COMPANY RESEARCH AND ANALYSIS REPORT

RS Technologies

3445

Tokyo Stock Exchange First Section

20-Oct.-2020

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Summary

Earnings are forecast to return to a growth track from 2021, following a temporary downturn as a Chinese subsidiary relocates production lines in the latter half of 2020

RS Technologies <3445> (hereafter, also "the Company") is a top provider of reclaimed silicon wafers, a major material for semiconductor chips. It has factories in Japan and Taiwan and the largest global market share with approximately 33% (the Company's estimate) in mainstay 12-inch reclaimed wafers (300 mm). In 2018, the Company entered the integrated manufacturing business of prime wafers in China to aim for the acceleration of growth with two pillars including reclaimed wafers.

1. Results for FY12/20 1H surpassed initial forecasts due to stronger-than-anticipated demand

In the FY12/20 1H consolidated results (January to June 2020), net sales increased 1.1% year-on-year (YoY) to ¥12,653mn, while operating income decreased 6.3% YoY to ¥2,580mn. Both net sales and operating income finished the period above the Company's initial plans (net sales of ¥11,200mn and operating income of ¥1,400mn). Considering the impact of the economic slowdown due to U.S.-China trade friction and the spread of coronavirus disease 2019 (COVID-19) (hereafter, "the COVID-19 pandemic"), the Company had anticipated a sluggish performance in the prime silicon wafer manufacturing and sales segment. However, business performance did not deteriorate as much as anticipated because of continued demand growth, including moves by customers to build up inventories throughout FY12/20 1H. Production also increased due to capital investment against the backdrop of surging demand from customers in the silicon wafer reclaim business in Japan and Taiwan. These factors led to above-plan net sales and operating income.

2. New China plant to start operations in earnest one month behind schedule in November 2020

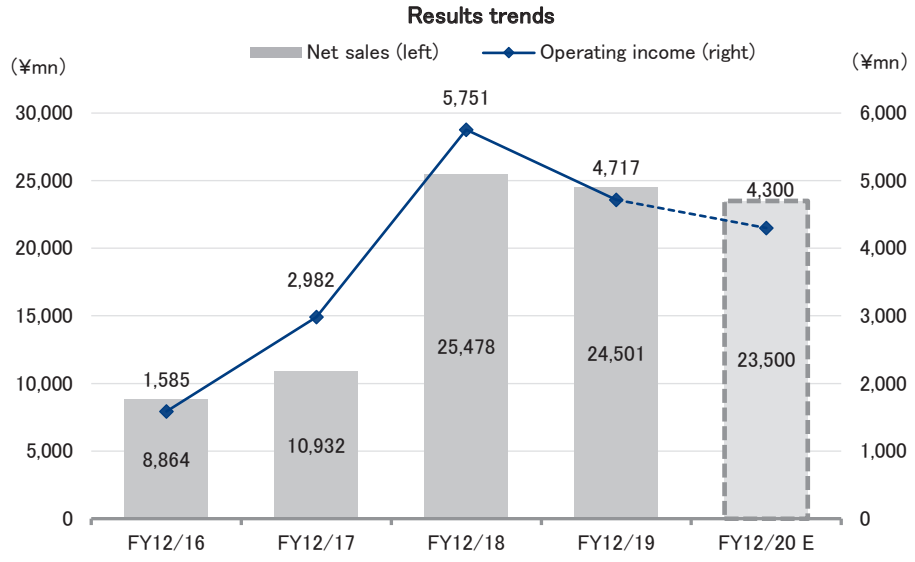
For FY12/20 results, the Company is forecasting net sales of ¥23,500mn, a decrease of 4.1% YoY, and operating income of ¥4,300mn, a decrease of 8.8% YoY. The Company has thus upwardly revised its forecasts from its initial plans (net sales of ¥22,700mn and operating income of ¥3,200mn). These upward revisions factor in the outperformance of net sales and operating income through FY12/20 1H. On a semiannual basis, the Company has reduced its forecast of net sales for FY12/20 2H from its initial plan of ¥11,500mn to ¥10,900mn. This forecast reflects, among other factors, the fact that the start of operations of the new prime wafer plant in China was pushed back by one month compared with the initial plan to November 2020. There has been no change in the assumed foreign exchange rate of ¥108 to US$1.

3. Results are expected to enter a re-growth period from FY12/21 onwards

From FY12/21 onward, results are expected to return to a growth stage due to expansion in the production capacity of 12-inch reclaimed wafers in Japan and Taiwan and 8-inch prime wafers in China. The Company has decided to increase the monthly production capacity of 12-inch reclaimed wafers at the Taiwan plant, where demand is surging, one year ahead of schedule, from 150,000 to 170,000 wafers. Together with production capacity in Japan, monthly production capacity will expand from 400,000 to 440,000 wafers. For 8-inch prime wafers in China, monthly production capacity is forecast to increase from 70,000 to 120,000 wafers by the end of 2021, as newly installed production lines come online. China has unveiled plans to develop the semiconductor industry as a national policy. The Company plans to establish and launch a joint-venture company to conduct the 12-inch reclaimed wafer and prime wafer businesses with Grinm Advanced Materials, a state-owned company, and a Chinese government-related investment fund (the Company's investment ratio is 19.99%). For reclaimed wafers, the Company plans to invest ¥3.8bn in a new plant in Dezhou for the first investment period and to start operations in FY2022, with monthly production capacity of 50,000 wafers. Conversely, for prime wafers, it will invest ¥5bn by FY2021 to establish a test line for R&D in the Beijing plant (monthly production capacity of 10,000 wafers), and in the future, it is aiming to establish a mass production system with a monthly production capacity of 300,000 wafers. As the total for both businesses, it will be necessary to invest ¥8.8bn up to FY2022. But of this amount, the Company plans to invest only approximately ¥1bn, and its strategy is to expand its businesses while keeping down risk in the initial period. The targets in the medium-term management plan are net sales of ¥31,600mn and operating income of ¥6,800mn in FY12/23, and at FISCO, we think these targets are fully attainable if the new plant in Dezhou makes a smooth start.

Key Points

- Results for FY12/20 1H surpassed the Company's initial plans due to a smaller-than-anticipated downturn in the prime wafer business.
- Temporary downturn in earnings expected in FY12/20 2H in connection with plant relocation in China.
- Results forecasts for 2021 could slow down slightly against existing targets due to the impact of active investment in production expansion in the Chinese prime wafer market.



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

Company overview

The Company started out as a reclaimed silicon wafer business and expanded its operations to the prime wafer manufacturing and sales business in China

1. History

RS Technologies (hereafter, "the Company" or "RST") was established in December 2010 in order to take over the wafer reclamation business of Rasa Industries <4022>, which had withdrawn from the business. Since then, it has been developing its silicon wafer reclamation processing business and currently has two plants, the Sanbongi plant in Osaki City, Miyagi Prefecture (formerly Rasa Industries' plant) and the Tainan plant in Taiwan (completed in December 2015), which is owned by a subsidiary, RSTEC Semiconductor Taiwan, established in February 2014.

Also, in December 2017, the Company announced that it would be launching a prime wafer business in China. In January 2018, together with Chinese state-owned company General Research Institute for Nonferrous Metals (currently, Grinm Advanced Materials, hereafter, GRINM) and Fujian Kuramoto, it established a joint venture, Beijing GRINM RS Semiconductor Materials Co., Ltd. (BGRS). At the same time, BGRS invested in GRINM Semiconductor Materials Co., Ltd., (hereafter, GRITEK), which was a subsidiary of GRINM that manufactures and sells silicon ingot and prime wafers, and it was made a wholly owned subsidiary. The investment ratios in BGRS are 45% for RST, 49% for GRINM and 6% for Fujian Kuramoto. So although RST's investment ratio is below 50%, Fujian Kuramoto is an investment company managed by a relative of RS Technologies' President Nagayoshi Ho, so in actual terms, RST owns more than 50%, and moreover, RST appointed three of the five directors that comprise the BGRS Board of Directors. Therefore, RST effectively holds the management rights and BGRS is deemed to be a subsidiary within its scope of consolidation.

The reason for the complex investment scheme for BGRS is that, if a Chinese company's investment ratio from local capital is 50% or above, it is treated by the Chinese government and local governments as a domestically funded company and is eligible to receive various types of subsidies and other funding from them. Such companies also receive preferential treatment in areas like capital investment and taxes, giving them competitive advantages over foreign-funded companies. In August 2018, together with the City of Dezhou, Shandong, GRITEK established Shandong GRINM Semiconductor Materials Co., Ltd., (hereafter, Shandong GRITEK) as a joint venture to be a new manufacturing base (investment ratios: GRITEK 80% and Dezhou 20%).

In addition, in 2013, RST started a purchasing and sales business mainly for semiconductor-related manufacturing equipment and parts. It also acquired the shares and made wholly owned subsidiaries of Union Electronics Solutions Co., Ltd., a semiconductor trading company, in May 2018, and then DG Technologies, which manufactures and sells semiconductor manufacturing equipment consumable parts (quartz glass and silicon parts) in January 2019. Moreover, RST has been expanding its business fields in 2020 through such means as establishing Shanghai Union Semiconductor Co.,Ltd. and Beijing Gritek & IVT Valve Technology Co., Ltd., in order to expand sales of semiconductor-related materials in China.

The Company's strength in reclaimed wafers lies in the large number of times they can be reclaimed through precision inspection and polishing technologies

2. Reclaimed wafers and prime wafers

To appreciate the strengths and growth potential of the Company's mainstay reclaimed silicon wafer business and prime wafer business, it is essential to understand the manufacturing process of and role played by silicon wafers as well as the manufacturing methods used to produce them. We provide an explanation below.

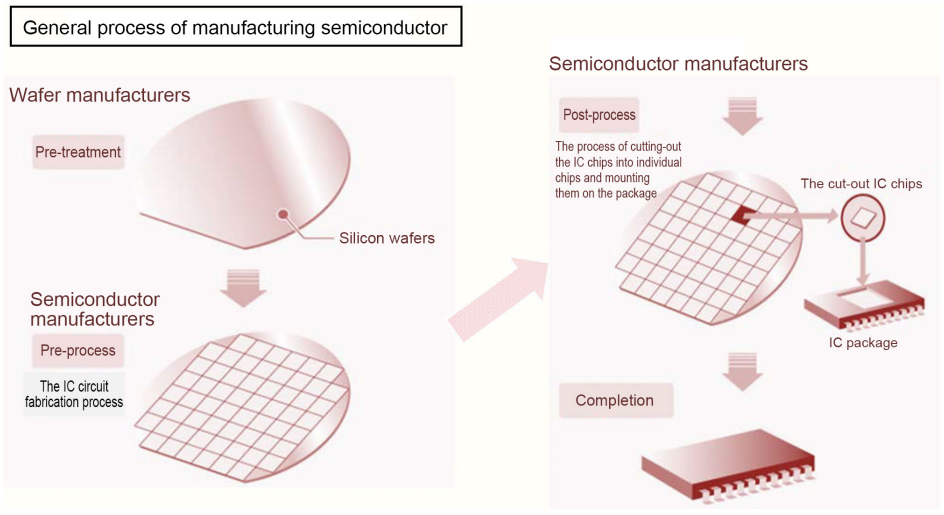
(1) Silicon wafers

"A semiconductor" is a substance that has intermediary electrical conductivity properties between a conductor, which conducts electricity, and an insulator, through which electricity cannot pass. Using these properties, integrated circuits (IC) are manufactured to fabricate highly dense electric circuits. The Micro-Processing Unit (MPU), which is 'the brain' of the PC, and memory to store information (such as flash memory and DRAM), are typical examples of semiconductors. They are installed in various applications, including home electrical appliances, information-communication devices, and automotive electrical equipment, and are also known as the "rice of industry."

Various materials are used as the substrates of these semiconductors according to the required performance, with silicon being among the most widely used. An ingot of a single crystal silicon is pulled out of high-purity, melted polycrystalline silicon and then sliced thinly into wafers, and these wafers are called "silicon wafers." Semiconductor manufacturers fabricate detailed circuits on silicon wafers and manufacture semiconductor chips.

* The thickness of a single 12-inch wafer is determined as 775 μm ± 25 μm, and several hundred silicon wafers can be obtained from a single ingot.

Semiconductor manufacturing process



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

Currently, various sizes of silicon wafers are mass produced, and by size, they range from 5 inches (125 mm) in diameter to 6 inches (150 mm), 8 inches (200 mm), and 12 inches (300 mm). For state-of-the-art semiconductors that require high integration (miniaturization), 12-inch wafers are mass produced. This is because if miniaturization can be progressed and more semiconductor chips manufactured from a single silicon wafer, it becomes possible to keep down the manufacturing costs per item. Alongside this trend toward a large diameter for the wafer size, wafer-manufacturing technologies are also tending to become more complex, which is raising the barrier to entry.

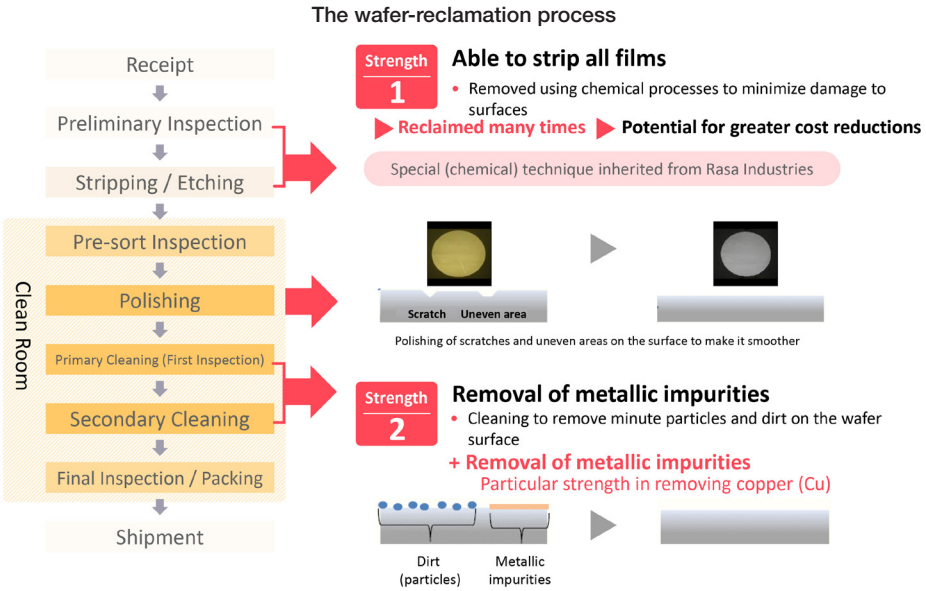
In the last few years, there has been a movement to explore the possibilities for an 18-inch (450 mm) wafer as the next generation of wafers, but currently this movement has subsided. This is because, the technological aspect as seen from the manufacturing-equipment side is becoming increasingly complex and the capital investment costs for mass-production lines are rising, yet it is unknown whether there is sufficient demand to recover the investment costs. Therefore, for the time being, the 12-inch wafer is expected to remain the main product.

Also, not all silicon wafers introduced into the semiconductor manufacturing line are used to manufacture semiconductor chips. Semiconductors are completed by repeatedly creating fine circuit patterns on the silicon wafer, so the manufacturing process is carried out in tandem with tests and evaluations to check the finishing conditions in each process. The silicon wafers used for evaluation purposes have names including “test wafers,” “dummy wafers,” and “monitor wafers,” (hereafter, in this report they are collectively referred to as “monitor wafers”), and reclaimed wafers are used for these monitor wafers. Conversely, the wafers that are actually processed for the semiconductor chips are generally called “prime wafers” (in the name of the Company’s business segment, they are called “prime silicon wafers,” but they refer to the same thing).

(2) Reclaimed wafers

Currently, the amount of monitor wafers used is estimated to be about 20% of the total amount of wafers deployed on the semiconductor manufacturing line. Although it is basic to use a new wafer for the monitor wafer, semiconductor manufacturers often seek to reuse (reclaim) the monitor wafers they have used. This is in order to reduce the costs of manufacturing semiconductors as much as possible. At that time, semiconductor manufacturers recycle used monitor wafers with a reclaiming company such as the Company and reuse them. As the price of a reclaimed wafer is approximately 25% of the price a new wafer, if the number of wafers introduced remains the same, it is possible to reduce the wafer-introduction costs by around 15% simply by using reclaimed wafers for the monitor wafers.

In the wafer-reclamation process, an acceptance inspection is conducted and all elements, such as the insulating film formed in the semiconductor manufacturing process, are removed. After that, polishing is performed in a clean room to ensure that the surface of the wafer is completely flat, followed by precision cleaning, and then shipment. A strength of the Company is its technological capabilities, as in the film-removal process, it is able to strip all of the film through a chemical process and perform precision polishing that keeps any damage to the wafer’s surface to the absolute minimum. This increases the number of times a wafer can be reclaimed to 10 or 20 times, which is around double the industry average. The thickness of a 12-inch prime wafer is approximately 775 μm, and it is said that up to around 700 μm can be used for a monitor wafer. Therefore, the less the amount of the wafer’s thickness that is removed by polishing in a single reclamation process, the higher the number of times it can be reclaimed. For example, if the wafer thickness is reduced by 10 μm in a single polishing, the number of times the wafer can be reclaimed is only 7 or 8 times, but if the polishing can be kept down to a reduction of 5 μm, this number increases to as high as 15 times. Another of the Company’s strengths is that it has technologies to remove metal impurities. In particular, it has been certified by two semiconductor manufacturers to remove copper (Cu). Currently, it is not actively receiving requests for this service, but if the environment changes in the future, such as wafer demand-supply conditions becoming tight and costs increasing, then demand for it may rise.



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

(3) Prime wafers

Prime wafer has the same meaning as new wafer. Wafer processing consists of front-end processing including silicon crystal ingot pulling and back-end processing including the slicing of ingots into wafers and polishing the surface of the wafers (manufacturers that handle both front-end and back-end processes are called integrated manufacturers). While all these processes require advanced technology, the success of silicon wafer manufacturing businesses depends largely on front-end processing yields. Production yield does not merely refer to the number of units that can be produced in a given amount of time. The more important factor is the number of good quality prime wafers that can be produced from one silicon crystal ingot (because there is a large difference in price between new prime wafers and new monitor wafers).

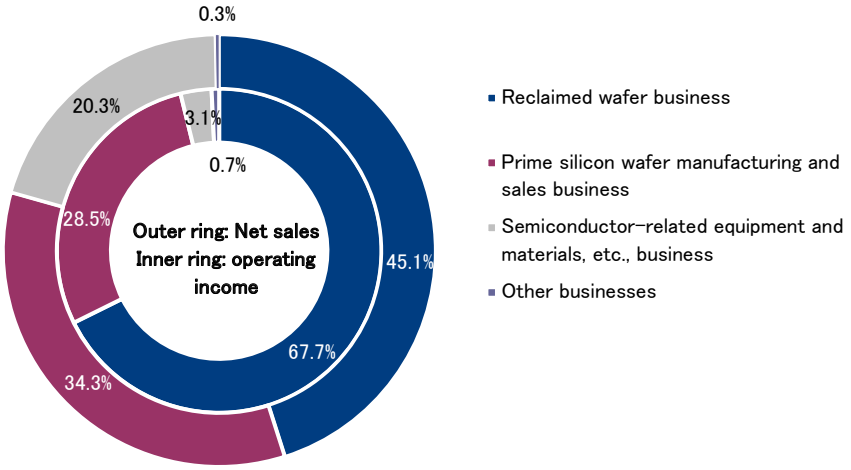
GRITEK manufactures and sells prime wafers in China. One of its strengths is that, as previously stated, it can utilize various preferential treatment systems as a domestically funded company, and that the Company could benefit from various Chinese government measures given that the semiconductor industry is being developed as a national policy. Currently, it conducts sales only to approximately 60 to 70 semiconductor manufacturers within China. But looking to the future, it is aiming to improve the quality of its products to the global standard and to sell to the whole world through RST's sales network.

The reclaimed wafer business has a leading global share of the 12-inch market, at 33%, and its main customers include TSMC and Sony.

3. Business description

The Company classifies its business operations into three business segments, specifically the reclaimed wafer business, the prime silicon wafer manufacturing and sales business, and the semiconductor-related equipment and materials, etc., business, and other businesses, and discloses information on each segment. Looking at the percentages of results by business segment in FY12/20 1H, the reclaimed wafer business provided 45.1% of net sales and 67.7% of operating income, and the prime silicon wafer manufacturing and sales business 34.3% of net sales and 28.5% of operating income. These two businesses are the Company's core earnings drivers.

Percentages of results by segment (FY12/20 1H)

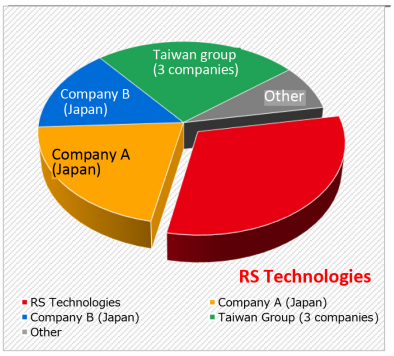


Source: Prepared by FISCO from the Company's financial results

(1) Reclaimed wafer business

The reclaimed wafer business is conducted by the Company and its Taiwanese subsidiary. At the end of 2019, the monthly production capacity for mainstay 12-inch wafers by the Company was 250,000 wafers (it has a production capacity of 120,000 wafers for 8-inches and below), while Taiwan has a capacity for 150,000 wafers, for a total 400,000 wafers. On a volume basis, it has the top share worldwide, at around 33% (the Company's estimate). Its competitors in Japan are Hamada Heavy Industries Ltd., and Mimasu Semiconductor Industry Co., Ltd., <8155>, and these three Japanese companies have around 60% to 70% of the global market share.

The Company's share of the 12-inch reclaimed wafer market



A new plant in Taiwan and expansion of the Sanbongi Factory increased production capacity, increasing our market share to 33%.

We will further enhance production capacity at both plants by using empty factories at Sanbongi, and utilizing business partnerships, M&A, and other means.

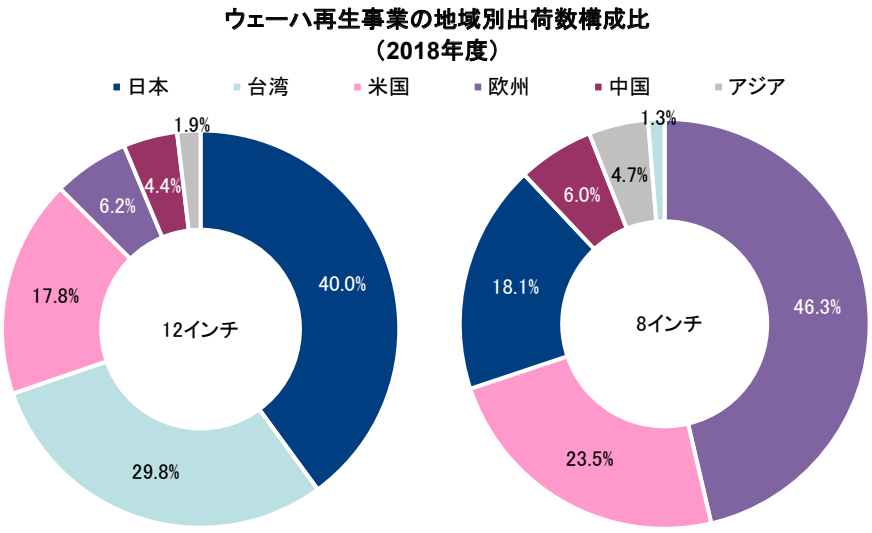
Note: RTS survey

	FY12/15 1H	FY12/15 2H	FY12/16	FY12/17	FY12/18	FY12/19
RST Group Production Capacity	180,000 wafers	240,000 wafers	280,000 wafers	300,000 wafers	340,000 wafers	400,000 wafers
RST Group Market Share	19%	24%	29%	30%	31%	33%

Note: RTS survey

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

The percentages of the number of wafers sold by region (FY12/18) are as follows. For 12-inch wafers, Japan provides 40.0% and Taiwan 29.8%, so these two countries provide around 70% of the total. Conversely, 8-inch wafers stand out for having higher numbers for Europe and the United States, at 46.3% and 23.5%, respectively. Its main customers are the major semiconductor manufacturers, such as TSMC <TSM> in Taiwan, Sony Semiconductor Manufacturing Corporation and Kioxia Corporation in Japan, Intel <INTC> in the United States, and STMicroelectronics <STM> and Infineon Technologies in Europe.



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

Looking at the market shares by region (FY12/18), the Company's shares of the main markets for 12-inch wafers are 43.4% for Japan, 26.4% for Taiwan, and 19.3% for the United States, and also 67.9% for Europe and 35.6% for China, indicating that it has a high share of the market as a whole. Conversely, in the 8-inch wafer market, the Company is notable for having high shares in Europe, at 58.0%, and the United States 28.2%, but relatively low shares in the other regions, including Japan. This is considered to be because the Company is focusing on 12-inch wafers. Looking at the planned construction of 12-inch semiconductor plants in the future, there are seven plants planned for China and five for Europe, which are the top ranked regions for the number of planned plants. Considering that the Company currently has high market shares in these regions, at FISCO we think that the Company's global share may rise even higher in the medium term.

Planned construction of new 12-inch semiconductor plants in the reclaimed wafer business

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

(2) Prime silicon wafer manufacturing and sales business

The prime silicon wafer manufacturing and sales business is conducted by the Chinese subsidiary GRITEK, and two-thirds of its sales are prime wafers and one-third of its sales are consumables and ingot. At the end of 2019, the Beijing plant's monthly production capacity of prime wafers was 50,000 5-inch wafers, 150,000 6-inch wafers, and 70,000 8-inch wafers. For the 8-inch wafers, it externally procures the ingot for products that require high quality, but since 2019, it has been gradually increasing the rate of in-house manufacturing. Its prime wafer customers are mainly Chinese semiconductor manufacturers, and its customer numbers have increased to around 60 to 70 companies. These customers primarily manufacture analog semiconductors for use in home electronic appliances, automobiles and other products. GRITEK also sells consumables and ingot overseas.

(3) Semiconductor-related equipment and materials, etc., business

The semiconductor-related equipment and materials, etc., business includes sales of semiconductor manufacturing equipment and semiconductor materials and parts that are purchased and sold by the Company, and sales from the subsidiaries Union Electronics Solutions and DG Technologies. It mainly purchases the semiconductor manufacturing equipment from Japanese semiconductor manufacturers and others (including some used products), and primarily sells them to semiconductor manufacturers in China, South Korea, Taiwan and other markets.

Also, Union Electronics Solutions mainly handles the power semiconductors of Hitachi Power Semiconductor Device, Ltd., as its first distributor, and also the microcontrollers (MCUs) and other products of Renesas Electronics Corporation <6723>. Its annual net sales are on a scale of around ¥1bn. DG Technologies manufactures and sells semiconductor manufacturing equipment consumable parts (quartz glass and silicon-related parts), selling them to major domestic semiconductor manufacturing equipment manufacturers and semiconductor manufacturers such as TSMC. Its annual net sales are on scale of slightly less than ¥2bn, while it purchases silicon-related parts mainly from GRITEK in China.

(4) Other businesses

The sales of other businesses are comprised of electricity-sales revenue from the solar power generation business started in 2013 (the power generation capacity is approximately 1.59 MW), and also technical consulting services and other services provided by the Company in the semiconductor wafer manufacturing process. However, its effect on results as a whole is negligible.

Business trends

Results for FY12/20 1H surpassed the Company's initial plans due to a smaller-than-anticipated downturn in the prime wafer business

1. FY12/20 1H results summary

In FY12/20 1H consolidated results were characterized by slightly higher net sales and small decreases in profits. Net sales increased 1.1% YoY to ¥12,653mn, while operating income decreased 6.3% YoY to ¥2,580mn. Ordinary income rose 0.8% YoY to ¥2,898mn. Net income attributable to owners of the parent decreased 2.1% YoY to ¥1,686mn. In addition, sales and profits both finished the period above the Company's initial plans.

FY12/20 1H consolidated results

(¥mn)

	FY12/19 1H		FY12/20 1H				
	Results	% of sales	Initial plan	Results	% of sales	YoY	Vs. plan
Net sales	12,515	-	11,200	12,653	-	1.1%	13.0%
Cost of sales	8,166	65.3%	-	8,491	67.1%	4.0%	-
SG&A expenses	1,593	12.7%	-	1,581	12.5%	-0.8%	-
Operating income	2,755	22.0%	1,400	2,580	20.4%	-6.3%	84.4%
Ordinary income	2,920	23.3%	1,400	2,898	22.9%	-0.8%	107.0%
Net income attributable to owners of the parent	1,723	13.8%	1,000	1,686	13.3%	-2.1%	68.7%

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

The Company generated growth in net sales, as an increase in sales reflecting higher production capacity in the reclaimed wafer business and higher sales in the semiconductor-related equipment and materials, etc. business helped to cover a decline in sales in the prime wafer business due to the impact of the global economic slowdown.

Meanwhile, operating income decreased, as an increase in earnings supported by higher sales owing to increased production capacity in the reclaimed wafer business was unable to fully offset a decrease in earnings due to lower sales in the prime wafer business. That said, operating income finished the period 84.4% above the initial plan, due partly to the curtailment of SG&A expenses along with the above-plan net sales. In addition, non-operating income and expenses improved YoY. This improvement was mainly attributable to an improvement in financial income and an increase in foreign-exchange gain.

Looking at the results by Group company, the Company and its Taiwanese subsidiary achieved higher net sales and profits due to a solid performance in the reclaimed wafer business at both companies. The Company's net sales rose 17.1% YoY and its operating income increased 7.8% YoY, while the Taiwanese subsidiary posted a 41.9% increase in net sales and a 37.2% increase in operating income. On the other hand, the Beijing subsidiary's net sales decreased 17.0% YoY and its operating income decreased 31.4% YoY due to the impact of the global economic slowdown. It appears that all Group companies have surpassed the initial plans.

Business performance trends by Group company for FY12/20 1H

(¥mn)

	RST		Taiwanese subsidiary		Beijing subsidiary		Other subsidiaries	
	Results	YoY	Results	YoY	Results	YoY	Elimination of inter-company transactions	YoY
Net sales	5,222	17.1%	2,375	41.9%	4,762	-17.0%	294	-
Operating income	982	7.8%	767	37.2%	920	-31.4%	-89	-
Operating income margin	18.8%	-1.6pt	32.3%	-1.1pt	19.3%	-4.1pt	-	-

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

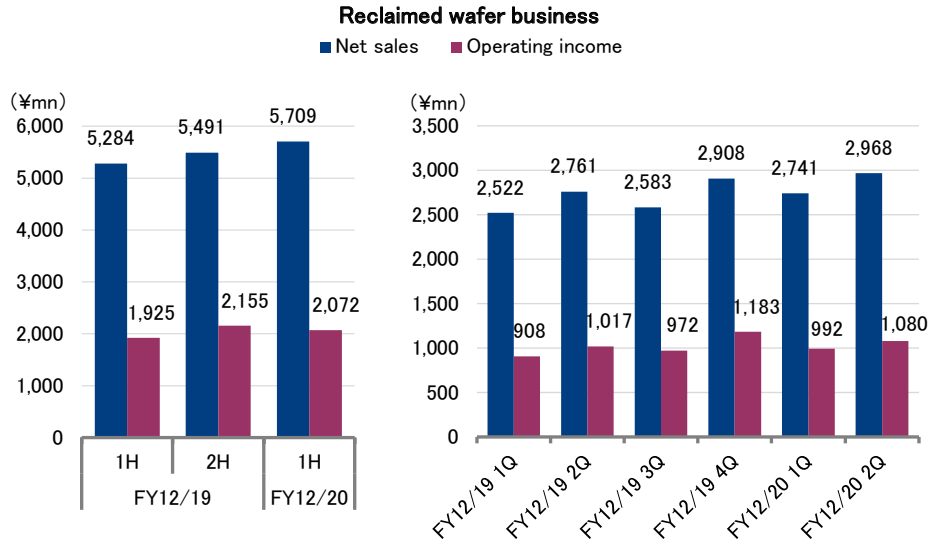
Demand for 12-inch wafers is strong, surpassing production capacity in the reclaimed wafer business

2. Developments by business segment

(1) Reclaimed wafer business

In the reclaimed wafer business, net sales increased 8.0% YoY to ¥5,709mn and operating income rose 7.6% YoY to ¥2,072mn. Major factors behind the increases in sales and profit were strong demand from main customers both domestically and overseas, in addition to increases in the production capacity of 12-inch reclaimed wafers in Japan and Taiwan in FY12/19. The monthly production capacity for 12-inch reclaimed wafers was increased from 340,000 wafers in 2018 (220,000 wafers domestically and 120,000 wafers in Taiwan) to 400,000 wafers in 2019 (250,000 wafers domestically and 150,000 wafers in Taiwan). The Taiwanese subsidiary has performed strongly enough to conduct monthly production of more than 150,000 wafers.

While there were concerns about the negative impact of the COVID-19 pandemic, demand for semiconductors for use in data centers and PCs were favorable due to stay-at-home and telework demand. In addition, amid a decrease in overall production volume of semiconductors for use in smartphones, there was surging demand in cutting-edge fields such as 5G mobile devices and base stations and strong orders from main customers involved in semiconductors in these fields. In 12-inch reclaimed wafers, the average unit price also increased slightly due to growth in demand for high-grade products.



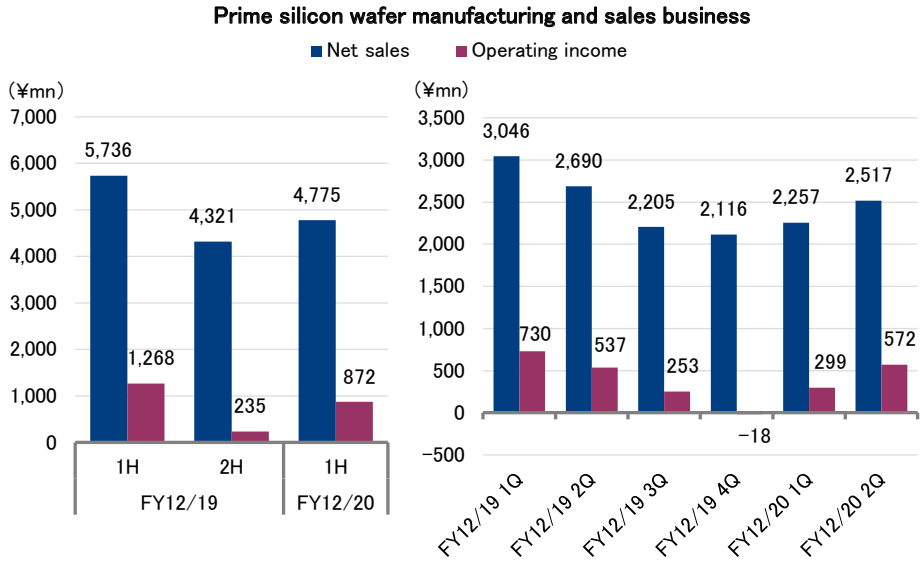
Note: Figures in the quarterly graph include internal sales and transfer sales.
Source: Prepared by FISCO from the Company's results briefing materials

(2) Prime wafer manufacturing and sales business

In the prime wafer manufacturing and sales business, net sales decreased 16.8% YoY to ¥4,775mn and operating income declined 31.2% YoY to ¥872mn. The main reason for the decreases in sales and earnings was a decline in production volume at Chinese semiconductor manufacturer customers brought about by the impact of a global economic slowdown.

However, looking at trends on a quarterly basis, both net sales and operating income have increased for two consecutive quarters since bottoming out in FY12/19 4Q. The main reason for the increase in net sales appears to be stronger-than-anticipated demand, a trend driven by factors including moves by customers to build up inventories. Moreover, profitability has been improving, owing to improving production yields for 8-inch wafers as well as raw material cost reductions supported by a higher rate of in-house ingot manufacturing. In FY12/20 2Q, operating income returned to a growth path, increasing 6.5% YoY.

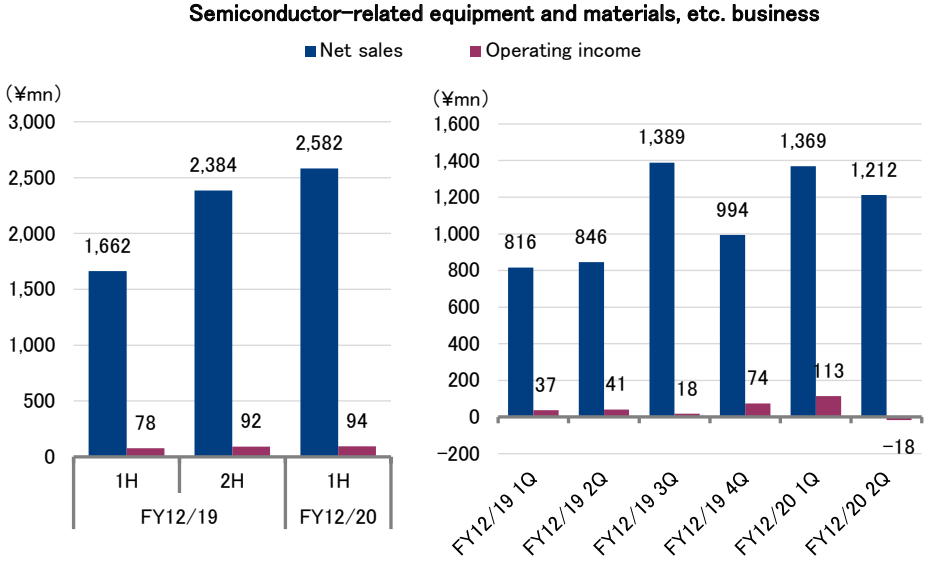
In FY12/19 4Q, the Company posted a downturn in operating income. This downturn mainly reflected provisions for employees' early retirement in connection with the relocation of the Beijing plant, along with recruitment costs for new employees ahead of the launch of the new plant in Dezhou and related personnel costs.



Note: Figures in the quarterly graph include internal sales and transfer sales.
Source: Prepared by FISCO from the Company's results briefing materials

(3) Semiconductor-related equipment and materials, etc., business

In the semiconductor-related equipment and materials, etc. business, net sales increased 55.4% YoY to ¥2,582mn, and operating income rose 20.5% YoY to ¥94mn. Net sales increased mainly due to a solid performance by semiconductor-related materials in FY12/20 2Q, in addition to a large order received in FY12/20 1Q for ultrasound imaging equipment and inspection equipment, which are products purchased and sold by the Company. In FY12/20 2Q, the Company posted an operating loss of ¥18mn. The Company is making capital investments to expand the production capacity of consumable parts at DG Technologies, and an increase in expenses related to these capital investments was the main reason for the operating loss.



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

Non-current assets increased with progress on investments in the construction of a new plant in Dezhou and other projects

3. Financial condition and management indicators

Looking at the financial condition at the end of FY12/20 2Q, total assets increased ¥6,247mn from the previous fiscal year-end to ¥54,882mn. The main factors behind this change were as follows. In current assets, cash and deposits increased ¥793mn, trade receivables rose ¥171mn, and inventories increased ¥101mn. In non-current assets, there was an increase in construction in progress of ¥5,469mn in connection with advances in new plant construction at the subsidiary Shandong GRITEK.

Total liabilities were up ¥4,406mn from the previous fiscal year-end to ¥17,059mn. In current liabilities, there were increases of ¥2,454mn in trade accounts payable and ¥107mn in accounts payable-trade. In non-current liabilities, there was a decrease of ¥605mn in long-term borrowings and an increase of ¥1,665mn in other. Moreover, net assets increased ¥1,841mn from the previous fiscal year-end to ¥37,822mn. This increase mainly reflected an increase of ¥1,494mn in retained earnings due to the recording of net income attributable to owners of the parent, as well as an increase in non-controlling interests of ¥420mn.

Looking at management indicators, the equity ratio, which indicates stability, decreased from 42.7% at the previous fiscal year-end to 40.4%, while the interest-bearing debt ratio rose from 19.1% to 20.2%. The main contributing factor was the Company's borrowings from financial institutions to finance the construction of a new plant at Shandong GRITEK. However, as the Company has abundant net cash (cash and deposits less interest-bearing debt) of ¥18.0bn, it can be judged to be maintaining a sound financial condition.

Consolidated balance sheets

(¥mn)

	FY12/16	FY12/17	FY12/18	FY12/19	FY12/20 2Q	Increase/ decrease amount
Current assets	5,348	7,387	26,074	32,760	34,267	1,507
(Cash and deposits)	1,952	3,243	14,879	22,156	22,949	793
Non-current assets	5,333	4,843	10,516	15,873	20,614	4,740
Current liabilities	2,992	3,370	4,979	7,252	10,678	3,426
Non-current liabilities	4,317	3,334	2,474	5,400	6,381	980
Total liabilities	7,310	6,704	7,453	12,652	17,059	4,406
(Interest-bearing debt)	5,147	4,033	2,812	3,962	4,469	507
Total net assets	3,371	5,525	29,137	35,981	37,822	1,841
(Stability)						
Equity ratio	31.5%	45.1%	49.6%	42.7%	40.4%	-2.3pt
Interest-bearing debt ratio	152.9%	73.1%	15.5%	19.1%	20.2%	1.1pt

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

Forecasts

Temporary downturn in earnings expected in FY12/20 2H in connection with plant relocation in China

1. Company forecasts for FY12/20

For its FY12/20 consolidated results, the Company is forecasting net sales of ¥23,500mn, a decrease of 4.1% YoY, and operating income of ¥4,300mn, a decrease of 8.8% YoY. Ordinary income is forecast to decrease 11.4% YoY to ¥4,800mn and net income attributable to owners of the parent is forecast to decline 7.8% YoY to ¥2,800mn. While there are concerns about a resurgence in the COVID-19 pandemic in FY12/20 2H, business performance through the FY12/20 1H period surpassed the Company's plans. Therefore, the Company upwardly revised its forecasts of net sales and profits relative to its initial plans.

However, in its initial plans, the Company had assumed that earnings would bottom out in FY12/20 1H and turn upwards from FY12/20 2H onwards. The Company has now revised its outlook and expects earnings to bottom out in FY12/20 2H. The main reason for this revised outlook is the relocation of plant facilities to the new plant of Shandong GRITEK. The assumed foreign exchange rate is ¥108 to US$1 (compared to the actual rate of ¥111 to US$1 in the previous fiscal year). For every appreciation of the exchange rate by ¥1 against the US dollar, the Company's earnings will be reduced by around ¥10 to ¥20mn on a semiannual basis.

FY12/20 consolidated results forecasts

(¥mn)

	FY12/19		FY12/20				FY12/20 semiannual results		
	Full-year results	% of sales	Initial plan	Revised plan*	% of sales	YoY	1H results	2H forecast	Versus 1H
Net sales	24,501	-	22,700	23,500	-	-4.1%	12,653	10,846	-14.3%
Operating income	4,717	19.3%	3,200	4,300	18.3%	-8.8%	2,580	1,719	-33.4%
Ordinary income	5,416	22.1%	3,400	4,800	20.4%	-11.4%	2,898	1,901	-34.4%
Profit attributable to owners of parent	3,035	12.4%	2,400	2,800	11.9%	-7.8%	1,686	1,113	-34.0%
Earnings per share (EPS) (¥)	236.98		187.07	216.74			129.09	87.65	

* The revised plan represents figures announced in July 2020.
Source: Prepared by FISCO from the Company's financial results

Plans for each company have not been disclosed subsequent to the revisions to the Company's business forecasts. Net sales of the Chinese subsidiary in FY12/21 2H are forecast to decrease from ¥4,762mn in 1H because of the impact of the plant relocation. Operating income is forecast to be positive, but it will decrease from the level in FY12/20 1H. In order to relocate the 8-inch wafer line of the Beijing plant to the new plant, the Company halted the operation of the wafer line in the latter half of July 2020. Net sales are planned to gradually start returning in November when the new plant will start operations in earnest. The new plant plans to install a new production line with a monthly production capacity of 50,000 wafers, in addition to the production line to be transferred, which has a monthly production capacity of 70,000 wafers. For this reason, the production capacity of 8-inch prime wafers in China will increase to 120,000 wafers, which is 1.7 times the previous production capacity.

With regard to the outlook for the Company and the Taiwanese subsidiary in FY12/20 2H, firm business results are expected. Current demand for reclaimed wafers remains favorable, and no change in these conditions are foreseen in FY12/20 2H.

Forecasts

Results outlook by Group company

(¥mn)

		FY12/18 Results	FY12/19		FY12/20		
			Results	YoY	Initial plan	YoY	2Q achievement rate
RS	Net sales	10,557	9,447	-10.5%	9,300	-1.6%	56.2%
	Operating income	2,631	1,989	-24.4%	1,700	-14.5%	57.8%
	Profit margin	24.9%	21.1%	-3.8pt	18.3%	-2.8pt	
Taiwanese subsidiary	Net sales	2,904	3,464	19.3%	4,000	15.5%	59.4%
	Operating income	972	1,185	22.0%	1,000	-15.6%	76.7%
	Profit margin	33.5%	34.2	0.8pt	25.0%	-9.2pt	
Chinanese subsidiary	Net sales	11,919	10,058	-15.6%	6,900	-31.4%	69.0%
	Operating income	2,049	1,564	-23.9%	200	-87.2%	460.0%
	Profit margin	17.2%	15.5%	-1.7pt	2.9%	-12.6pt	
Other subsidiaries	Net sales	-	1,532	-	2,500	63.2%	11.8%
	Operating income	-	-21	-	300	-	-
	Profit margin	-	-	-	-	-	-

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

With increasingly active investment in expanding production in the Chinese prime wafer market, trends in the future supply-demand balance will need to be watched closely

2. Medium-term management plan

The Company announced its Medium-Term Management Plan (four year plan) at the beginning of the fiscal year. The outlook for FY12/20 calls for sales and profits to decrease due to factors including the impact of the plant relocation at the Chinese subsidiary. However, the Company will transition to a growth stage from FY12/21. It is targeting net sales of ¥31,600mn and operating income of ¥6,800mn for FY12/23. The Company aims to increase the operating margin from 19.3% in FY12/19 to 21.5% in FY12/23. Depreciation expenses will increase due to increased investment, but will be offset by the positive effect of increased net sales. The compound average growth rate for the four-year period starting in FY12/19 is 7% for net sales and 10% for operating income. During this period, a growth rate of 5% is assumed for the semiconductor market.

In the prime silicon wafer manufacturing and sales business, there has been increasingly active investment in expanding the production of prime wafers, along with the deterioration in the global economy due to the COVID-19 pandemic and intensified U.S.-China trade friction. In 8-inch wafers, Tianjin ZHONGHUAN Semiconductor Joint-STOCK Co., Ltd. plans to increase its monthly production from the current 200,000 wafers to 300,000 wafers within 2020 and 700,000 wafers in the future. Additionally, Ferrotec Holdings Corporation <6890> has unveiled plans to increase its monthly production from the current 100,000 wafers to 350,000 wafers by the end of 2021. Trends in the supply-demand balance of 8-inch wafers in the Chinese market will need to be watched closely going forward.

Meanwhile, in the reclaimed wafer business, TSMC, a major customer, has been strengthening its competitiveness further in cutting-edge semiconductors. This trend will act as a tailwind for the Company over the medium term. This is because TSMC plans to construct a semiconductor plant with a monthly production capacity of 20,000 wafers in Arizona, U.S.A. in 2024, and when the new plant starts operations, it will be supplied with the Company's reclaimed wafers. TSMC has highly rated the quality and technological capabilities of the Company's reclaimed wafers.

Forecasts

Medium-term management plan

(¥mn)

	FY12/19		FY12/20			FY12/21		FY12/22		FY12/23	
	Results	YoY	Initial plan	Revised plan	YoY	Forecasts	YoY	Forecasts	YoY	Forecasts	YoY
Net sales	24,501	-3.8%	22,700	23,500	-4.1%	27,000	14.9%	29,800	10.4%	31,600	6.0%
Operating income	4,717	-18.0%	3,200	4,300	-8.8%	4,800	11.6%	6,100	27.1%	6,800	11.5%
Operating income margin	19.3%	-	14.1%	18.3%	-	17.8%	-	20.5%	-	21.5%	-
Ordinary income	5,416	-11.8%	3,400	4,800	-11.4%	5,000	4.2%	6,400	28.0%	6,900	7.8%
Ordinary income margin	22.1%	-	15.0%	20.4%	-	18.5%	-	21.5%	-	21.8%	-
Profit attributable to owners of parent	3,035	-16.2%	2,400	2,800	-7.8%	3,000	7.1%	3,600	20.0%	4,000	11.1%
Earnings per share	236.98	-	187.07	216.74	-	233.84	-	280.61	-	311.79	-
Capital investment	6,752		15,400	15,400		6,800		3,500		Undecided	
(of which, the Chinese joint-venture company)	-		1,000	1,000		4,500		3,300		Undecided	
Depreciation expenses	1,814		2,400	2,300		3,500		4,300		Undecided	

Note: Capital investment and depreciation expenses from 12/20 onward were estimated by FISCO from interviews with the Company.
Source: Prepared by FISCO from the Company's results briefing materials and interviews with the Company

(1) Reclaimed wafer business

In the reclaimed wafer business, the Company will commence mass production at Shandong GRINM RS Semiconductor Materials Co., Ltd. (hereafter "SGRS")*, a joint venture in China, from 2022, in addition to ramping up production capacity in Japan and Taiwan, with the aim of boosting its market share in the 12-inch wafer industry. Accordingly, the Group's overall monthly production capacity of 12-inch reclaimed wafers will increase from 400,000 wafers in FY12/19 to 500,000 wafers in FY12/22.

* SGRS was established as a joint venture by the Company, GRINM, and the Dezhou City Government Fund in March 2020. SGRS will conduct manufacturing and sales of 12-inch prime wafers and the 12-inch wafer reclaim business.

Looking at the capital investment plan, domestically the Company will invest ¥0.2bn in 2020, ¥1.0bn in 2021, and ¥0.2bn in 2022 to increase the monthly production capacity from 250,000 wafers in 2019 to 270,000 wafers in 2021 and 280,000 wafers in 2022. Meanwhile, in Taiwan, it will invest ¥0.2bn in 2020 and ¥1.3bn in 2021 to increase the monthly production capacity from 150,000 wafers in 2019 to 170,000 wafers in 2021. In 2021, the Company primarily plans to introduce inspection and polishing machinery to respond to miniaturization. It had initially planned to introduce this machinery in 2022, but it decided to bring its plans forward by one year in response to surging local demand. In China, the Company plans to establish infrastructure and other facilities in the Dezhou plant in 2020, and to invest ¥3.8bn up to 2022 to construct and start operations of a mass production line for 50,000 wafers a month. If mass production in China starts from 2022, the wafers currently produced in Japan and then exported to China will switch to shipments from the Dezhou plant, and the resulting excess capacity at the Japanese plant will be targeting shipments to Japan, Asia, Europe and the United States.

Plan to strengthen the production capacity for 12-inch reclaimed wafers

Plant	Monthly production capacity at period-end					
	2017	2018	2019	2020	2021	2022
Sanbongi plant	200,000 wafers	220,000 wafers	250,000 wafers	→	270,000 wafers	280,000 wafers
Tainan plant	100,000 wafers	120,000 wafers	150,000 wafers	→	170,000 wafers	→
Dezhou plant*						50,000 wafers
Total	300,000 wafers	340,000 wafers	400,000 wafers	400,000 wafers	440,000 wafers	500,000 wafers

* The Dezhou plant's portion is from the newly established SGRS (an equity-method affiliate, with an ownership ratio of 19.99%), and it will be responsible for about 10% of the capital investment amount.
Source: Prepared by FISCO from the Company's results briefing materials

Forecasts

Capital investment plans

(¥bn)

Plant	2020	2021	2022	Details
Sanbongi plant	0.2	1.0	0.2	Plans to establish a new line to increase facilities in 2021
Tainan plant	0.2	1.3	-	Bring forward by one year the investment in miniaturization (inspection and polishing machinery) planned for 2022
Dezhou plant*	0.5	-	3.3	Invest in plant improvements in 2021, first investment period in 2022
Total	0.9	2.3	3.5	

* The Dezhou plant's portion is from the newly established SGRS (an equity-method affiliate, with an ownership ratio of 19.99%), and it will be responsible for about 10% of the capital investment amount.
Source: Prepared by FISCO from the Company's results briefing materials

(2) Prime silicon wafer manufacturing and sales business

In the prime silicon wafer manufacturing and sales business, Shandong GRITEK plans to increase 8-inch wafer production capacity from the current 70,000 wafers per month to 120,000 wafers in 2021. As noted earlier, the production facilities of the Beijing plant will be relocated to the Dezhou plant in 2020 and a line with a monthly production capacity of 70,000 wafers will start operations in November 2020. In addition, production is forecast to increase to 120,000 wafers in 2021 through the introduction of a new line with a production capacity of 50,000 wafers. The Company is planning total capital investment of ¥14.0bn.

Moreover, the Company plans to establish a test line at SGRS for R&D, aimed at mass production of 12-inch prime wafers. In 2021, SGRS will establish a line with monthly production capacity of 10,000 wafers. It plans to make a total investment of ¥5.0bn over the two years through 2021. SGRS will set the stage for mass production over the next 1.5 to 2 years, and thereafter commence mass production as it obtains certification from semiconductor manufacturers. In the future, it aims to put in place a mass production system with a monthly production capacity of 300,000 wafers. To realize mass production of 12-inch prime wafers, investment of large amounts of funds on a scale of tens of billions of yen is required. The Company has held down its initial risk by establishing a joint venture with GRINM and Dezhou City Government-related fund and confining its investment ratio in the joint venture to approximately 20%. While there are three investing companies, the Dezhou City Government also intends to provide support, such as granting subsidies and preferential treatment in infrastructure areas, such as electric power and gas.

Chinese subsidiary's investment plan for prime wafers

8 inch	2020	2021
Monthly production capacity	70,000 wafers	120,000 wafers
Capital investment	¥14.0bn	Undecided

12 inch (test line)	2020	2021	202X
Monthly production capacity	0 wafers	10,000 wafers	300,000 wafers
Capital investment	¥0.5bn	¥4.5bn	Undecided

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

(3) China is developing its semiconductor industry as a national policy

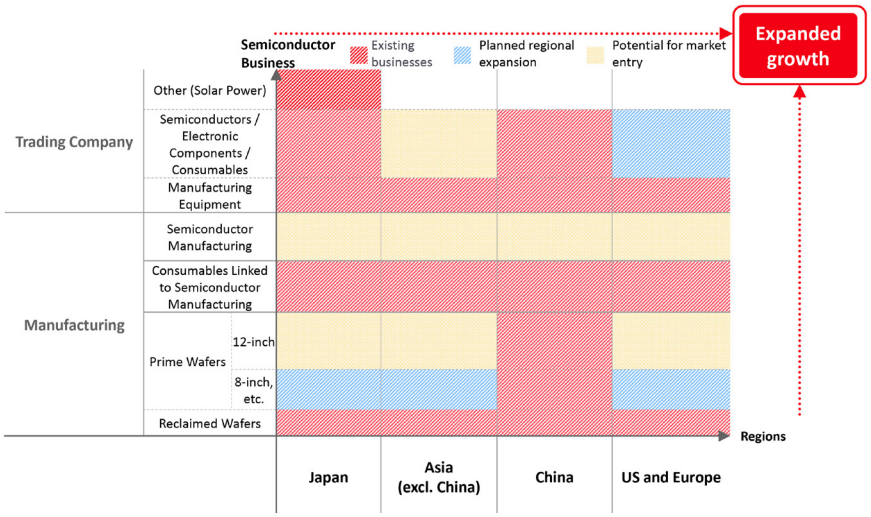
The Chinese government is developing its semiconductor industry as a national policy, and it is aiming to increase the rate of domestic production, which is currently only around 15%, to as high as 70% by 2025. However, the reality is that China is still far behind in terms of semiconductor manufacturing and materials technologies. The sales of Semiconductor Manufacturing International Corporation (SMIC), which is China's largest foundry manufacturer, are still only slightly more than US$3bn. In order to manufacture state-of-the-art semiconductors, it is necessary to have elements such as the manufacturing equipment to form fine-wiring patterns and high-quality silicon wafers, and the current situation is that Chinese companies rely on overseas procurement for all of these elements. It seems that the main reason for this is that they are not accumulating mass-production technologies in the cutting-edge semiconductors field.

That said, in the liquid crystal display market, through active investment in the last 10 years supported by government subsidies, Chinese manufacturers have succeeded in capturing market share from Taiwanese and Korean manufacturers. It is fully possible that the same development will occur in the semiconductor market, which will undoubtedly prove beneficial for the Company, which is developing a business in China supported by local government subsidies and other support. In FY12/19, sales to China accounted for 30.0% of total sales. If the Company starts the mass production of 12-inch reclaimed wafers and prime wafers, it is expected that this percentage will further rise and contribute to its earnings growth. The Company has deployed U.S.-made inspection machinery in the reclaimed wafer inspection process. In China, it can support operations with machinery models that are not subject to export restrictions. Accordingly, the Company has judged that there will be no problems with developing the wafer reclaim business in China.

(4) Business areas and the development of sales regions in the future

As its long-term strategy, the Company's policy is to expand its business areas and sales regions. The new developments it is currently planning include sales to regions other than China of prime wafers produced in China. It needs to further improve quality to be adopted in the Japanese, U.S., and European markets. The Company is aiming to catch up and to begin sales to the world beyond China. Also, as a trading-company function, it conducts sales in Japan and China of semiconductors, electronic parts, and consumable materials, and going forward, it plans to sell these products in the European and U.S. markets as well.

The business areas the Company is targeting



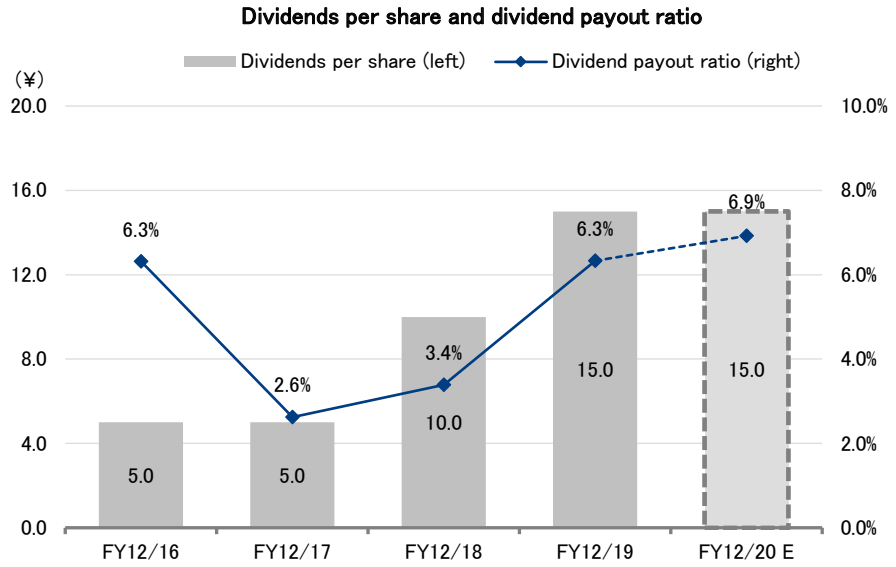
Source: Prepared by FISCO from the Company's results briefing materials

Shareholder return policy

Aiming to continuously maintain dividend payments and improve a dividend level that reflects results

Making fair returns to shareholders is an important concern of Company management, and the Company's basic policy is to return value to shareholders by paying dividends. The Company decides on its dividends after considering a comprehensive range of factors, including current profits, the targets of its medium-term management plan, and its financial strength.

For FY12/20, the Company plans to pay a dividend per share of ¥15.0 (for a dividend payout ratio of 6.9%), which is unchanged YoY. The level of the dividend payout ratio is low compared to those of other listed companies but this is because it is currently prioritizing investment for growth. The Company increased the dividend by ¥5 in FY12/19, while remaining committed to rewarding shareholders through share price appreciation driven by earnings growth, and stably paying dividends.



Note: The Company conducted a 2-for-1 stock split on July 1, 2017. Figures for FY12/16 have been retroactively adjusted.
Source: Prepared by FISCO from the Company's financial results

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