganic products; mainly supplies the semiconductor industry
- Expects a 16.2% YoY increase in FY3/19 operating profit with benefits from the vibrant semiconductor industry
- High capital investments at ¥40bn in FY3/19; focus on activities including qualitative aspects

Results trends



Source: Prepared by FISCO from the Company's financial results

Company profile

Manufactures a wide range of parts and products mainly for semiconductor manufacturing equipment firms

1. Company profile

Ferrotec is a pure holding company with 35 consolidated subsidiaries and six equity-method affiliates and 6,719 group employees as of March 31, 2018. It was originally established as US-based Ferrofluidics Corporation's Japanese entity (former Nippon Ferrofluidics Co., Ltd.) in 1980, but later separated from the parent company and has pursued an independent path.

It manufactures vacuum seals, quartz products, ceramic products, CVD-SiC, ferrofluids, thermo-electric modules, silicon wafers, solar-cell silicon, and other various products that are mainly made from inorganic materials, equipment, parts, and materials. It also handles cleaning and consignment processing and assembly of various parts and products for semiconductor manufacturing equipment firms. Primary customers thus are global major semiconductor manufacturing equipment firms.

2. History

The Company has a very unique history. It was initially established as the Japanese entity of a US company in 1980 and mainly conducted import sales of the parent's products (vacuum seals, etc.). In 1982, it built a plant in Chiba Prefecture and began direct production. Ties to the parent company faded as the Company's ratio of self-manufactured products climbed. The Company completely split from the parent in 1987 and embarked on a separate path. It then developed proprietary products, such as HDD laminated seals and ultra-high vacuum ferrofluids (fluorine-based magnetic fluids). It established the first Chinese site (Hangzhou) in 1992 and created a second Chinese production site in Shanghai and changed the company name to Ferrotec Corporation in 1995.

The Company continued to expand the product line-up and businesses. It registered shares with the Japan Securities Dealers Association as an OTC publicly-traded stock in 1996. It acquired Ferrofluidics Co., Ltd., the former US parent company, as a subsidiary in a friendly TOB in 1999. Events in the early 2000s included a business alliance in automotive temperature control systems with US-based Gentherm Incorporated (former Amerigon) in 2001, the start of consignment processing of small-diameter silicon wafers at the Shanghai plant in 2002, and the acquisition of Russia-based thermo module manufacturer SCTB NORD as a subsidiary in 2005. The Company widened business scope more recently through the purchase of a vacuum deposition equipment business from UK-based Edwards Vacuum in 2010, the launch of a large plant in Yinchuan (China) in 2011, acquisition of a stake in Admap Inc., a CVD-SiC product supplier, making it a subsidiary in 2015, and capital participation in Asahi Seisakusho Co., Ltd., an industrial equipment firm, making it a subsidiary in 2016. The Company transitioned to a holding company in spring 2017 and currently operates as an international company with manufacturing subsidiaries and sales companies located in nine countries worldwide, including Japan, Europe, America, China, and Southeast Asia.

The Company listed shares through an OTC registration with the JSDA in October 1996. It now trades on the Tokyo Stock Exchange's JASDAQ (Standard) market.

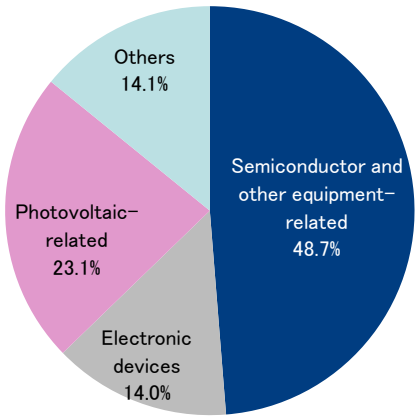
Business overview

Has wide-ranging business content (products), but semiconductor and other equipment-related business is the main area

1. Business segments

Ferrotec has broad business content because of its proprietary development of many products and acquisitions of numerous companies as subsidiaries through M&A activity, as described above. Its business segments are semiconductor and other equipment-related business (48.7% of overall sales in FY3/18), electronic devices business (14.0%), photovoltaic-related business (23.1%), and others business (14.1%).

Net sales by segment
(FY3/18: ¥90,597mn)



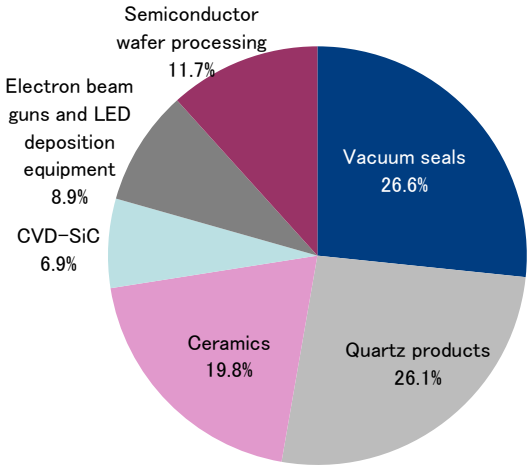
Source: Prepared by FISCO from the Company's results briefing materials

Additionally, these segments consist of the sub-segments described below.

2. Semiconductor and other equipment-related

The semiconductor and other equipment-related business covers vacuum seals, quartz products, ceramics, CVD-SiC, electron-beam guns and LED deposition equipment, and semiconductor wafer processing sub-segments.

Semiconductor manufacturing equipment-related sales ratios by sub-segment (FY3/18: ¥44,150mn)



Source: Prepared by FISCO from the Company's results briefing materials

(1) Vacuum seals (13.0% of overall sales in FY3/18)

Vacuum seals function as a rotary manipulator into a vacuum environment using ferrofluid and are utilized in semiconductor, FPD, LED, solar cell, and other manufacturing processes. These are Ferrotec's core products used mainly in semiconductor wafer etching and deposition processes and in the rotary mechanism of FPD panel conveyance robots. They are capable of precisely transferring required power for processing while keeping sealed space separated from the outside.

Sales shares by industries (FY3/18) are semiconductors at 30%, LEDs at 10%, FPDs at 21%, solar cells at 18% and others (mainly consignment business, etc.) at 21%.

(2) Quartz products (12.7% of overall sales in FY3/18)

Quartz products are silica glass with very high purity that can withstand heat and chemical changes. Ferrotec's products are primarily utilized in semiconductor manufacturing for the wafer deposition and dispersion process and as jigs and consumables in conveyance and cleaning processes. Quartz products serve in an important capacity in semiconductor manufacturing processes that are becoming more precise and requiring higher purity levels.

Sales shares by industries (FY3/18) are OEM mainly to major semiconductor manufacturers at 66%, end users (device manufacturers) at 23%, LEDs at 1%, photovoltaic at 2%, LCDs at 1%, and others at 4%. Main OEM sites are three major companies in Japan, two major companies in the US, and one company in China.

(3) Ceramics (9.6% of overall sales in FY3/18)

Ferrotec supplies a variety of ceramic parts with high strength and high purity utilizing the material technologies, production technologies and precision processing technologies that it possesses. Ferrotec's offerings can be categorized as fine ceramics (FC) with robust strength, high purity, and excellent heat resistance and machinable ceramics (MC) that can undergo advanced machine processing. The former are mainly used as parts in semiconductor manufacturing equipment. In particular, they are vital to the dry-etching method (plasma etchers). The latter are used as parts and jigs in a variety of processing. Demand is growing for use as jigs in the semiconductor inspection process (for wafer probers). Usage in advanced medical equipment that leverages precision processing features is also growing in recent years.

Sales shares by major products are MC semiconductor inspection at 19%, MC domestic general at 5%, MC exports at 7%, FC semiconductor equipment at 17%, FC exports at 33%, and others at 23%.

(4) CVD-SiC (3.4% of overall sales in FY3/18)

Ferrotec realizes very high purity, excellent heat resistance, high wear resistance, and erosion resistance in silicon carbide (SiC) products that apply a proprietary CVD production method. It is broadly utilized in jigs for use in high temperatures, including wafer boats and tubes and dummy wafers (silicon wafer replacements).

Sales shares by regions are China at 41%, Japan at 28%, North America at 20%, Taiwan at 10%, and Europe at 1%.

(5) Electron beam guns and LED deposition equipment (4.3% of overall sales in FY3/18)

Ferrotec supplies electron-beam (EB) guns and a wide range of US-made Temescal mount systems (precision deposition equipment), which are outfitted with an advanced EB guns and high-pressure power supply as core components, from smaller production types for universities and research centers to large product models with high throughput. Many customers employ these systems as a global standard for compound semiconductors that are likely to be adopted in next-generation communications and other areas. Steady advances are proceeding in LED and communications chip process areas.

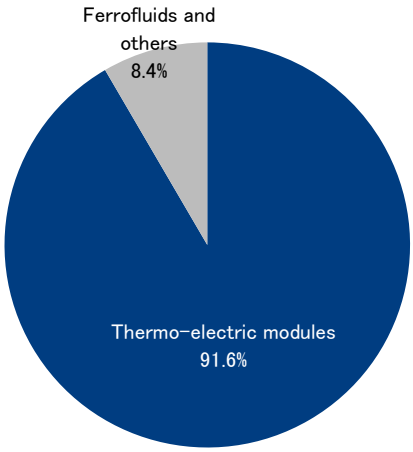
(6) Semiconductor wafer processing (5.7% of overall sales in FY3/18)

Ferrotec handles integrated production from mono-crystal ingots to wafer processing for small-diameter silicon wafers (six inches or less) for the semiconductor industry. It has built global supply operations mainly for volume-output products used by bipolar ICs, discrete circuit applications, and MEMS. It also started production of eight-inch wafers in 2017, and has built a framework to boost volume output for eight-inch wafers, as shall be noted later

3. Electronic devices

The electronic devices business consists of thermo-electric modules and ferrofluids and others.

Electronic device sales ratios by sub-segments (FY3/18: ¥12,701mn)



Source: Prepared by FISCO from the Company's results briefing materials

(1) Thermo-electric modules (12.8%)

Thermo-electric modules are plate-like semiconductor cooling devices (Peltier devices) that utilize the effect of heat transferring from one metal to the other when electric current flows through a junction between two types of metal. These modules are compact and lightweight and do not require freons. Common uses are temperature-control sheets in automobiles and cooling chillers, optical communications, biochemical, air-conditioners, and dryers and other consumer electronics products.

Sales shares by industry are automotive at 29%, automotive, other at 1%, semiconductors at 14%, photology at 5%, biochemical at 14%, communications equipment at 6%, scientific areas at 3%, consumer at 10%, power device substrates at 12%, and others at 7%.

(2) Ferrofluids and others (1.2% of overall sales in FY3/18)

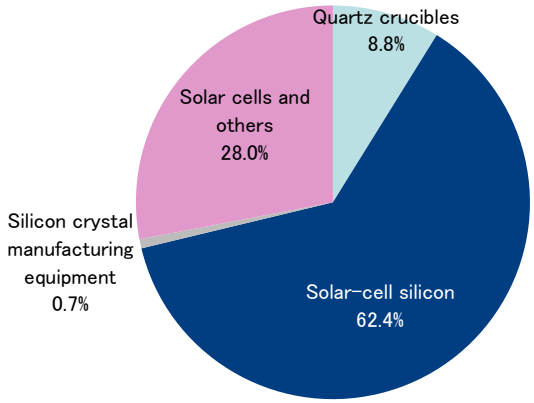
Ferrofluids are a functional liquid material that is magnetically affected by external magnetic fields and is attracted to magnets. The NASA space program in the 1960s developed ferrofluids for the purpose of transporting fuel in a zero-gravity environment. Today they are utilized in speakers, actuators, sensors, recycling separation, and vacuum seals (which are one of Ferrotec's main products).

Other businesses include power semiconductor substrates. The latter are heat-dissipation and insulation substrates that apply thermo-electric module manufacturing technologies and bond a copper circuit board to alumina and aluminum nitride ceramics through a eutectic reaction. These products contribute to downsizing and energy savings in trains, electric-drive vehicles, air-conditioners, and servers and are likely to attract growing demand.

4. Photovoltaic-related

The photovoltaic-related business consists of quartz crucible, solar-cell silicon, silicon crystal manufacturing equipment, and solar cells and other products.

Photovoltaic-related sales ratios by sub-segments (FY3/18: ¥20,938mn)



Source: Prepared by FISCO from the Company's results briefing materials

(1) Quartz crucibles (2.0% of overall sales in FY3/18)

Ferrotec's quartz crucibles use raw materials with the same level of high purity as quartz products vital to the semiconductor manufacturing process and serve as containers for mono-crystal silicon raw material. Main customers are manufacturers of mono-crystal silicon for semiconductor and photovoltaic applications. The policy going forward will be to secure earnings by increasing the ratio of semiconductor customers.

(2) Solar-cell silicon (14.4% of overall sales in FY3/18)

Ferrotec produces crystallized ingots by melting raw-material silicon at a high temperature and then gradually cooling it. Besides mono-crystal ingots with excellent power-generation performance thanks to well-ordered atomic arrangement, Ferrotec also makes multi-crystal ingots economically and with robust production efficiency using its own production facilities.

It produces thinly sliced mono-crystal wafers by cutting these ingots with a fixed abrasive grain wire saw. Ferrotec's wafers correspond to thinning wires and are utilized in modules with high power conversion.

(3) Silicon crystal manufacturing equipment (0.2% of overall sales in FY3/18)

Mono-crystal drawing equipment is manufacturing equipment for mono-crystal silicon ingots utilizing Ferrotec's core technology cultivated in the semiconductor process. The ingot shape is formed while drawing silicon melt, which is obtained by melting raw-material polysilicon in a vacuum electric furnace. This equipment incorporates many products based on Ferrotec technologies, including vacuum seals, carbon heaters (for melting the raw material at high temperatures), and receiving crucibles.

Ferrotec also manufactures multi-crystal manufacturing equipment that makes ingots with robust productivity. Its manufacturing equipment supports high-volume filling of polycrystalline materials and recycled materials and performs well in multi-crystal ingot quality and productivity. These features contribute to high conversion efficiency for multi-crystal modules.

(4) Solar cells and others (6.5% of overall sales in FY3/18)

Solar cells combine a photovoltaic wafer with an electrode that uses two types of electrode (p-type, n-type) semiconductors with different electrical properties. Ferrotec manufactures mono-crystal and multi-crystal cells and sells these cells to photovoltaic product firms.

5. Others (14.1% of overall sales in FY3/18)

This business includes various consignment tasks and cleaning procedures for semiconductor manufacturing equipment parts. As explained below, it plans to remove this business from the others segment and move it into the semiconductor equipment segment from FY3/19.

6. Features and strengths

(1) Pioneer in inorganic materials

The Company has been involved for many years in production and processing of a wide range of inorganic materials, including quartz, silicon, silicon nitride, and silicon carbide (SiC). It hence has accumulated extensive knowhow (material qualities, production method, processing method, etc.) related to these materials. We believe this aspect is a characteristic and strength.

(2) Handles production equipment too

Additionally, the Company handles not just materials, but also various types of production equipment. It therefore possesses production equipment as well and offers customers a variety of proposals (solutions), including materials, processed parts, finished products, and manufacturing equipment.

(3) Supports one-stop solutions

Furthermore, the Company engages in service businesses, such as cleaning semiconductor manufacturing equipment parts (removal, cleaning, reinstallation) and production equipment assembly. Customers can conduct one-stop outsourcing of material supply, parts processing, equipment assembly, and parts cleaning. We think this is an important strength.

(4) Trust relationship with major customers

The Company's main customers are global top-class semiconductor manufacturing equipment manufacturers because its products are primarily utilized in semiconductor manufacturing equipment and semiconductor production processes as explained above. The top three firms in FY3/18 sales were two US-based production equipment firms and a Japanese equipment firm. The Company has supplied these leading semiconductor manufacturing equipment manufacturers with products and parts over many years. We believe its deep trust relationships with these customers are assets and a strength.

Business performance

Operating profit rose 48.6% YoY on vibrant demand from the semiconductor industry

1. Review of FY3/18 results

(1) Earnings

In FY3/18, Ferrotec reported ¥90,597mn in net sales (+22.7% YoY), ¥8,437mn in operating profit (+48.6%), ¥7,157mn in ordinary profit (+26.1%), and ¥2,678mn in net income attributable to owners of parent (-17.8%). It posted sharply higher operating profit, despite a slump in photovoltaic-related business, thanks to steep sales and profit increases in the mainstay semiconductor and other equipment-related business spurred by vibrant conditions in the global semiconductor market as well as upbeat trends in others business that handles cleaning and wafer processing.

Overall gross margin improved to 27.5% (vs. 26.7% a year earlier), and gross income was ¥24,915mn (+26.4% YoY). Operating profit climbed sharply, even though SG&A expenses rose 17.4% YoY, because of the increase in gross income. Ordinary profit only improved 26.1% due to non-recurrence of the forex profit from the previous fiscal year (¥213mn) and a forex loss (¥640mn) instead. Net income attributable to owners of parent, meanwhile, dropped 17.8% YoY because of booking ¥1,114mn as a lawsuit losses allowance for a lawsuit related to the PV business.

Ferrotec booked large capital investments totaling ¥12,300mn (compared to ¥7,322mn in FY3/17), mainly because of capital investments at the Chinese subsidiary, while depreciation costs were ¥4,188mn (¥3,593mn).

FY3/18 results

(¥mn, %)

	FY3/17		FY3/18			
	Amount	% of sales	Amount	% of sales	Change	% change
Net sales	73,847	100.0	90,597	100.0	16,750	22.7
Gross profit	19,708	26.7	24,915	27.5	5,207	26.4
SG&A expenses	14,030	19.0	16,477	18.2	2,447	17.4
Operating profit	5,678	7.7	8,437	9.3	2,759	48.6
Ordinary profit	5,675	7.7	7,157	7.9	1,482	26.1
Net income attributable to owners of parent	3,256	4.4	2,678	3.0	-578	-17.8
Capital investment	7,322	-	12,300	-	4,978	68.0
Depreciation	3,593	-	4,188	-	595	16.6

Source: Prepared by FISCO from the Company's results briefing materials

Steep rise in surplus cash and deposits due to issuance of corporate bonds and shares

(2) Financial condition

In financial standing at end-FY3/18, the Company reported ¥67,240mn in current assets (+¥15,995mn YoY), mainly on increases of ¥8,870mn in cash and deposits, ¥3,044mn in promissory note receivables and sales receivables, and ¥2,890mn in inventory assets. Fixed assets climbed ¥10,362mn YoY to ¥51,217mn with additions of ¥9,246mn to tangible fixed assets primarily from capital investments, ¥862mn to intangible fixed assets, and ¥254mn in investments and other assets. Gross assets hence grew by ¥26,356mn to ¥118,457mn.

Liabilities rose by ¥14,245mn YoY to ¥66,645mn, mainly on increases of ¥4,492mn in promissory note payables and other payables, ¥1,389mn in short-term loans, including long-term loans with less than one year to repayment, and ¥2,418mn in corporate bonds, and a ¥1,147mn decline in long-term loans. Net assets were up ¥12,111mn YoY to ¥51,812mn with gains of ¥4,392mn in capital from the capital increase, ¥4,389mn in capital reserves, and ¥1,865mn in surplus profit from net income attributable to owners of parent.

Consolidated balance sheet

(¥mn)

	FY3/17	FY3/18	Change
Net sales	14,778	23,648	8,870
Semiconductor and other equipment-related business	17,656	20,700	3,044
Vacuum seals	13,883	16,773	2,890
Quartz products	51,245	67,240	15,995
Ceramics	34,294	43,541	9,246
CVD-SiC	8,583	10,355	1,772
EB guns and LED deposition systems	8,454	12,564	4,110
Wafer processing	1,280	1,589	309
Electronic devices business	2,060	2,922	862
Thermo-electric modules	769	378	-391
Ferrofluids and others	4,499	4,753	254
Photovoltaic-related business	40,855	51,217	10,362
Quartz crucibles	92,100	118,457	26,356
Solar-cell silicon	13,926	18,419	4,492
Silicon crystal manufacturing equipment	5,002	5,874	872
Solar cells and others	4,538	5,055	516
Others business	32,108	43,481	11,373
Operating profit	-	2,418	2,418
Semiconductor and other equipment-related business	12,625	11,478	-1,147
Electronic devices business	20,290	23,163	2,873
Photovoltaic-related business	52,399	66,645	14,245
Others business	39,701	51,812	12,111

Source: Prepared by FISCO from the Company's financial results

(3) Cash flow conditions

Cash flow provided by operating activities during FY3/18 was ¥9,946mn. Major inflows include income before income taxes of ¥5,501mn, depreciation of ¥4,188mn, and a ¥3,931mn increase in accounts payable. Major outflows include a ¥2,435mn increase in accounts receivable and a ¥2,604mn in inventories. Cash flow used in investing activities was ¥12,388mn, with the outflows consisting mainly of ¥11,087mn in payments of tangible fixed assets and ¥1,212mn in payments of intangible fixed assets. Cash flow provided by financing activities was ¥10,830mn, with ¥90mn inflow from an increase in short-term borrowing and long-term debt, proceeds from the issuance of bonds of ¥3,245mn, and proceeds from the issuance of stock of ¥8,712mn versus outflows of ¥811mn in payments for dividend.

As a result, the balance of cash and cash equivalents increased ¥8,810mn to ¥23,648mn at the end of FY3/18.

Cash flow statement

(¥mn)

	FY3/17	FY3/18
Cash flow from operating activities	8,218	9,946
Income before income taxes	5,114	5,501
Depreciation	3,593	4,188
Changes in notes and accounts receivable (-: increase)	-1,025	-2,435
Changes in inventories (-: increase)	666	-2,604
Changes in accounts payable (-: decrease)	2,603	3,931
Cash flow from investing activities	-7,070	-12,388
Cash flow from financing activities	3,897	10,830
Changes in short-term borrowing and long-term debt	4,504	90
Proceeds from the issuance of bonds	-	3,245
Proceeds from the issuance of stock	19	8,712
Payments for dividend	-492	-811
Changes in cash and cash equivalents	4,739	8,810
Cash and cash equivalents, end of year	14,778	23,648

Source: Prepared by FISCO from the Company's financial results

2. Segment overview

In segment results, sales and profits increased to ¥44,150mn in sales (+36.9% YoY) and ¥7,294mn in operating profit (+72.3%) for mainstay semiconductor equipment and ¥12,701mn in sales (+0.6%) and ¥3,006mn in operating profit (+15.9%) for electronic devices. Photovoltaic sales rose 11.5% to ¥20,938mn, but operating profit slumped to a ¥1,592mn loss (vs. a ¥1,184mn loss a year earlier) due to booking bad debt allowances related to past production equipment sales and inventory valuation losses. The others business booked ¥12,807mn in sales (+25.5% YoY) and a ¥226mn operating loss (vs. a ¥244mn profit a year ago).

Segment sales and operating profit

(¥mn, %)

	FY3/17		FY3/18			
	Amount	% of sales	Amount	% of sales	Amount	% of sales
Net sales	73,847	100.0	90,597	100.0	16,750	22.7
Semiconductor and other equipment-related business	32,243	43.7	44,150	48.7	11,907	36.9
Vacuum seals	8,160	11.0	11,761	13.0	3,601	44.1
Quartz products	8,242	11.2	11,523	12.7	3,281	39.8
Ceramics	6,266	8.5	8,729	9.6	2,463	39.3
CVD-SiC	1,905	2.6	3,039	3.4	1,134	59.5
EB guns and LED deposition systems	3,817	5.2	3,936	4.3	119	3.1
Wafer processing	3,854	5.2	5,161	5.7	1,307	33.9
Electronic devices business	12,627	17.1	12,701	14.0	74	0.6
Thermo-electric modules	11,747	15.9	11,634	12.8	-113	-1.0
Ferrofluids and others	879	1.2	1,068	1.2	189	21.5
Photovoltaic-related business	18,773	25.4	20,938	23.1	2,165	11.5
Quartz crucibles	2,041	2.8	1,850	2.0	-191	-9.4
Solar-cell silicon	10,599	14.4	13,066	14.4	2,467	23.3
Silicon crystal manufacturing equipment	967	1.3	157	0.2	-810	-83.8
Solar cells and others	5,166	7.0	5,865	6.5	699	13.5
Others business	10,204	13.8	12,807	14.1	2,603	25.5
Operating profit	5,678	7.7	8,437	9.3	2,759	48.6
Semiconductor and other equipment-related business	4,234	-	7,294	-	3,060	72.3
Electronic devices business	2,594	-	3,006	-	412	15.9
Photovoltaic-related business	-1,184	-	-1,592	-	-408	-
Others business	244	-	-226	-	-470	-
Adjustment value	-210	-	-44	-	166	-

Source: Prepared by FISCO from the Company's results briefing materials

Below we review conditions in the major sub-segments.

(1) Vacuum seals business

Sales were healthy with a 44.1% YoY gain to ¥11,761mn. Demand grew for the vacuum process in semiconductor production equipment. In the FPD market, investments by Chinese panel manufacturers supported solid OLED demand. Additionally, outsourced processing demand strengthened in US, European, and Chinese markets.

(2) Quartz products

Sales expanded 39.8% YoY to an all-time high of ¥11,523mn on benefits from increased global semiconductor demand. Next-generation product sales rose to the major domestic OEM customer, and upbeat customer momentum and improvement in the Company's share lifted sales to the major US customer. Other positive trends were larger orders from the Taiwanese DRAM manufacturer and the start of Si etcher parts supply to the major domestic OEM customer.

(3) Ceramic products

Sales increased 39.3% YoY to ¥8,729mn. Machinable ceramics benefited from upbeat sales of inspection tools for automotive logic ICs and solid sales of general industrial machinery products in Japan and medical products in overseas markets. In fine ceramics, demand expanded for semiconductor film formation equipment and FPD equipment parts in Japan and stronger demand from etching equipment boosted overseas sales to a new record. The new Chinese plant opened in September 2017 is already operating at full capacity, and the Company plans to continue adding facilities as explained later.

(4) CVD-SiC products

Sales increased 59.5% YoY to ¥3,039mn*. In demand, sales of domestic and overseas semiconductor manufacturing equipment parts were healthy thanks to new investments in China. Aggressive prototyping and development of new equipment parts paid off. The Company started volume production and accelerated entry into the large parts business utilizing large facilities. It also switched to volume production of niche products to meet cutting-edge needs and entered non-semiconductor areas.

* The high YoY growth rate includes an impact from the previous fiscal year just having nine months.

(5) Wafer processing and deposition equipment

Semiconductor wafer processing sales expanded 33.9% YoY to ¥5,161mn. This business continues to operate mainstay six inch wafer facilities at full capacity of 360,000 units per month amid robust demand for analog devices, discrete devices, and power semiconductors. The Company expects to raise capacity to 400,000 wafers during 2018. EB gun and deposition equipment sales were roughly unchanged YoY at ¥3,936mn (+3.1%).

(6) Thermo module products

Sales were sluggish at a 1.0% YoY decline to ¥11,634mn. In automotive temperature-adjusting seats, while sales are growing in the Chinese market, overall demand modestly softened due to sales conditions in the US market. The Company launched an internal automotive project to address potential in EV and automated driving areas. In other industrial use, sales improved for semiconductor-wafer thermal adjustment and biotech and medical testing and industrial, consumer, and automotive power semiconductor substrates posted gains.

(7) Quartz crucibles

Sales slipped 9.4% YoY to ¥1,850mn. Photovoltaic monocrystalline crucible sales are trending lower. Semiconductor crucibles posted healthy sales for monocrystalline semiconductors amid robust demand. The Company plans to exit production of money-losing photovoltaic rectangular baths.

(8) Solar cell silicon

Sales rose 23.3% YoY to ¥13,066mn. The Company secured profitability for silicon products as a whole on last-minute demand from China through the end of 2017 and steady operating rates, mainly for monocrystalline N-type wafers. While global deployment volume grew 26% YoY to 96GW, wafer prices have been dropping in 2018 due to higher output by a major Chinese manufacturer and temporary decline in demand.

(9) Photovoltaic cells

Sales increased 13.5% YoY to ¥5,865mn, including other business, but momentum slowed, mainly in the second half of 2017, because of declines in pricing for monocrystalline and polycrystalline products. Profitability fell amid toughening competitive conditions in the PERC monocrystalline cell market, even with efforts to sustain price competitiveness by boosting efficiency.

3. Major capital investment

The Company spent ¥12,300mn on capital investments in FY3/18 (payment basis), as mentioned above. Main outlays were large-diameter wafer (eight inch) production facilities, additions to quartz product and ceramic production facilities, and a new cleaning service plant. The Company expects to keep these capital investments at high levels in FY3/19 and FY3/20, as explained below.

Business outlook

Profits likely to increase again on robust demand mainly in the semiconductor manufacturing equipment industry

High capital investments

1. FY3/19 forecast

The Company guides for ¥98,000mn in sales (+8.2% YoY), ¥9,800mn in operating profit (+16.2%), ¥8,500mn in ordinary profit (+18.8%), and ¥5,300mn in net income attributable to owners of parent (+97.9%) in FY3/19. With the prospect of continued global shortages in semiconductors for the time being, device manufacturers are actively investing and conditions are healthy at production equipment firms too. We expect upbeat results to continue for the Company as well because these semiconductor manufacturing equipment firms are its main customers and believe it is likely to attain FY3/19 guidance. Upward revisions are a possibility depending on trends.

The Company also plans to invest heavily in FY3/19 with ¥40,000mn in capital investments to lay the groundwork for expansion from FY3/20.

Business outlook

Segment sales and operating profit outlooks

(¥mn)

	FY3/18		FY3/19 forecast			
	Amount	% of sales	Amount	% of sales	Change	% change
Net sales	90,597	100.0	98,000	100.0	7,403	8.2
Semiconductor and other equipment-related business	44,150	48.7	58,710	59.9	14,561	33.0
Vacuum seals	11,761	13.0	15,000	15.3	3,239	27.5
Quartz products	11,523	12.7	13,640	13.9	2,118	18.4
Ceramics	8,729	9.6	11,500	11.7	2,771	31.7
CVD-SiC	3,039	3.4	3,000	3.1	-40	-1.3
EB guns and LED deposition systems	3,936	4.3	4,270	4.4	334	8.5
Wafer processing	5,161	5.7	7,500	7.7	2,339	45.3
Equipment parts cleaning	-	-	3,800	3.9	3,800	-
Electronic devices business	12,701	14.0	12,930	13.2	230	1.8
Thermo-electric modules	11,634	12.8	11,880	12.1	246	2.1
Ferrofluids and others	1,068	1.2	1,050	1.1	-17	-1.6
Photovoltaic-related business	20,938	23.1	16,207	16.5	-4,731	-22.6
Quartz crucibles	1,850	2.0	2,000	2.0	150	8.1
Solar-cell silicon	13,066	14.4	8,317	8.5	-4,749	-36.3
Silicon crystal manufacturing equipment	157	0.2	120	0.1	-37	-23.6
Solar cells and others	5,865	6.5	5,770	5.9	-95	-1.6
Others business	12,807	14.1	10,153	10.4	-2,655	-20.7
Gross income	24,915	27.5	27,900	28.5	2,985	12.0
SG&A expenses	16,477	18.2	18,100	18.5	1,622	9.8
Operating profit	8,437	9.3	9,800	10.0	1,363	16.2
Ordinary profit	7,157	7.9	8,500	8.7	1,343	18.8
Net income attributable to owners of parent	2,678	3.0	5,300	5.4	2,622	97.9
Capital investment	12,300	-	40,000	-	27,700	-
Depreciation	4,188	-	5,000	-	812	-

Source: Prepared by FISCO from the Company's results briefing materials

2. Outlook by segment

Below we present segment and sub-segment sales outlooks.

(1) Semiconductor equipment business: ¥58,710mn in sales (+33.0% YoY)

a) The Company expects ¥15,000mn in vacuum seal-related sales (+27.5% YoY) with sustained upbeat demand for the semiconductor manufacturing equipment vacuum process. OLED demand in the FPD market, meanwhile, is likely to face modest adjustment in 2H due to the impact of investment delays by major panel manufacturers. Outsourced processed demand should be healthy mainly in the Chinese market.

Key measures are continuing joint developments with semiconductor manufacturing equipment manufacturers, sustaining capital investments in large processing machines, strengthening ties among group members to obtain synergies, and bolstering sales in Asia.

b) The Company projects ¥13,640mn in quartz product sales (+18.4% YoY). With semiconductor-related investments likely to remain at a high level, demand for quartz products should exceed supply. Chip manufacturers are making vibrant investments in memory devices (D-RAM, 3D-NAND), IoT devices, power semiconductors, and automotive ICs. Furthermore, full-fledged investments by Chinese FAB operators should increase quartz spare parts demand from device manufacturers. The Company is receiving strong demand from major domestic and US OEM customers. It has also started supplying Si parts to the major domestic OEM and this business is likely to expand.

Key measures are significantly increasing facilities to accommodate demand from major OEM customers (plant construction started at Changshan and Dongtai sites in China) and reinforcement of development projects for the next and subsequent generations.

c) The Company expects ¥11,500mn in ceramic product sales (+31.7%). In machinable ceramics, semiconductor memory testing tool demand is sluggish, but logic demand appears vibrant in Japan. Outlooks for domestic general industrial machinery and overseas medical-related parts are healthy too. In fine ceramics, FPD equipment parts demand is likely to weaken, but the Company expects upbeat demand for semiconductor equipment parts in Japan. The overseas plan, meanwhile, targets higher sales than in 2017 due to prospect of further demand increases for film formation and etching equipment parts.

As ongoing sales policies, the Company intends to promote increased sales of high precision and high value-added products for vehicles and other areas and it is pursuing stronger sales of heat-resistant and electrical insulation parts, in addition to existing products. In fine ceramics, the Company aims to bolster production facilities and thereby increase sales in response to growing global semiconductor manufacturing equipment demand.

d) The Company forecasts roughly flat CVD-SiD product sales at ¥3,000mn (-1.3%). It expects healthy demand for semiconductor manufacturing equipment-related products in Japan and abroad accompanying new investments in China, but some sluggishness in new equipment parts already at volume output due to adoption of alternative materials. The Company plans to begin volume production of large parts and start handling coating products for usage in the group.

Key measures are strengthening production capabilities to accommodate parts demand from semiconductor manufacturing equipment manufacturers, establishing a production company for semiconductor manufacturing equipment parts and beginning volume output in Korea, and continuing aggressive entry into non-semiconductor areas.

e) The Company projects ¥4,270mn in EB gun and deposition equipment sales (+8.5% YoY), with growth still being led by communications and filter demand, mainly from the IoT application. Its main measure is promoting development of various applications for 5G communications base stations (compound semiconductor deposition equipment).

f) The Company forecasts ¥7,500mn in semiconductor wafer processing sales (+45.3% YoY), a steep increase. It already manufactures six inch wafers at a pace of 360,000 units per month and aims to increase output to 400,000 units in 2018. For eight inch wafers, it has existing operations to handle 100,000 units at the Shanghai plant, but the site is temporarily suspended due to environmental measures. The Company expects to restart this plant in June 2018. It plans to build a new plant in Hangzhou, as explained below, and establish capacity for 450,000 units per month by FY3/21.

g) Equipment parts cleaning: The Company intends to separate this business from the others segment and include it as a new sub-segment under the semiconductor equipment business from FY3/19. It expects ¥3,800mn in FY3/19 sales.

(2) Electronic devices: ¥12,930mn (+1.8% YoY)

a) The Company projects a slight rise in thermo module product sales to ¥11,880mn (+2.1% YoY). It expects sluggishness in temperature-adjusting seats to continue in automotive-related business. In other industrial areas, it projects healthy trends in semiconductor manufacturing equipment, biotech and medical testing devices, and consumer electronics.

Measures include increase in sub-assembly products and improved sales efforts (particularly in semiconductor and medical areas) and reinforcement of new module and embedded product line-ups. The Company also plans to continue capital investments in increasing output and automation and volume output investments for power semiconductor substrates.

b) The Company expects ¥1,050mn in ferrofluid and other product sales (-1.6% YoY).

(3) Photovoltaic: ¥16,207mn (-22.6% YoY)

a) The Company forecasts ¥2,000mn in quartz crucible sales (+8.1% YoY).
The outlook projects higher demand for semiconductor crucibles and increase in monocrystalline crucible sales. While it expects gains by mid-diameter crucibles in the semiconductor business, ramp-up at Chinese companies is modestly lagging. Photovoltaic large crucibles are mainly concentrated in the 28-inch large size.

As actions, the Company plans to focus on semiconductor business in pursuit of higher sales. The new dedicated semiconductor crucible plant (with clean facilities and automated assembly) should be ready in September 2018. Development efforts are addressing a large melting furnace to support 32-inch products in the near future.

b) The Company projects a steep decline in photovoltaic silicon sales to ¥8,317mn (-36.3%). It expects higher volume in N-type wafers thanks to expansion of evaluation approval. Polycrystalline products mainly go to OEM customers, and efforts focus on the facility operating rate and profitability. Volume should continue to expand globally in FY3/19, but price decline is a concern.

c) The Company expects ¥120mn in silicon crystal production equipment (-23.6% YoY), continuing the shrinkage trend.

d) The Company forecasts ¥5,770mn in cells and other product sales (-1.6%), roughly unchanged from the previous year. It expects a tougher market environment, but aims to secure operations and profits with monocrystalline and PERC OEM business in China. With volume likely to rise globally, the Company hopes to sustain prices with the high-conversion advantage of PERC technology.

(4) Others business: ¥10,153mn (-20.7% YoY)

Segment sales are likely to be weaker due to the transfer of the semiconductor manufacturing equipment part cleaning business to the semiconductor equipment segment from FY3/19*. The outlook expects roughly flat sales in other areas.

* The Company does not disclose segment profit targets.

Medium to long-term growth strategy

Planning aggressive capital investments to increase output of key products

1. Measures to achieve medium-term targets

The Company plans to conduct concentrated capital investments in areas with robust demand in order to achieve growth over the medium term. Main initiatives are listed below.

(1) Investing management resources into semiconductor and other equipment-related business: eight inch wafers, material products, cleaning business
(2) Introducing applied products into the automobile industry (electric vehicles): Applications other than automobile seats
(3) Expansion in growth of the electronic device business: Strengthen communications, medical, and domestic electrical appliances fields

The Company also intends to promote reforms in non-financial areas, such as ESG initiatives and work style reforms.

2. Main investment plans in semiconductor equipment businesses

The Company's products are used in almost all semiconductor front-end processes (pulling equipment, outsourced processing, quartz products, ceramics, CVD-SiC, equipment cleaning, vacuum seals, and silicon parts). With further expansion of the global semiconductor manufacturing equipment market expected, the Company aims to increase business by investing business resources in this area.

(1) Quartz: Increase production capacity by adding new lines
The Company plans to bolster facilities to address growing demand from major US and domestic users. It is currently building plants in Jiangsu and Zhejiang (China) that should be finished in around November 2018 and begin contributing to sales in FY3/20.

(2) Ceramics: Expanding production capacity in Japan and overseas
In Japan, the Company started operation of the Ishikawa Development Center in January 2018 and plans to strengthen development capabilities through integrated activities with the Kansai plant (located in Hyogo). With growing demand from major US and Japanese companies, the Company is setting up a No.2 building at the Jiangdong plant (Hangzhou) that should be finished in around January 2019 and begin contributing to sales in FY3/20.

(3) Equipment Contract Processing Business
The Company will establish OEM capabilities for semiconductor production equipment and other items and aims to strengthen consignment output in areas of strength.

(4) Eight inch wafers: Bolstering volume output capabilities for crystal (ingots) and at the wafer plant in China

The Company already manufactures six inch wafers at a pace of 360,000 units per month and aims to increase output to 400,000 units in 2018. For eight inch wafers, it has existing operations to handle 100,000 units at the Shanghai plant, but the site has been temporarily suspended since December 2017 due to environmental issues on request from the Chinese government. The Company is waiting for renewed approval and expects to begin output again in the latter half of FY3/19. Additionally, it plans to complete a building for additional capacity at the Hangzhou site (350,000 units) by end-2018 and start volume output during 2019 after installing equipment and conducting test production. In 2020, the Company hence should have Yinchuan ingot (six inch and eight inch) facilities plus wafer capacity of 850,000 units with 400,000 six inch wafers in Shanghai, 100,000 eight inch wafers in Shanghai, and 350,000 eight inch wafers in Hangzhou.

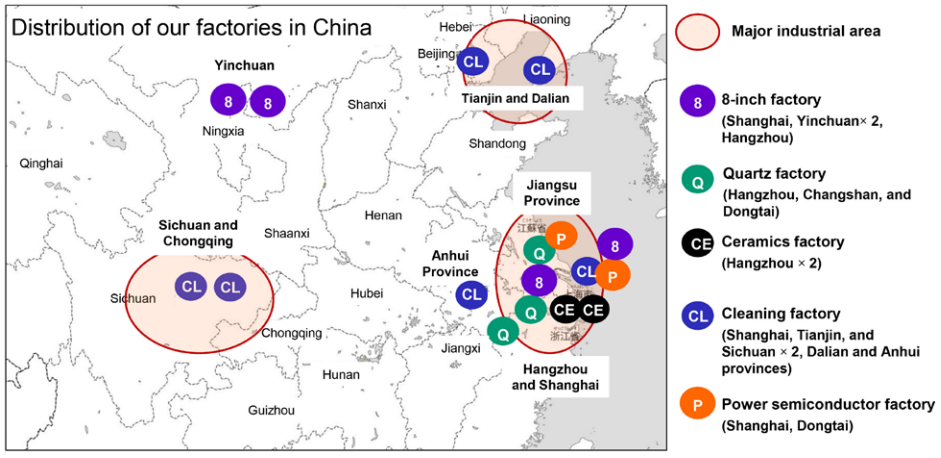
(5) Cleaning business

The Company is strengthening its cleaning business for semiconductor manufacturing equipment parts and materials that currently holds a market share of about 60% in China. This action comes in response to requests from major customers amid the shift to finer processing and 3D structures in semiconductors. Specifically, it plans to build a new cleaning plant at a fifth location in Anhui (China) with operations starting at the end of 2018 and contributions to sales in FY3/20.

The Company's major plants over the next few years are shown below based on the capital investment plan described above.

Expansion of production capacity

Decentralizing factories while developing factories in major areas, and so reducing business risks



Source: The Company's material on the medium-term growth strategy

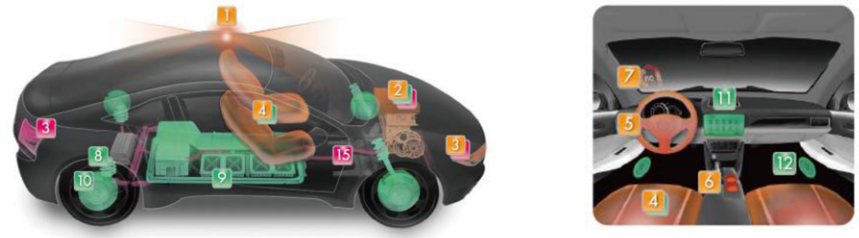
3. Strengthening automotive business

The Company expects consolidation of new technologies in automobiles and growing demand for automotive semiconductors as the EV shift proceeds. It also anticipates inclusion of many of its products in automobiles, including thermo modules, ferrofluids, and power semiconductors. Given these trends, the Company intends to bolster automotive business as a longer-term strategy. Its first initiative is formation of the "Automotive Project," an internal team, and activities started in January 2018.

Medium to long-term growth strategy

Expansion of in-car products

Mainly developing thermo-modules, magnetic fluids, and power semiconductors, etc. and making proposals for in-car mounted products suitable for further advancement



Thermo-module application	Magnetic fluids and applications	Power semiconductor substrates and applications
1 Laser radar	2 Engine suspension	2 Engine
2 Battery cooling	4 Seat suspension	**Bodies**
3 Laser headlights	8 Suspension around the foot	3 Headlamp control and room lamp control
4 Seat cooling system	9 Hzero® high-precision DC sensors for monitoring SOCs	**Powertrain**
5 Steering heater cooler	10 Hzero ® composite wheel in motor	13 HEV motor control Transmission, brake and steering control
6 Cup holder	11 Touch Panel & Center	
7 HUD (Head-up Display)	12 Audio	

← Our core technology products support a wide range of automotive products

Source: The Company's material on the medium-term growth strategy

4. Electronic devices business

The Company wants to broaden application scope of thermo modules to communications, medical, and other areas. It is also putting efforts into the development of power-generation modules. Furthermore, the Company is looking at opportunities in the industrial power semiconductor market that is likely to achieve 30% growth through 2030 (¥4trn market). It is building a power semiconductor substrate plant in Jiangsu amid strong requests from customers.

As explained above, plans call for a variety of facility additions and plant construction during FY3/19-20. We review the roadmap for this period next.

New plant implementation plan

New plant in China Operation schedule		FY3/19				FY3/20				FY3/2021				. . .
Factory	Place	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
8-inch wafer secondary line	Hangzhou					Around 1Q 2019-Completed								
Quartz	Jiangsu Province, Dongtai					Around October 2018-Completed								
Ceramics	Hangzhou						Around January 2019-Completed							
Cleaning factory	Anhui Province, Sichuan Province					Around October 2018-Completed								
DCB substrate	Jiangsu Province, Dongtai					Around July 2018-Completed								
Silicon crystal(second)	Yinchuan						Around January 2019-Completed							

Source: The Company's material on the medium-term growth strategy

5. Capital investment plans

The FY3/19 capital investment budget is ¥40,000mn, including ¥24,000mn in eight inch wafer facilities, ¥8,000mn in quartz, ¥3,000mn in power semiconductors, ¥4,000mn in cleaning plants, and the remaining ¥1,000mn in other areas.

Required funds, meanwhile, will be covered by the roughly ¥8,000mn in proceeds from corporate bond and new share issuance conducted in FY3/18, ¥5,000mn in loans received in 1H, ¥12,000mn in loans expected in 2H, ¥4,000mn in Chinese loans, ¥7,000mn from arrangement of leases for some equipment, and ¥4,000mn in surplus funds at the Chinese subsidiary.

While it might seem fairly dangerous for a company with ¥90,000mn in sales to make capital investments worth ¥40,000mn, the plan targets rapid growth that leverages current robust conditions in semiconductor and semiconductor manufacturing equipment industries. We will be closely monitoring the Company's trends.

6. Improvements in non-financial aspects too

Besides the financial growth described above, the Company is aggressively pursuing qualitative (non-financial) activities, such as ESG and work style reforms. Specific efforts are listed below.

(1) Scholarship program: Offers scholarships at Anaheim University and Zhejiang University). Promotes social contributions that support young people globally.
(2) Contributions to local society: Subsidiary Asahi Seisakusho cleans up the area around the Shonan plant and interacts with the local residents' association. Contributes to contacts with local residents and improves the environment.
(3) Personnel cultivation: Implements monthly discussions between young group employees and top executives to pass along corporate ideals and promote long-term personnel cultivation.

Shareholder return policy

Priority on aggressive capital investments for the time being

The Company pays dividends as shareholder return. It expects to pay a ¥24 annual dividend in FY3/19. While the payout ratio is just 16.8%, we think management is putting priority on profit retention (capital investments) because of plans for robust capital investments over the next few years as explained above.

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