COMPANY RESEARCH AND ANALYSIS REPORT

Ferrotec Holdings Corporation

6890

TSE JASDAQ

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Summary

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

Ferrotec Holdings <6890> (hereafter, also "the Company") manufactures vacuum seals, quartz products, ceramic products, CVD-SiC, ferrofluids, thermo-electric modules, silicon wafers, solar-cell silicon, and other various products, equipment, parts, and materials. The Company also provides cleaning service for various parts to semiconductor production equipment (SPE) manufacturers and silicon wafer polishing.

1. FY3/19 results

In FY3/19, the Company reported ¥89,478mn in net sales (-1.2% YoY), ¥8,782mn in operating profit (+4.1%), ¥8,060mn in ordinary profit (+12.6%), and ¥2,845mn in net profit attributable to parent shareholders (+6.3%). While the mainstay semiconductor and other equipment-related business sustained sales growth, overall sales slightly declined due to weakness and shrinkage in the photovoltaic related business. Operating profit continued to rise YoY thanks to the profit increase in semiconductor and other equipment-related business. Net profit attributable to parent shareholders improved over the previous year (when the Company booked an allowance for lawsuit losses), despite taking a ¥2,429mn impairment charge. We think these results were positive, even though they came in lower than period-start guidance, by delivering profit increases amid slowdown in the semiconductor industry. The Company plans to continue high-level robust capital investments.

2. FY3/20 forecast

In FY3/20 guidance, the Company targets ¥92,000mn in net sales (+2.8% YoY), ¥8,800mn in operating profit (+0.2%), ¥8,100mn in ordinary profit (+0.5%), and ¥4,700mn in net profit attributable to parent shareholders (+65.2%). It expects a rise in overall sales, even with the prospect of continued decline in photovoltaic related business sales, driven by gains in semiconductor and other equipment-related and electronic device businesses. The Company projects slightly higher profits by successfully absorbing a likely steep increase in depreciation costs (¥2.2bn) because of strong capital investments.

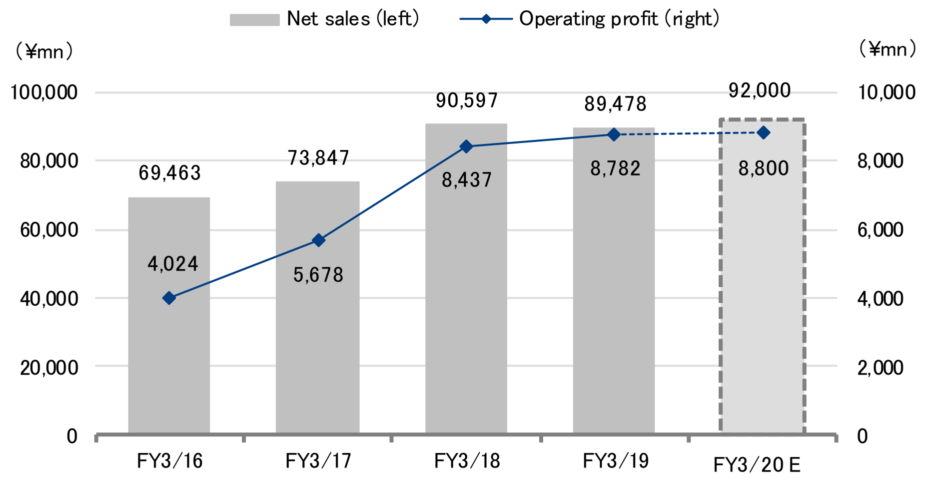
3. Longer-term outlook: Continuation of robust capital investments

While the Company has not announced clear quantitative goals, it plans to significantly expand production facilities for core products over the next few years. It revised FY3/19 capex spending slightly downward to ¥36bn (vs. the period-start plan's ¥4bn), but is likely to raise the FY3/20 budget to ¥48bn). The Company intends to quickly broaden its business scope based on an outlook for longer term continuation of strong investments in semiconductor and SPE industries, its main customers, despite recent modest slowdown. It also sees opportunities in the automotive industry and has already created an internal project team. The Company is putting efforts into ESG activities too. We think upcoming changes not only quantitatively but also qualitatively should be closely monitored.

Key Points

- Leading manufacturer of quartz, ceramic, and other inorganic products; mainly supplies the semiconductor industry
- Operating profit likely to increase 0.2% YoY in FY3/20 even with a modest slowdown in the semiconductor industry
- High capital investments at ¥48bn in FY3/20; 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 production equipment firms

1. Company profile

Ferrotec is a pure holding company with 41 consolidated subsidiaries and seven equity-method affiliates and 7,392 group employees as of March 31, 2019. 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 SPE firms. Primary customers thus are global major SPE firms. Meanwhile, the solar-cell silicon business is shrinking, and the Company ultimately plans to withdraw from those operations except for OEM supply activities.

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.

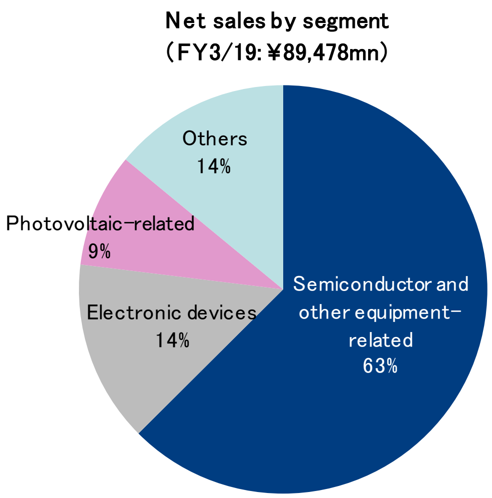
The Company listed shares through an OTC registration with the JSDA in October 1996. It now trades on the Tokyo Stock Exchange's JASDAQ (Standard) market.

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 (62.5% of overall sales in FY3/19), electronic devices business (14.4%), photovoltaic-related business (9.0%), and others business (14.0%).

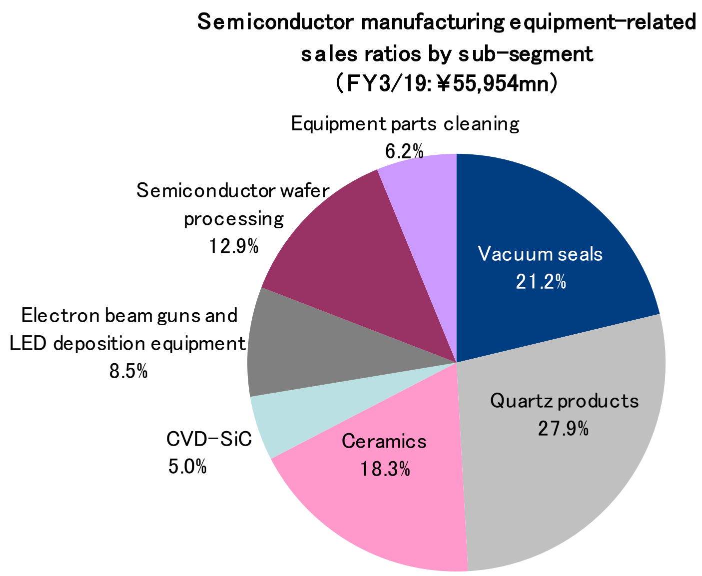


Source: Prepared by FISCO from the Company's results briefing materials

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, CVDSiC, electron-beam guns and LED deposition equipment, semiconductor wafer processing, and parts cleaning sub-segments.



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

(1) Vacuum seals (13.3% of overall sales in FY3/19)

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 (FY3/19) are semiconductors at 36%, LEDs at 11%, FPDs at 11%, solar cells at 19% and others (mainly consignment business, etc.) at 23%.

(2) Quartz products (17.4%)

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 (FY3/19) are OEM mainly to major semiconductor manufacturers at 70%, end users (device manufacturers) at 26%, optical fibers at 1%, and others at 3%. Main OEM sites are three major companies in Japan, two major companies in the US, and one company in China.

(3) Ceramics (11.4%)

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 (FY3/19) are MC semiconductor inspection at 9%, MC domestic general at 5%, MC exports at 8%, FC semiconductor equipment at 15%, FC exports at 37%, and others at 26%.

(4) CVD-SiC (3.1%)

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 (FY3/19) are China at 38%, Japan at 32%, North America at 22%, Taiwan at 4%, and Europe at 2%.

(5) Electron beam guns and LED deposition equipment (5.3%)

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 voltage 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 (8.1%)

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.

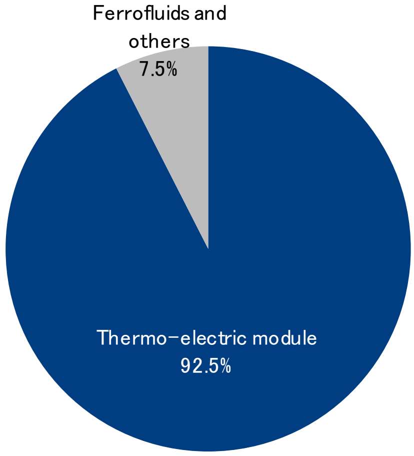
(7) Parts cleaning (3.9%)

Equipment parts cleaning business handles cleaning of SPE parts. It was included under “other related business” through FY3/18. This is an area with growth prospects.

3. Electronic devices

The electronic devices business consists of thermo-electric modules and ferrofluids and two other sub-segments.

Electronic device sales ratios by sub-segments
（FY3/19: ¥12,897mn）



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

(1) Thermo-electric modules (13.3%)

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 (FY3/19) are automotive at 19%, automotive, other at 1%, semiconductors at 17%, photology at 4%, biochemical at 10%, communications equipment at 8%, scientific areas at 4%, consumer at 15%, power device substrates at 18%, and others at 4%.

(2) Ferrofluids and others (1.1%)

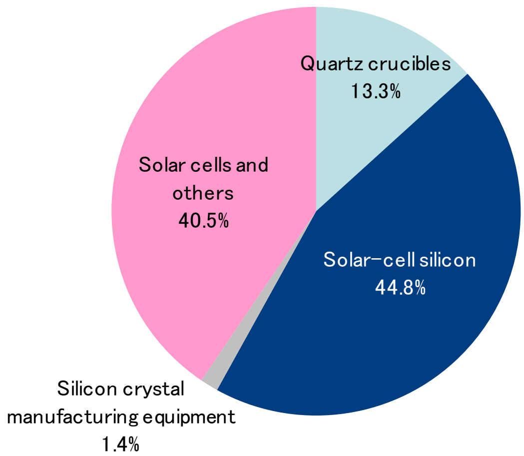
Ferrofluids are a functional liquid material that is magnetically affected by external magnetic fields and is attracted to magnets. The NASA space program in the 1960s developed ferrofluids for the purpose of transporting fuel in a zero-gravity environment. Today they are utilized in speakers, actuators,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

Other businesses include power semiconductor substrates. They 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 segment consists of quartz crucibles, solar-cell silicon, silicon crystal production equipment, and cells and other business. The Company is currently shrinking this business and ultimately plans to exit it, other than OEM supply activities.

Photovoltaic-related sales ratios by sub-segments
(FY3/19: ¥8,083mn)



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

(1) Quartz crucibles (1.2%)

The Company uses the same high-purity raw materials which are essential for the quartz products used in the semiconductor production process for its quartz crucibles, and the crucibles are used as containers to replenish single-crystal silicon raw material. Main customers are manufacturers of single-crystal silicon used in semiconductors, solar cells, and other applications. The Company aims to generate profits by raising the share of sales to semiconductor customers. It therefore moved the segment to semiconductor and other equipment-related business in FY3/20.

(2) Solar-cell silicon (3.7%)

The process for making crystallized ingots is melting raw silicon material at a high temperature and then gradually cooling it. Using its own facilities, the Company manufactures not only single-crystal ingots with regular atomic arrangement that delivers excellent power generation performance, but also multi-crystal ingots that are highly economical and offer excellent production efficiency. It slices these ingots with a fixed-abrasive wire saw and makes thinly sliced single-crystal wafers. However, it intends to steadily shrink and exit this business.

(3) Silicon crystal manufacturing equipment (0.0%)

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 (1.6%)

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 (12.4%)

This business covers various consignment tasks. While cleaning SPE parts and other related tasks were booked in this sub-segment up until FY3/18, the Company moved them to the semiconductor and other equipment-related segment in 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 SPE 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 SPE manufacturers because its products are primarily utilized in SPE 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 SPE manufacturers with products and parts over many years. We believe its deep trust relationships with these customers are assets and strength.

Business performance

Sales and profits are increasing on continuation of robust demand from the semiconductor industry

1. Review of FY3/19 results

(1) Earnings

In FY3/19, Ferrotec reported ¥89,478mn in net sales (-1.2% YoY), ¥8,782mn in operating profit (+4.1%), ¥8,060 mn in ordinary profit (+12.6%), and ¥2,845mn in net income attributable to owners of parent (+6.3%).

The semiconductor and other equipment-related business booked higher sales as a segment, despite slowdown in capital investments (production equipment) in 2H, thanks to healthy consumables business. Electronic device business posted higher sales, even with a downward trend in device sales for automobiles with temperature-controllable seats, because of upbeat sales of power semiconductor substrates. Photovoltaic related business reported sharply lower sales as the Company shrinks this area. Other related business delivered higher sales on increase in consignment task (semiconductor production equipment, etc.) tasks.

Overall gross margin improved to 30.3% (vs. 27.5% in FY3/18), and gross profit reached an all-time high of ¥27,137mn (+8.9% YoY). SG&A expenses climbed by ¥1,876mn (11.4%) due to expansion of the Company's businesses, though mainly from a ¥1,009mn rise in testing and research costs and a ¥600mn increase in personnel costs. Operating profit rose 4.1% based on these trends. Ordinary profit, meanwhile, increased at a faster pace than operating profit because non-operating revenue added ¥384mn YoY, mainly on increase in equity-method investment profit, and non-operating expenses dropped by ¥172mn on decline in forex losses and changes. Net profit attributable to parent shareholders increased 6.3% mainly because of booking impairment losses for photovoltaic related business (¥2,429mn).

Ferrotec booked large capital investments totaling ¥35,953mn (compared to ¥12,300mn in FY3/18), mainly because of capital investments at the Chinese subsidiaries, while depreciation costs were ¥5,755mn (¥4,188mn).

FY3/19 results

(¥mn, %)

	FY3/18		FY3/19			
	Amount	Composition ratio	Amount	Composition ratio	Change	% change
Net sales	90,597	100.0	89,478	100.0	-1,120	-1.2
Gross profit	24,915	27.5	27,137	30.3	2,222	8.9
SG&A expenses	16,477	18.2	18,354	20.5	1,876	11.4
Operating profit	8,437	9.3	8,782	9.8	346	4.1
Ordinary profit	7,157	7.9	8,060	9.0	902	12.6
Net income attributable to owners of parent	2,678	3.0	2,845	3.2	168	6.3
Capital investment	12,300	13.6	35,953	40.2	23,653	192.3
Depreciation	4,188	4.6	5,755	6.4	1,567	37.4

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

Cash and deposit holdings rose due to corporate bond and share issuances and tangible fixed assets grew too

(2) Financial condition

In financial standing at the end of FY3/19, the Company reported ¥77,271mn in current assets (up ¥10,445mn from the end of the previous fiscal year), mainly on increases of ¥7,907mn in cash and deposits, ¥760mn in notes and accounts receivables, and decrease of ¥497mn in inventories. Fixed assets climbed ¥34,196mn from the end of previous fiscal year to ¥85,827mn with additions of ¥32,592mn to tangible fixed assets primarily from capital investments, ¥635mn to intangible fixed assets, and ¥970mn in investments and other assets. Total assets hence grew by ¥44,641mn to ¥163,098mn.

Liabilities rose by ¥46,605mn from the end of the previous fiscal year to ¥113,250mn, mainly on increases of ¥2,468 in notes and accounts payable, ¥7,458mn in short-term debt, including current portion of long-term borrowings, ¥8,807mn in bonds, and ¥18,027mn in long-term debt. Net assets were declined by ¥1,964mn from the end of the previous fiscal year to ¥49,848mn with gains of ¥2,011 mn in retained earnings from net income attributable to owners of parent and a decrease of ¥3,704mn in foreign currency translation adjustment.

Consolidated balance sheet

(¥mn)

	End of FY3/18	End of FY3/19	Change
Cash and deposit	23,648	31,555	7,907
Notes and accounts receivable	20,700	21,460	760
Inventories	16,773	16,276	-497
Total current assets	66,826	77,271	10,445
Tangible fixed assets	43,541	76,133	32,592
Intangible fixed assets	2,922	3,557	635
Investments and other assets	5,166	6,136	970
Total fixed assets	51,631	85,827	34,196
Total assets	118,457	163,098	44,641
Notes and accounts payable	18,419	20,887	2,468
Shot-term debt	5,874	9,603	3,729
Current portion of long-term borrowings	5,055	8,784	3,729
Total current liabilities	43,477	60,180	16,703
Bonds	2,418	11,225	8,807
Long-term debt	11,478	29,505	18,027
Total fixed liabilities	23,167	53,069	29,902
Total liabilities	66,645	113,250	46,605
Net assets	51,812	49,848	-1,964

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

(3) Cash flow conditions

Cash flow provided by operating activities during FY3/19 was ¥11,466mn. Major inflows include income before income taxes of ¥5,642mn, depreciation of ¥5,755mn and a ¥1,543 increase in accounts payable. Major outflows include a ¥2,057mn increase in notes and accounts receivable and a ¥157mn in inventories. Cash flow used in investing activities was ¥37,063mn, mainly due to ¥34,810mn in purchase of property, plant and equipment. Cash flow provided by financing activities was ¥34,507mn, with ¥25,825mn inflow from an increase in long-term debt, proceeds from the issuance of bonds of ¥10,001mn, versus outflows of ¥887mn in payments for dividend.

As a result, the balance of cash and cash equivalents increased ¥7,906mn to ¥31,555mn in FY3/19.

Cash flow statement

(¥mn)

	FY3/18	FY3/19
Cash flow from operating activities	9,946	11,466
Income before income taxes	5,501	5,642
Depreciation	4,188	5,755
Changes in notes and accounts receivable (-: increase)	-2,435	-2,057
Changes in inventories (-: increase)	-2,604	-157
Changes in accounts payable (-: decrease)	3,931	1,543
Cash flow from investing activities	-12,388	-37,063
Purchase of property, plant and equipment	-11,087	-34,810
Cash flow from financing activities	10,830	34,507
Changes in short-term debt and long-term debt	90	25,825
Proceeds from the issuance/redemption of bonds	2,951	10,001
Proceeds from the issuance of stock	8,712	5
Cash dividends paid	-811	-887
Changes in cash and cash equivalents	8,810	7,906
Cash and cash equivalents, end of year	23,648	31,555

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

2. Segment overview

In segment results, sales and profits increased to ¥55,954mn in sales (+19.9% YoY) and ¥9,187mn in operating profit (+22.5%) for mainstay semiconductor and other equipment-related and ¥12,897mn in sales (+1.5%) and ¥2,366mn in operating profit (-21.3%) for electronic devices. Photovoltaic-related sales decreased 61.4% to ¥8,083mn and operating loss was ¥1,659mn (vs. a ¥1,593mn loss a year earlier) due to booking inventory valuation losses and other factors. The others business booked ¥12,544mn in sales (+21.8% YoY) and a ¥312mn operating loss (vs. a ¥429mn loss a year ago).

Segment sales and operating profit

(¥mn, %)

	FY3/18		FY3/19			
	Amount	Composition ratio	Amount	Composition ratio	Change	% change
Net sales	90,597	100.0	89,478	100.0	-1,120	-1.2
Semiconductor and other equipment-related business	46,662	51.5	55,954	62.5	9,292	19.9
Vacuum seals	11,761	13.0	11,889	13.3	128	1.1
Quartz products	11,524	12.7	15,590	17.4	4,066	35.3
Ceramics	8,729	9.6	10,221	11.4	1,492	17.1
CVD-SiC	3,039	3.4	2,800	3.1	-239	-7.9
EB guns and LED deposition systems	3,936	4.3	4,750	5.3	814	20.7
Wafer processing	5,162	5.7	7,236	8.1	2,074	40.2
Parts cleaning	2,511	2.8	3,468	3.9	957	38.1
Electronic devices business	12,701	14.0	12,897	14.4	196	1.5
Thermo-electric modules	11,633	12.8	11,930	13.3	297	2.6
Ferrofluids and others	1,068	1.2	967	1.1	-101	-9.5
Photovoltaic-related business	20,939	23.1	8,083	9.0	-12,856	-61.4
Quartz crucibles	1,851	2.0	1,072	1.2	-779	-42.1
Solar-cell silicon	13,066	14.4	3,620	4.0	-9,446	-72.3
Silicon crystal manufacturing equipment	157	0.2	116	0.1	-41	-26.1
Solar cells and others	5,865	6.5	3,275	3.7	-2,590	-44.2
Others business	10,296	11.4	12,544	14.0	2,248	21.8
Operating profit	8,437	9.3	8,782	9.8	346	4.1
Semiconductor and other equipment-related business	7,497	-	9,187	-	1,689	22.5
Electronic devices business	3,007	-	2,366	-	-641	-21.3
Photovoltaic-related business	-1,593	-	-1,659	-	-66	-
Others business	-429	-	-312	-	-118	-27.4
Adjustment value	-45	-	-799	-	-754	-

Note: The Company booked “parts cleaning” under “others” in FY3/18 and under “semiconductor and other equipment related business” from FY3/19.
Source: Prepared by FISCO from the Company's results briefing materials

Below we review conditions in the major sub-segments.

(1) Vacuum seals business

Net sales totaled ¥11,889mn (+1.1% YoY). SPE-related (mainly vacuum process) business slowed in 2H and OLED-related and LCD-related business (FPD market) slipped in 2H due to the impact of delayed investments by Korean and Chinese manufacturers. The business sustained a sales increase with support from relatively healthy income in 1H.

(2) Quartz products

Net sales totaled ¥15,590mn (+35.3%), a vibrant result. Semiconductor capital investments were upbeat in 1H, but slowed in 2H. Demand for quartz consumables parts from semiconductor end users (device manufacturers), meanwhile, was relatively positive and sales volumes for Si parts and Si boards used in high-temperature processes expanded. Additionally, the Company started volume production and delivery of Si etcher parts for a major domestic production equipment manufacturer. These trends fueled sharply higher sales (YoY).

(3) Ceramic products

Net sales amounted to ¥10,221mn (+17.1%). In machinable ceramics, while overseas sales of semiconductor inspection jig materials and medical-related parts were upbeat, domestic sales of semiconductor inspection jig materials stalled. In fine ceramics, sales to etching equipment and film formation equipment applications in Japan slowed during 2H, while sales to the etching equipment application in overseas markets was healthy. Overall trends were strength in overseas business and weakness in domestic business.

(4) CVD-SiC products

Net sales totaled ¥2,800mn (-7.9%). Sales of SPE parts and materials were generally healthy in Japanese and overseas markets, but modestly lost momentum toward the end of the fiscal year. Demand for high-purity, heat-resistant parts and materials increased in SiC epitaxial equipment business.

(5) Wafer processing and parts cleaning

Semiconductor wafer processing sales totaled ¥7,236mn (+40.2%). Mainstay six-inch wafers sustained high utilization from 2Q amid healthy market conditions, following establishment of operations that support 400,000 wafers a month during 1H. In eight-inch wafers, the Company resumed production in July 2018, established operations to handle 100,000 wafers a month by year-end (December), and booked ¥832mn in 4Q sales.

Parts cleaning* sales grew at a healthy pace with a 38.1% YoY increase to ¥3,468mn.

> * The Company booked "parts cleaning" under "others" through FY3/18 and under "semiconductor and other equipment-related business" from FY3/19.

(6) Thermo-electric module products

Sales were sluggish with a 2.6% YoY increase to ¥11,930mn. In the automotive business, products for temperature-controllable seats incurred slightly weaker sales conditions in the US market. The Company launched automotive project activities to expand sales of TE applied products for automobiles. It is also starting volume production for cup holders and other auto applications.

SPE and wafer cooling applications performed well in other industry business. The Company is broadening scope to consumer and biomedical areas. Optical communications and 5G investments supported upbeat momentum in communications related business. Power substrates had a 38% increase in sales (YoY) on reinforcement of production capacity.

(7) Quartz crucibles

Net sales weakened to ¥1,072mn (-42.1%). Sales of single-crystal crucibles for photovoltaic use dropped from the latter half of 1H due to the impact of subsidy policy revision by the Chinese government. Semiconductor crucibles, meanwhile, realized higher sales of single-crystal crucibles. The Company ended production and sales of multi-crystal square-shaped vessels. This resulted in a steep YoY decline in segment sales. The Company plans to concentrate on high value-added semiconductor use and narrow the photovoltaic-use business to certain large-diameter business. It thus moved this segment to the semiconductor and other equipment-related business in FY3/20.

(8) Solar cell silicon

Net sales fell significantly to ¥3,620mn (-72.3%). The primary reason was hefty decline in the market price because of reduced demand and tougher competition amid dramatic market changes since the Chinese government revised its solar cell policy (531 new policy; revision to subsidy policy). As a result, the Company's business has been incurring losses since the latter half of 1H and booked inventory valuation losses. It thus reported a major loss.

(9) Photovoltaic cells

Sales, including other business, were down 44.2% YoY to ¥3,275mn. Losses widened in the latter half of 1H because of rapid market shrinkage and steep price decline following China's "531 Policy" rollout. The Company hence has gradually shifted to OEM (processing fee business) in an effort to improve profitability.

3. Major capital investment

The Company spent ¥35,953mn on capital investments in FY3/19 (vs. ¥12,300mn in the previous year). Key investments include production facilities (worth of ¥18,563mn) for large-diameter wafers (8-inch), facility additions to enhance production of quartz products and ceramics, and a new plant for cleaning services. The Company expects to keep these capital investments at high levels in FY3/19 and FY3/20, as explained below.

Business outlook

Expecting slowdown in SPE industry business, but continuation of sales gains in wafer processing and equipment parts cleaning

1. FY3/20 forecast

In FY3/20 guidance, the Company targets ¥92,000mn in net sales (+2.8% YoY), ¥8,800mn in operating profit (+0.2%), ¥8,100mn in ordinary profit (+0.5%), and ¥4,700mn in net profit attributable to parent shareholders (+65.2%). It expects a slight rise in overall sales, even with the prospect of continued decline in photovoltaic related business sales, driven by gains in semiconductor and other equipment-related and electronic device businesses.

The Company intends to sustain high capital investments at ¥48,000mn (vs. ¥35,953mn in FY3/19) and factors in a significant rise in depreciation costs to ¥8,000mn (+39.0% YoY). Operating profit hence should remain roughly flat.

Segment sales and operating profit outlooks

(¥mn, %)

	FY3/19		FY3/20 E			
	Amount	Composition ratio	Amount	Composition ratio	Change	% change
Net sales	89,478	100.0	92,000	100.0	2,522	2.8
Semiconductor and other equipment-related business	55,954	62.5	60,800	66.1	4,846	8.7
Vacuum seals	11,889	13.3	8,500	9.2	-3,389	-28.5
Quartz products	15,590	17.4	16,800	18.3	1,210	7.8
Ceramics	10,221	11.4	10,200	11.1	-21	-0.2
CVD-SiC	2,800	3.1	2,600	2.8	-200	-7.1
EB guns and LED deposition systems	4,750	5.3	3,800	4.1	-950	-20.0
Wafer processing	7,236	8.1	10,500	11.4	3,264	45.1
Parts cleaning	3,468	3.9	6,600	7.2	3,132	90.3
Quartz crucibles *	1,072	1.2	1,800	2.0	728	67.9
Electronic devices business	12,897	14.4	14,900	16.2	2,003	15.5
Thermo-electric modules	11,930	13.3	13,700	14.9	1,770	14.8
Ferrofluids and others	967	1.1	1,200	1.3	233	24.1
Photovoltaic-related business	8,083	9.0	4,900	5.3	-3,183	-39.4
Solar-cell silicon	3,620	4.0	3,400	3.7	-220	-6.1
Silicon crystal manufacturing equipment	116	0.1	0	0.0	-116	-100.0
Solar cells and others	3,275	3.7	1,500	1.6	-1,775	-54.2
Others business	12,544	14.0	11,400	12.4	-1,144	-9.1
Gross profit	27,137	30.3	28,062	30.5	925	3.4
SG&A expenses	18,354	20.5	19,262	20.9	908	4.9
Operating profit	8,782	9.8	8,800	9.6	17	0.2
Ordinary profit	8,060	9.0	8,100	8.8	40	0.5
Net income attributable to owners of parent	2,845	3.2	4,700	5.1	1,854	65.2
Capital investment	35,953	-	48,000	-	12,047	33.5
Depreciation	5,755	-	8,000	-	2,245	39.0

Note: Quartz crucibles moved from the photovoltaic related segment to the semiconductor and other equipment-related segment in FY3/20
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 and other equipment-related business: ¥60,800mn in sales (+8.7% YoY)

a) The Company expects ¥8,500mn in sales for the vacuum seals business (-28.5% YoY). Demand for the SPE-related business might weaken due to the impact of delays in memory investments. Demand is likely to be weak for both OLEDs and LCDs in the FPD market. The Company aims to maintain operating rates through recruitment of consignment processing demand in areas other than solar cells and SPE.

Key measures are continued joint development with SPE manufacturers and capex in large processing equipment, generating synergies via better relationships among group companies, and bolstering sales in China utilizing existing channels and brands of group companies.

b) The Company expects ¥16,800mn in sales for quartz products (+7.8%). While SPE investment has recently slowed, mainly in memory-related areas (DRAM, 3D-NAND), the Company projects a recovery in 2020 (4Q). Market conditions are solid for quartz products that have a high percentage of consumables business. Sales of Si pots and Si parts used in the miniaturization high-temperature process should increase too.

The Company significantly expanded facilities to accommodate OEM demand from major customers (it operates Changshan and Dongtai plants in China). It is strengthening initiatives for next-generation and subsequent generation development projects too. (It launched a development site in Yamagata in Japan and started operating a plant for next-generation development products in May 2019.)

c) The Company targets ¥10,200mn in ceramic product sales (-0.2% YoY). In machinable ceramics, it anticipates recovery in domestic semiconductor inspection jigs and also growth in business for a new jig type related to process migration. Sales for general industrial use should remain healthy. In fine ceramics, it expects upbeat sales of parts for semiconductor film formation equipment in Japan, but sees weakness in overseas film formation equipment.

As ongoing sales policy, the Company focuses on sales of new jigs related to process migration as well as sales expansion for machinable ceramics with high-performance properties in machinable ceramics business. It aims for broad sales of SPE parts and general industrial machinery parts in Japan and overseas markets in fine ceramics business.

d) The Company projects slightly lower CVD-SiC product sales at ¥2,600mn (-7.1%). In SPE-related parts and materials for Japanese and overseas markets, it forecasts weakness in 1H due to investment delays, inventory adjustments, and other impacts and then recovery in 2H. In high-purity, heat-resistant parts and materials for SiC epitaxial equipment, it expects a healthy trend and further increases in 2020.

As measures, the Company plans to expand sales of SPE-related consumable parts and materials and develop production operations. It will focus on new adoption by Japanese and Chinese SPE manufacturers and also bolster development and prototyping operations in the SiC semiconductor area.

e) The Company forecasts ¥10,500mn in semiconductor wafer processing sales (+45.1%). In six-inch wafers, it already has operations to process 400,000 wafers a month and intends to sustain a high utilization rate. In eight-inch wafers, it aims to increase full-year sales based on the Shanghai plant (100,000 wafers a month). It plans to install and ramp up machinery and equipment at the new plant in Hangzhou and build operations with a monthly processing capacity of 450,000 wafers (including the existing 100,000-wafer capacity) by FY3/21.

f) Parts cleaning: The Company has separated this business from the others segment and includes it as a new sub-segment under the semiconductor and other equipment-related business from FY3/19 (+90.3% YoY). It expects ¥6,600mn in FY3/20 sales. The Company intends to further bolster production capacity with a new base in Anhui and a second plant in Neijiang, Sichuan for further production capacity.

g) The Company expects ¥1,800mn in quartz crucible sales (+67.9% YoY), and quartz crucible products will be transferred to this segment from FY3/20. Sales for semiconductor plants are vibrant, including growth in large crucibles applied to eight-inch wafers. Semiconductor business is becoming the main area for crucibles from FY3/20. Gross profit has been rising thanks to high added value of these products. The Company is just selling large-diameter products for solar cells.

As actions, the Company plans to focus on semiconductor business in pursuit of higher sales. Construction was completed on a new building for the dedicated semiconductor crucible plant (with clean facilities and automated assembly) and it commenced operation. Development efforts are addressing a large melting furnace to support 32-inch products in the near future. The Company hopes to begin mass production as soon as 2H 2019.

(2) Electronic devices: ¥14,900mn (+15.5% YoY)

a) The Company expects recovery by thermo-electric module product sales to ¥13,700mn (+14.8%). In automotive business, it expects demand from temperature-controllable seats to remain sluggish and intends to develop products for next-generation automobiles. In other industry business, it anticipates rising demand for 5G and other communications equipment. It also intends to continue reinforcing output capacity for power semiconductor substrates on the prospect of growing demand.

As measures, it aims to conduct sales expansion activities worldwide for TE sub-assembly products and strengthen development of new automotive applications. It also plans to reinforce development of new silicon nitride and aluminum nitride materials for power semiconductor substrates.

b) The Company expects ¥1,200mn in ferrofluid and other product sales (+24.1% YoY).

(3) Photovoltaic-related: ¥4,900mn (-39.4% YoY)

b) The Company forecasts a modest decline in solar-cell silicon sales to ¥3,400mn (-6.1% YoY). It has decided to restrict itself to OEM (this avoids valuation losses due to being a processing fee business) because of the prospect of market prices remaining at a low level and to place emphasis on the operation rate and profitability.

As measures, it intends to increase quality in OEM products and promote low oxygen products and thinner slicing. It also aims to exit production and clear inventories of money-losing products and eliminate idle equipment. Additionally, the Company plans to shrink external sales (zero sales) of silicon crystal production equipment and promote in-house business for semiconductor use.

b) The Company projects sharply lower sales in cells and other business at ¥1,500mn (-54.2%). The outlook factors in continued low pricing and curtailment to just OEM business. Management is also looking for the right timing to exit OEM production too in the future.

(4) Other business: ¥11,400mn (-9.1 YoY)

Since the Company moved SPE-related equipment parts cleaning business to the semiconductor and other equipment-related business in FY3/19, this segment currently mainly obtains income from subsidiary Asahi Seisakusho's linen detergent and machine assembly businesses.

3. Capital investments and depreciation costs

The Company budgets ¥48,000mn in capital investments for FY3/20, with about ¥41,000mn for investments in middle-diameter and large-diameter wafers and the rest comprised of ¥1,000mn for power semiconductors, ¥2,000mn for quartz products (mainly Yamagata), ¥1,500mn for cleaning (China), and about ¥2,500mn for others. It expects depreciation costs to increase from ¥5,755mn in FY3/19 to ¥8,000mn.

The Company's plan for funding heavy capital investments consists of ¥8,000mn in depreciation, roughly ¥18,000mn in operating cash flow and surplus funds, ¥7,000mn in Chinese subsidies, and ¥15,000mn in new loans.

Medium- to long-term growth strategy

Aiming for ¥12.5bn in FY3/22 OP after aggressive capital investments to raise output of key products

1. Overview of medium-term management goals

The Company announced medium-term management goals with FY3/22 as the final year as it aims for medium-term growth. Below we review these goals.

(1) Outline of medium-term management goals

Results: Over ¥120bn in final fiscal-year net sales

Product strategy: Improvements to the business portfolio

- Shifting photovoltaic related business to just consumable sales
- Investing resources in upbeat semiconductor-related products and strengthening recurring business and automotive business

Capital investments: Investing ¥71bn over three years with the peak in FY3/20

Shareholder return: Plans to consider dividend hikes as profits increase

(2) Quantitative goals (FY3/22): Disclosed in ranges due to uncertainty in the semiconductor market

Net sales: ¥120-130bn

Operation profit: ¥120-130bn

Operating margin: Over 10%

ROE: Over 10%

ROIC: Over 6%

Equity ratio: Over 40%

(3) Product strategy: Focusing on four strategic products (semiconductor materials*), wafers, power semiconductors, and cleaning) and aiming to sharply increase sales

Product strategy

(¥bn)

	Current sales (FY3/19)	Final fiscal year (FY3/22)	Growth rate
Semiconductor materials	28.6	38.1	33.2%
Wafers	7.2	28.2	291.6%
Power semiconductors	2.0	7.0	250.0%
Cleaning	3.5	8.5	142.9%

* Semiconductor materials = Total of SPE jigs, consumable quartz and silicon parts, ceramics, and CVD-SiC
Source: Prepared by FISCO from the Company's medium-term growth strategy briefing materials

2. Strategic product 1: Semiconductor materials

Semiconductor materials with constant demand as consumables are doing well. The Company intends to expand production capacity by adding lines.

(1) Quartz: Increase production capacity by adding new lines

Quartz products are a particularly robust area in materials business. The Company hence intends to expand output capacity in order to meet growing demand. It already finished plants in Jiangsu and Zhejiang (China) in October 2018 and built the new Ferrotec Alion plant in Yamagata. It expects full-fledged sales contributions from these sites 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. Strategic product 2: Wafer business

(1) Progress with middle-diameter (eight-inch) wafers in China

The Company has already begun volume production of middle-diameter (eight-inch) wafers at a Shanghai plant and started sales with operations for processing 100,000 wafers a month. It is currently building a facility at the Hangzhou plant that should be ready during FY3/20 and plans to start volume production in FY3/21. Semiconductor materials with constant demand as consumables are doing well. The Company intends to expand production capacity by adding lines.

(2) Monthly output volume goal: Major investments in middle-diameter (eight-inch) and large-diameter (12-inch) wafers

The Company plans to invest about ¥45.7bn in middle-diameter and large-diameter wafer facilities over the three years through FY3/22 in light of longer-term needs. It is aiming for operations with combined monthly processing for large, middle, and small wafers of 880,000 wafers by FY3/22.

(3) Sales plan: Targeting ¥28.2bn in the final fiscal year

The Company is targeting ¥28.2bn in final fiscal-year sales by ramping up volume production of middle-diameter (eight-inch) wafers. It also intends to reinforce output of large-diameter wafers in preparation for longer-term market needs.

(4) Expects to realize profitability in the next three years

Wafer business profits fluctuate with global prices. The Company has been aggressively building plants since last year (2018). Due to recent price decline, however, it anticipates profitability for eight-inch wafer business in the final fiscal year of the medium-term plan (FY3/22) and 12-inch wafer business in around FY3/24. It hopes to promptly achieve profitability through an increase in the average price by improving quality and cost savings on decline in COGS.

4. Strategic product 3: Cleaning business

(1) Production operations and sales plan

The Company completed a new site in Anhui and a second line at Neijiang (Sichuan) in China, giving it six plants at five locations. It also intends to review further new sites in light of semiconductor and FPD markets. The plan calls for expansion of sales by 159% in three years from now, mainly with recurring business.

5. Strategic product 4: DCB power semiconductor substrates

(1) Production operations and sales plan

The Company forecasts expansion of the global power semiconductor market from ¥2.4trn in 2016 to ¥3.1trn in 2025. In particular, it expects growing demand in automobile and machine tool areas and intends to strengthen production operations. While it has already finished a new plant in Jiangsu, it plans to launch another new plant in Dongtai. Longer-term plans call for volume production of silicon nitride and aluminum nitride substrates, in addition to existing alumina ceramic substrates, and ¥7,000mn in sales in FY3/22 (255% increase versus FY3/19).

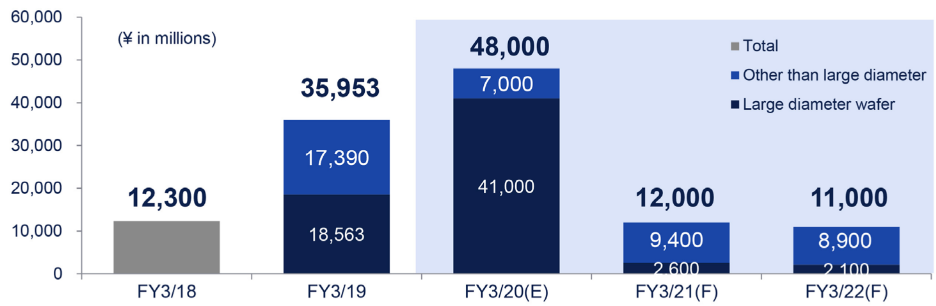
6. Capital investment plans and Financial indicator

(1) Capital investment plans

The Company has prepared a massive capital investment budget totaling ¥71,000mn for the next three years. By fiscal year, it intends to spend ¥48,000mn in FY3/20 (including ¥41,000mn on middle- and large-diameter wafer facilities), ¥12,000mn in FY3/21 (¥2,600mn), and ¥11,000mn in FY3/22 (¥2,100mn). This budget puts the peak in capex outlays in FY3/20.

In terms of content, the budget mainly targets silicon wafers (eight-inch and 12-inch wafers), but also arranges ongoing investments in semiconductor materials (quartz, ceramics, and silicon) and cleaning business as strategic areas.

Capital investment plans



Prepared by FISCO from the Company's medium-term growth strategy briefing materials

(2) Financial indicator goals: Over 6% ROIC, over 10% ROE

Below we present the Company's financial indicator goals for the next three years (medium-term business plan).

Medium-term growth strategy

			New Medium-term Management Plan		
	FY3/18	FY3/19	FY3/20(E)	FY3/21(F)	FY3/22(F)
ROIC*	**8.4%**	**6.0%**	**4.3%**	**4.4%**	**6.0%**
ROE	5.2%	5.7%	9.2%	8.7%	10.8%
ROS*	7.9%	9.0%	8.9%	7.5%	8.0%
CAPEX(¥ in millions)	12,300	35,953	48,000	12,000	11,000
Growth stage	Expansion				Stable

ROIC improvement measures:
① Cost reductions (production shifts in key business divisions to the Dongtai and Changshan factories, where manufacturing costs are low)
② Reduce working capital (reduce company-wide inventories by 10%)
③ Improve production efficiency (promote company-wide automation)

※ ROIC = Operating income (1-effective tax rate)/(Working capital + Fixed assets)
ROS = Ordinary income ÷ Net sales × 100

Prepared by FISCO from the Company's medium-term growth strategy briefing materials

The Company anticipates temporary decline in ROIC and ROE values through FY3/21 due to major capex outlays, primarily in large-diameter wafers. It expects improved ROIC from FY3/21 thanks to decline in capital investments, pick-up in various businesses, and implementation of various reform measures.

Specific ROIC improvements are 1) lower COGS (shifting production for major business divisions to Dongtai and Changshan plants with low manufacturing costs), reduction in working capital (10% cutback in companywide inventories), and 3) better production efficiency (promoting companywide automation).

7. Improvements in non-financial aspects

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

Near-term priority on aggressive capital investments, though likely to raise dividends in the future

The Company pays dividends as its shareholder return policy. The FY3/19 annual dividend was ¥24, and it plans to pay ¥24 again in FY3/20 (18.9% estimated dividend payout ratio). We think the Company is likely to give priority to retained profits (capital investments) for the next few years because of its large capex budget as explained above. Nevertheless, since the new medium-term management plan outline lists "review of dividend hikes as profits increase," we think the Company is likely to raise the dividend when earnings improve.

FISCO

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