COMPANY RESEARCH AND ANALYSIS REPORT

RS Technologies

3445

Tokyo Stock Exchange First Section

29-May-2020

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https://www.rs-tec.jp/en/index.html

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Summary

The Company is launching a 12-inch silicon wafer business in China and is on a growth track in the Chinese semiconductor market

RS Technologies <3445> (hereafter, also "the Company") is a top reclaim service provider for silicon wafers, a major material for semiconductor chips. It has factories in Japan and Taiwan and the Company has the largest global market share with approximately 33% in mainstay reclaimed 12-inch wafers (300mm). 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. Sales and profits declined in FY12/19 due to the slow-down of prime wafer business

In the FY12/19 consolidated results, sales and profits declined, with net sales decreasing 3.8% year-on-year (YoY) to ¥24,501mn and operating income falling 18.0% to ¥4,717mn. The wafer business (reclaimed wafers) maintained the same level of earnings as in the previous fiscal year through the growth of the Taiwanese subsidiary, the prime wafer business in China suffered double-digit sales and profit decline due to the economic slowdown. Other major factors behind the lower profits were cost increases, including to strengthen the in-company management structure, and the recording of costs relating to correcting past fiscal year financial results. Also, at DG Technologies Inc., which was made a subsidiary in January 2019 and which conducts a business for semiconductor manufacturing equipment and parts, sales increased by nearly ¥2bn, but its operating income was small and profits declined as it recorded amortization of goodwill (¥154mn).

2. Decided to launch a 12-inch wafer business in China through a joint venture

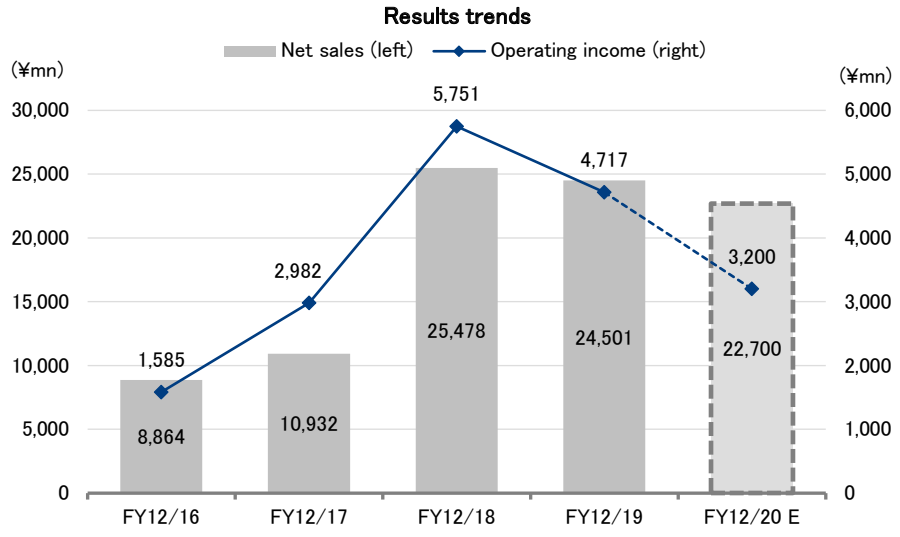
In December 2019, the Company announced an investment plan toward launching a 12-inch reclaimed wafer and prime wafer business in China. As a national policy, the Chinese government is focusing on developing its semiconductor industry and the Company is aiming to capture demand for 12-inch wafers, which is expected to increase in the future. As launching this business will require considerable funds, it is establishing a joint-venture company, with Grinm Advanced Materials, a state-owned company, and a Chinese government-related investment fund (the Company's investment ratio is 19.99%). In addition, the local government of Dezhou in Shandong, where a new plant is being constructed, will provide support, including subsidies and for infrastructure. For reclaimed wafers, the Company plans to invest ¥3.8bn for the first investment period and to start operations in FY2022, with a 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 have 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.

3. Results will enter a re-growth period from FY12/21 onwards

For the FY12/20 results, the forecasts are that net sales will decline 7.4% YoY to ¥22,700mn and operating income will fall 32.2% to ¥3,200mn. The main reasons for these lower earnings will be that in China, the production volume will temporarily decrease due to the impact of the Beijing plant's 8-inch, prime wafer mass-production line being transferred to the new plant in Dezhou by September 2020, and also as depreciation costs will increase following the strengthening of production capacity. At the current time, the effects of the COVID-19 outbreak are negligible, but in the event that the semiconductor market as a whole freezes due to the impact of the global pandemic, it may have a negative effect. The outlook is that results will once again enter a growth stage from FY12/21 onwards from the effects of strengthening the production capacities for 12-inch reclaimed wafers domestically and in Taiwan, and for 8-inch prime wafers in China. 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

- The Company has started a reclaimed silicon wafer business and is developing the prime wafer manufacturing and sales business in China.
- In its reclaimed wafer business, the Company has the globally leading share of the 12-inch market, at 33%, and its main customers include Taiwan Semiconductor Manufacturing Co., Ltd. (TSMC) <TSM>, Kioxia Corporation (formerly Toshiba Memory Corporation), and Sony Corporation <6758>.
- Under the medium-term management plan, the Company is targeting net sales of ¥31.6bn and operating income of ¥6.8bn in FY12/23 through actively investing in China.



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

Company overview

The Company has started a reclaimed silicon wafer business and is developing the prime wafer manufacturing and sales business in China

1. History

RS Technologies 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 GRIMN 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. So in actuality, it holds the management rights and it 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 able 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 RS) 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. In such ways, it has been expanding its business areas.

A strength for reclaimed wafers is the large number of times it can reclaim them through precision inspection and polishing technologies

2. Reclaimed wafers and prime wafers

To realize 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.

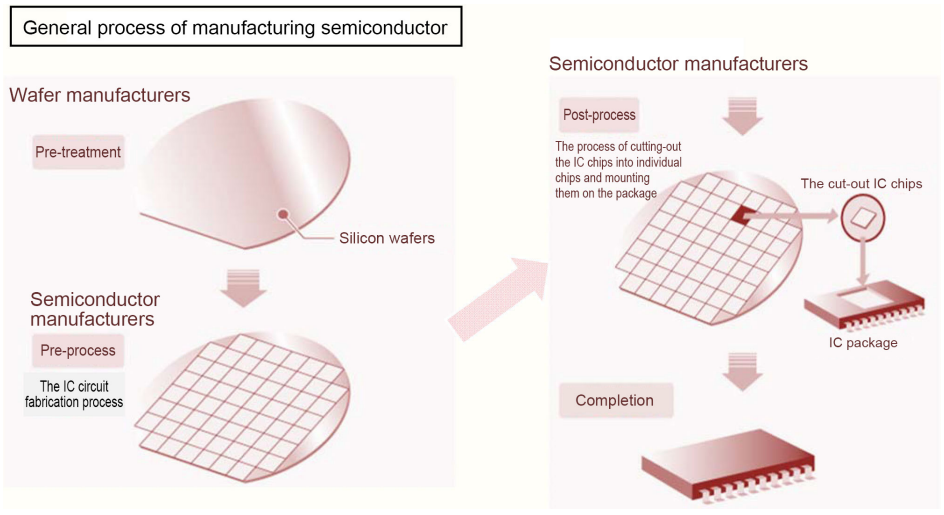
(1) Silicon wafers

"A semiconductor" is a substance that has intermediary properties between a conductor, which conducts electricity, and an insulator, through which electricity cannot pass. Integrated circuits (IC) are manufactured to use these properties 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 the typical semiconductors. They are installed in various applications, including home electrical appliances, information-communication devices, and automotive electrical equipment, and are known as the "rice of industry."

Various materials are used to support the required performance of these semiconductor motherboards, with silicon being among the most widely used. An ingot of a single crystal silicon is pulled out of melted polycrystalline silicon and then sliced thinly into wafers, and these wafers are called "silicon wafers." Semiconductor manufacturers use various types of semiconductor manufacturing equipment to fabricate detailed circuits on silicon wafers and thereby manufacture semiconductor chips.

* The thickness of a single 12-inch wafer is determined as 775μm±25μm, 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 (125mm) in diameter to 6 inches (150mm), 8 inches (200mm), and 12 inches (300mm). 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.

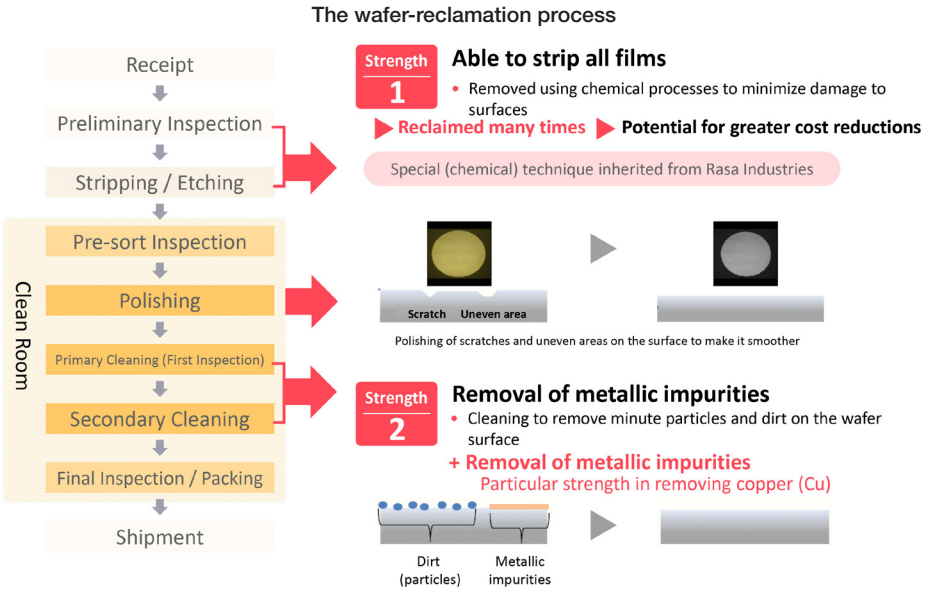
In the last few years, there has been a movement to explore the possibilities for an 18-inch (450mm) wafer as the next-generation wafer, but currently this movement has subsided. This is because, the technological aspect as seen from the manufacturing-equipment side is becoming increasingly complex and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

Also, it is not the case that all of the silicon wafers introduced into the semiconductor manufacturing line are used to manufacture semiconductor chips. Semiconductors are completed in the form of repeatedly creating fine wire patterns on the silicon wafer, so the manufacturing process is progressed while conducting 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 input to the semiconductor manufacturing line. Although it is basic to use a new wafer for the monitor wafer, there has arisen the need among semiconductor manufacturers to reuse (reclaim) the used monitor wafers in order to reduce the costs of manufacturing semiconductors, even if just by a little. 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% cheaper than that of 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 remove all of the film through a chemical process and perform precision polishing that keeps the damage to the wafer’s surface to the absolute minimum. This enables it to increase to 10 to 20 times the number of times a wafer can be reclaimed, which is around double the industry average. The thickness of a 12-inch prime wafer is approximately 775μm, and it is said that up to around 700μm 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 10μm 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 5μm, 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

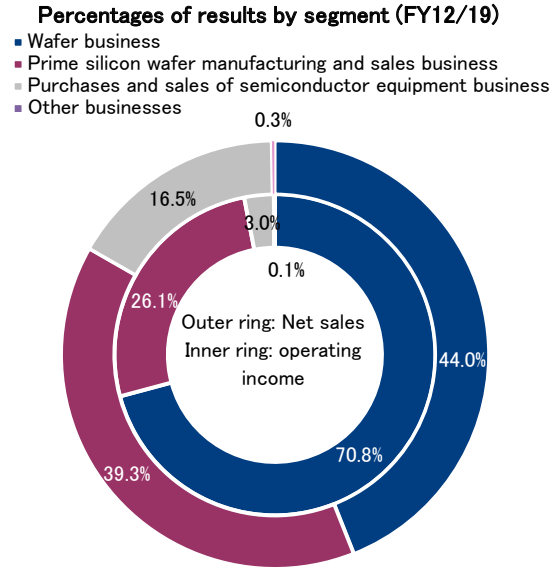
Prime wafer is the same meaning as new wafer. Wafer processing consists of front-end processing including silicon crystal ingot pulling and back-end processing including the slicing of ingots into wafers and polishing the surface of the wafers (manufacturers that handle both front-end and back-end processes 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. Its strengths include that, as previously stated, it can utilize various preferential treatment systems as a domestically funded company, and that the Company could benefit from the Chinese government's various measures with the national policy to focus on developing the semiconductor industry, it is able to benefit from the various measures it is implementing for this. 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 the globally leading share of the 12-inch market, at 33%, and its main customers include TSMC, Kioxia, and Sony

3. Business description

The three business segments are the wafer business, the prime wafer manufacturing and sales business, and the Semiconductor-related equipment and materials, etc., business, while it also discloses results for other businesses. Looking at the percentage of results by business segment in FY12/19, the wafer business provided 44.0% of net sales and 70.8% of operating income, and the prime wafer manufacturing and sales business 39.3% of net sales and 26.1% of operating income, and these two businesses are the Company's earning pillars.

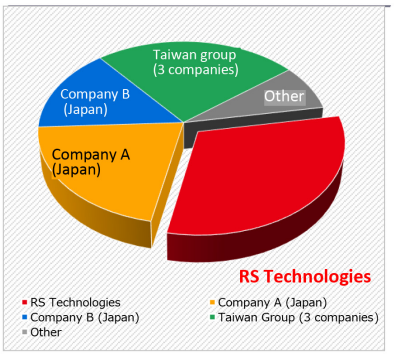


Source: Prepared by FISCO from the Company's financial results

(1) Wafer business

The wafer business is conducted by the Company and its Taiwanese subsidiary. At the end of 2019, the monthly production capacity for the mainstay 12-inch wafer by the Company was 250,000 wafers (it has production capacity of 120,000 wafers for 8-inches and below), while Taiwan has capacity for 150,000 wafers, for a total 400,000 wafers. On a volume basis, it has the globally leading share, at around 33%. 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

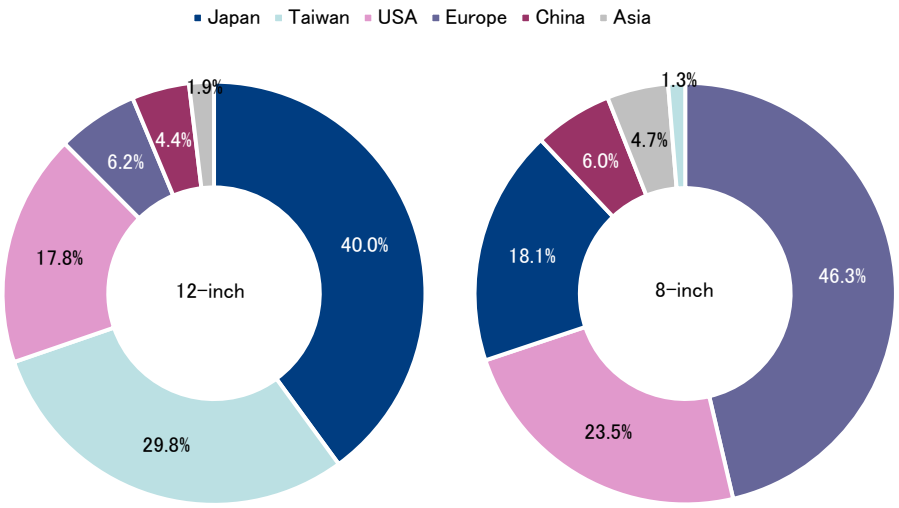
	FY12/15 1H	FY12/15 2H	FY12/16	FY12/17	FY12/18	FY12/19
RST Group Production Capacity	180,000 wafers	240,000 wafers	280,000 wafers	300,000 wafers	340,000 wafers	400,000 wafers
RST Group Market Share	19%	24%	29%	30%	31%	33%

Note: RTS survey

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

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

Percentages of shipment numbers in the reclaimed wafer business by region (FY2018)



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, from which we understand that it has a high share of the market as a whole. Conversely, a feature of the 8-inch wafer market is that its shares are high for Europe, at 58.0%, and the United States 28.2%, but that its shares for the other regions, including Japan, are relatively low. This is considered to be because the Company is focusing on the 12-inch wafer. Looking at the planned constructions 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. On 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 wafer manufacturing and sales business

The prime wafer manufacturing and sales business is conducted by the Chinese subsidiary GRITEK, and two thirds of its sales are of prime wafers and one third of 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. It also sells consumables and ingot overseas.

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

The Semiconductor-related equipment and materials, etc., business includes sales from selling semiconductor manufacturing equipment and semiconductor materials and parts that are purchased and sold by the company, and from the subsidiaries Union Electronics Solutions and DG Technologies. It mainly purchases the semiconductor manufacturing equipment from Japanese semiconductor manufacturers and others (including some new products), and primarily sells them on the Chinese market.

Also, Union Electronics Solutions mainly handles the power semiconductors of Hitachi Power Semiconductor Device, Ltd., as its no.1 specialty store, and also the MCU 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 domestic semiconductor manufacturing equipment manufacturers and semiconductor manufacturers. Its annual net sales are on scale of slightly less than ¥2bn, while it purchases silicon-related parts mainly from the Chinese subsidiary.

(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 1.59MW), 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

Sales and profits declined in FY12/19 due to a slump in the prime wafer business

1. FY12/19 results summary

In the FY12/19 consolidated results, net sales decreased 3.8% YoY to ¥24,501mn, operating income declined 18.0% to ¥4,717mn, ordinary income fell 11.8% to ¥5,416mn, and net income attributable to owners of the parent was down 16.2% to ¥3,035mn.

FY12/19 consolidated results

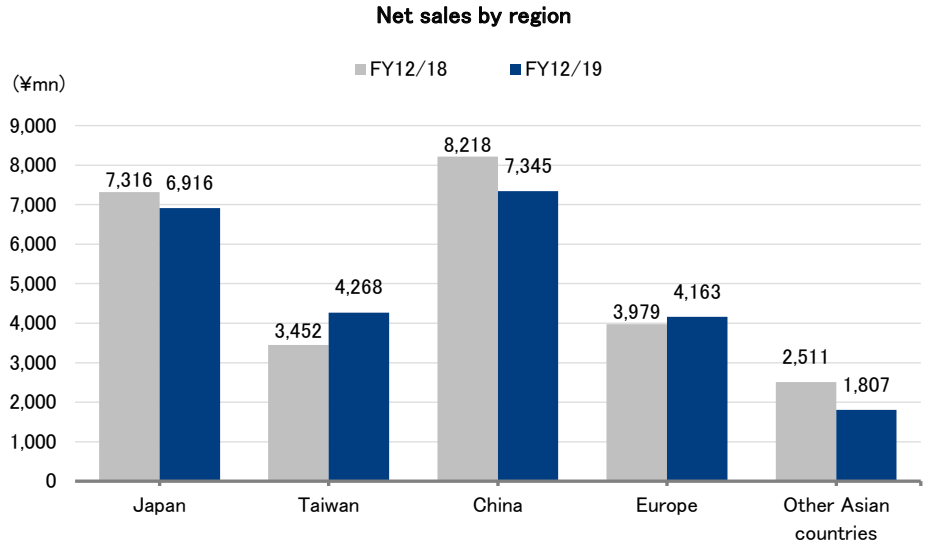
(¥mn)

	FY12/18		FY12/19				
	Results	% of sales	Initial plan	Results	% of sales	YoY	Vs. plan
Net sales	25,478	-	28,688	24,501	-	-3.8%	-14.6%
Cost of sales	17,112	67.2%	-	16,561	67.6%	-3.2%	-
SG&A expenses	2,614	10.3%	-	3,223	13.2%	23.3%	-
Operating income	5,751	22.6%	5,971	4,717	19.3%	-18.0%	-21.0%
Ordinary income	6,141	24.1%	6,151	5,416	22.1%	-11.8%	-11.9%
Extraordinary income (loss)	265	-	-	-406	-	-	-
Net income attributable to owners of the parent	3,620	14.2%	3,621	3,035	12.4%	-16.2%	-16.2%

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

The main reason for the decline in sales was the slump of the prime wafer business in China, which was affected by the economic slowdown. Looking at sales by region, sales increased 23.7% YoY for Taiwan and 4.6% for Europe and the United States, but they decreased 10.6% for China, 5.5% for Japan, and 28.0% for other Asian countries. At DG Technologies, which entered the scope of consolidation from January 2019, net sales were slightly less than ¥2bn, and it seems that on an existing businesses basis, sales declined by around 10%.

On the other hand, the main reasons for the decrease in operating income were that sales declined ¥604mn in the prime wafer business and that costs increased ¥343mn, mainly costs relating to correcting past fiscal year financial results and personnel costs following the strengthening of the in-company management structure. Also, although the effect of DG Technologies' operating income was only small, it recorded amortization of goodwill of ¥154mn.



Source: Prepared by FISCO from the Company's securities report

Non-operating income and expenses improved ¥309mn YoY. Looking at the main change factors, financial income improved ¥206mn, subsidy income in China increased ¥133mn, commissions received rose ¥93mn, commissions paid decreased ¥45mn, and the foreign-exchange gain declined ¥203mn. Also, in the previous fiscal period, a gain on negative goodwill of ¥265mn was recorded as extraordinary income, but in FY12/19, extraordinary losses were recorded, including ¥214mn for the plant relocation costs of the Chinese subsidiary, and ¥180mn for an impairment loss.

Looking at the results by Group company, the Company's net sales decreased 10.5% YoY and operating income declined 24.4%, while the Chinese subsidiary's net sales fell 15.6% and operating income decreased 23.9%, so sales and profits declined by double digits in both these companies, falling slightly below the initial target. The main factors behind the Company's decline in earnings were decrease in sales for reclaimed wafers and semiconductor-related equipment and parts, increase in personnel costs following the strengthening of the in-company management structure, and recording costs relating to correcting past fiscal year financial results. At the Chinese subsidiary, the main profit-decrease factors were decrease in sales for prime wafers, ingots, and consumables due to the impact of the economic slowdown triggered by the US-China trade friction, and recording costs associated with plant relocation, and its results were greatly below the initial forecasts. Conversely, results in the Taiwanese subsidiary steadily grew, with net sales increasing 19.3% and operating income rising 22.0%, surpassing its initial forecast. This is due to the effects of increasing production capacity from capital investment and against the backdrop of the rising demand from its main customers, like TSMC.

Results by Group company

(¥mn)

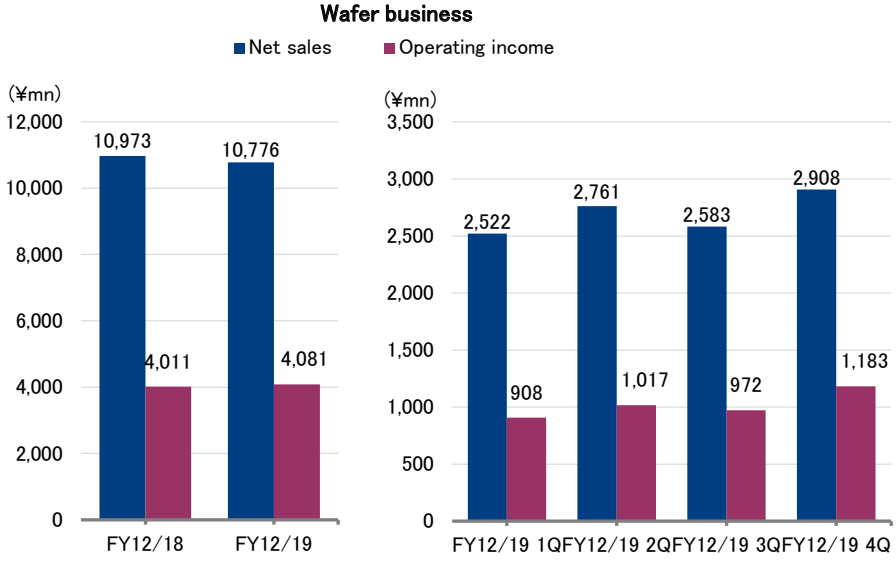
		FY12/18 Results	FY12/19 Initial forecast	FY12/19 Results	FY12/19 YoY
RS	Net sales	10,557	10,101	9,447	-10.5%
	Operating income	2,631	2,025	1,989	-24.4%
	Profit margin	24.9%	20.0%	21.1%	-3.8pt
Taiwanese subsidiary	Net sales	2,904	3,271	3,464	19.3%
	Operating income	972	935	1,185	22.0%
	Profit margin	33.5%	28.6%	34.2%	0.8pt
Chinese subsidiary	Net sales	11,919	11,867	10,058	-15.6%
	Operating income	2,049	2,786	1,564	-23.9%
	Profit margin	17.2%	23.5%	15.5%	-1.7pt
Other subsidiaries	Net sales	-	3,449	1,532	-
	Operating income	-	225	-21	-
	Profit margin	-	6.5%	-	-

* Other subsidiaries include Union Electronics Solutions and DG Technologies. Union Electronics Solutions was added to the scope of consolidation from FY12/18, but it has been omitted as its effects on results was negligible.
Source: Prepared by FISCO from the Company's results briefing materials

2. Developments by business segment

(1) Wafer business

In the wafer business, net sales decreased 1.8% YoY to ¥10,776mn and operating income increased 1.7% to ¥4,081mn. Depreciation costs rose following the strengthening of production capacity for 12-inch reclaimed wafers, but as demand was strong throughout the period from the main customers both domestically and overseas, the profit margin rose 1.3 percentage points (pp) YoY to 37.9%. The 12-inch reclaimed wafer monthly production capacity 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), but even so, the high facility utilization rate was maintained against the backdrop of the strong demand.



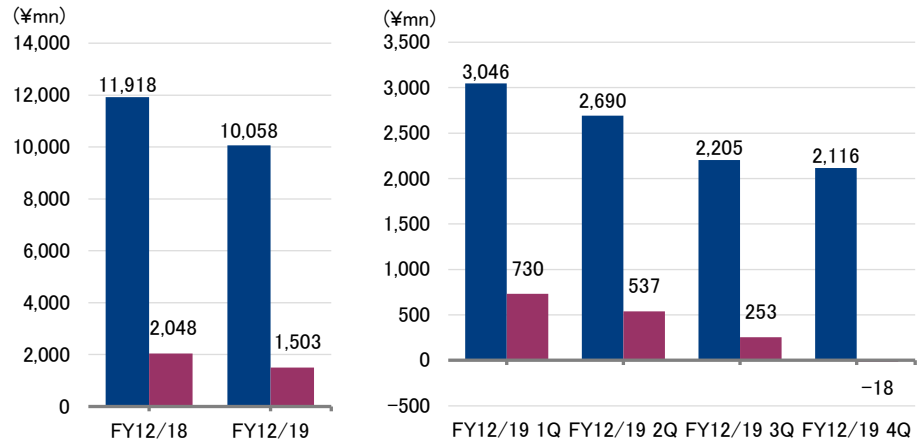
Note: Figures in the quarterly graph include internal sales and transfer sales.
Source: Prepared by FISCO from the Company's results briefing materials

(2) Prime wafer manufacturing and sales business

In the prime silicon wafer manufacturing and sales business, net sales decreased 15.6% YoY to ¥10,058mn and operating income declined 26.6% to ¥1,503mn. The main reasons for the declines in earnings include deterioration in the semiconductor market condition following the economic slowdown in China, decrease in sales for prime wafers, consumable materials, and other products, and recording increased depreciation costs and temporary costs due to a plant relocation. The operating income margin declined 2.3pp YoY to 14.9%, while the operating income margin before depreciation rose 1.2pp. It seems that this was mainly due to the rise in the in-house manufacturing rate of ingots used for 8-inch wafers.

Looking at the trends in net sales on a quarterly basis, we see that there is a downward trend, and that from 1Q through 2Q, the decrease was mainly of consumable materials, while in 3Q, the decline was due to the fall in demand for prime wafers. Also, the Company recorded operating loss in 4Q, but this included an employee early retirement allowance following the relocation of the Beijing plant, and recruitment costs and personnel costs for new employees toward the launch of the new plant in Dezhou.

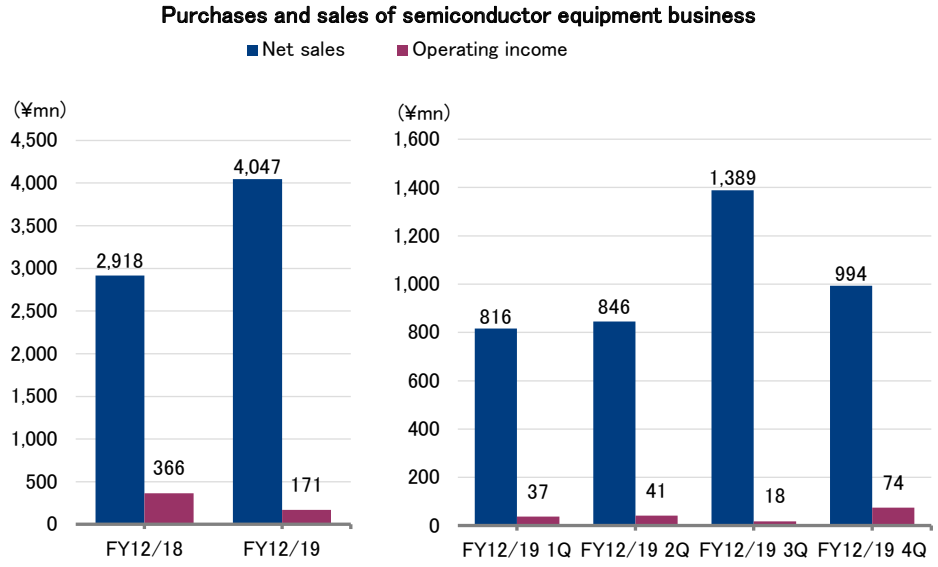
Prime silicon wafer manufacturing and sales business



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 purchases and sales of semiconductor equipment business, sales increased but profits decreased, with net sales rising 38.7% YoY to ¥4,047mn, but operating income falling 53.2% to ¥171mn. Sales increased due to DG Technologies being made a subsidiary, while the main profit-decrease factors were the changes to the sales-composition ratios and the recording of amortization of goodwill of ¥1.54mn.



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

Total assets greatly increased due to the effects of M&A, the funding and subsidies received from Dezhou City, and the recording of lease assets

3. The financial condition and management indicators

Looking at the financial condition at the end of FY12/19, total assets were up ¥12,043mn on the end of the previous fiscal period to ¥48,634mn. Breaking down the main change factors, in current assets, there were increases of cash and deposits of ¥7,276mn and inventory assets of ¥528mn, while decrease in trade receivables of ¥911mn. The main increase factors in non-current assets were an increase in construction in progress of ¥3,578mn following the advancement made to the new plant construction at the subsidiary Shandong RS, recording lease assets relating to overseas consolidated subsidiaries of ¥2,154mn following the adoption of IFRS No. 16, and recording goodwill of ¥502mn on making DG Technologies a subsidiary.

Total liabilities were up ¥5,199mn on the end of the previous fiscal year to ¥12,652mn. In current liabilities, there were increases in current portion of long-term borrowing scheduled to be repaid within the year of ¥411mn, accounts payable of ¥359mn, lease obligations of ¥317mn, and accrued expenses of ¥391mn. In non-current liabilities, there were increases of long-term borrowing of ¥384mn and lease obligations of ¥1,116mn. Net assets were up ¥6,843mn on the end of the previous fiscal year to ¥35,981mn. This was mainly because retained earnings increased ¥2,907mn due to the recording of net income attributable to owners of the parent, and also due to funding from Dezhou City to Shandong RS. Non-controlling interests rose ¥4,139mn.

Looking at the management indicators, the equity ratio, which indicates stability, decreased from 49.6% at the end of the previous fiscal period to 42.7%, while the interest-bearing debt ratio rose from 15.5% to 17.5%. The main factors behind the decrease in the equity ratio was that non-controlling interests increased significantly, from ¥10,973mn at the end of the previous fiscal period to ¥15,113mn, following the funding for Shandong RS, and also due to the recording of lease assets on the adoption of IFRS No. 16. However, as the interest-bearing debt ratio is at the low level of below 20% and the Company has an abundance of cash on hand, it can be judged to be maintaining a sound financial condition. For the indicators of profitability, ROE, ROA, and the operating income margin all declined, but the operating income margin was still maintained at above 10%, and looking to the medium term, it is forecast that the high level of profitability can be maintained in the future also.

Looking at cash flow developments, in FY12/19, net cash provided by operating activities was ¥9,015mn, rising significantly from ¥2,669mn in the previous fiscal period. Although net income before income taxes decreased ¥1,397mn YoY, the main reasons for this increase were due to the amount of subsidies received by the Chinese subsidiary rising by ¥3,072mn, while the payment amount of income taxes, etc., decreased by ¥820mn. Net cash used in investing activities was ¥6,107mn, with the main cash outflow items including purchase of property, plant, and equipment of ¥3,407mn, purchase of intangible assets of ¥1,401mn, and purchase of shares of DG Technologies of ¥627mn. Net cash provided by financing activities was ¥4,206mn, with the main inflow items being proceeds from share issuance to non-controlling shareholders of ¥3,455mn and an increase in borrowings.

Consolidated balance sheet

(¥mn)

	FY12/16	FY12/17	FY12/18	FY12/19	Increase/ decrease amount
Current assets	5,348	7,387	26,074	32,760	6,685
(Cash and deposits)	1,952	3,243	14,879	22,156	7,276
Non-current assets	5,333	4,843	10,516	15,873	5,357
Total assets	10,682	12,230	36,591	48,634	12,043
Current liabilities	2,992	3,370	4,979	7,252	2,273
Non-current liabilities	4,317	3,334	2,474	5,400	2,926
Total liabilities	7,310	6,704	7,453	12,652	5,199
(Interest-bearing debt)	5,147	4,033	2,812	3,634	821
Total net assets	3,371	5,525	29,137	35,981	6,843
(Stability)					
Equity ratio	31.5%	45.1%	49.6%	42.7%	-6.9pt
Interest-bearing debt ratio	152.9%	73.1%	15.5%	17.5%	2.0pt
(Profitability)					
ROA	14.3%	27.6%	25.2%	12.7%	-12.5pt
ROE	29.5%	47.6%	30.6%	15.6%	-15.0pt
Operating income margin	17.9%	27.3%	22.6%	19.3%	-3.3pt

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

Consolidated cash flow statement

(¥mn)

	FY12/16	FY12/17	FY12/18	FY12/19
Cash flow from operating activities	964	2,744	2,669	9,015
Cash flow from investing activities	-776	-202	-22	-6,107
Cash flow from financing activities	-91	-1,252	9,550	4,206
Balance of cash and cash equivalents at the end of the period	1,714	2,916	14,652	21,363

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

Forecasts

The Company has decided to launch a 12-inch silicon wafer in China, aiming for further growth

1. Changes to the investment plan for China

In December 2019, the Company announced that it had reviewed its investment plan for China in the future. Specifically, it has judged that demand for 12-inch prime wafers is set to increase more than expected alongside the growth of the Chinese semiconductor market, so it will put on hold one part of its plan to increase production of 8-inch prime wafers, and instead it will invest in development toward the mass production of 12-inch prime wafers at an early stage. At the same time, it decided to invest in new facilities for 12-inch reclaimed wafer production bases in China. There are currently 7 new 12-inch semiconductor factories planned in China, and the company will positively capture the growing demand for 12-inch wafers.

Changes to the investment plan for China

	Previous investment plan	New investment plan (disclosed December 18, 2019)
Business environment	• Growth in power semiconductor demand is expected accompanying the growth in home appliance and automobile market.	• Situation has changed where demand for 12-inch wafers is expected to increase more than previously anticipated, accompanying the growth of the semiconductor market.
Investment strategy	• Establish global quality in 8-inch prime wafers then enter 12-inch wafer business.	• Partially review plans to install additional capacity for 8-inch wafers. • Decide on earlier advance into 12-inch wafer business.
Investment plan	• 8-inch prime wafer production capacity of 220,000 wafers/month in 2021. (70.000 existing + 150,000 additional wafers)	• 8-inch prime wafer production capacity of 120,000 wafers/month in 2021. (70.000 existing + 50,000 additional wafers) • Start R&D for mass production of 12-inch prime wafers → Install a test line: (10,000 wafers/month), target to achieve high quality and mass production. • Make investment for production base in China for 12-inch reclaimed wafer business.

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

Also, as the investment scheme for the 12-inch wafer business, the Company, GRINM, and a Dezhou City Government-related fund invested to establish a joint venture in 2020 (the Company's investment ratio is 19.99%), which will start as an equity-method affiliate. To realize mass production of 12-inch prime wafers, investment on a scale of tens of billions of yen is required, and therefore the Company decided to establish a joint-venture company to keep down the initial risk, but it has in sight raising its investment ratio in the future. 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, like for electric power and gas.

In the investment plan for the future, in 2021 the Company will introduce a 12-inch prime wafer test line for R&D use (monthly production of 10,000 wafers). It plans to invest ¥0.5bn in 2020, including to establish infrastructure in factories, and ¥4.5bn in 2021 to construct a test line. The targets are to realize mass production in the next two to three years, and then in the two years after that, to start mass production while acquiring certification from semiconductor manufacturers, toward establishing a mass production structure with a monthly production capacity of 300,000 wafers in the future.

On the other hand, in the investment plan for 12-inch reclaimed wafers, 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. It has not yet decided on the time period for the subsequent second investment period, but it has in sight strengthening the production capacity by a further 50,000 wafers per month.

As the total amount for prime wafers and reclaimed wafers, the capital investment amount up to 2022 will be ¥8.8bn. But of this amount, the Company's contribution will be approximately ¥1bn.

Under the medium-term management plan, the Company is aiming for net sales of ¥31.6bn and operating income of ¥6.8bn through actively investing in China

2. Medium-term management plan

The Company has announced its new (four year) medium-term management plan. The plan's targets for FY12/23 are net sales of ¥31,600mn and operating income of ¥6,800mn. The forecasts are for sales and profits to decline in FY12/20 due to the impact of a plant relocation of the Chinese subsidiary, but from FY12/21 onwards, it will transition to a re-growth stage. The operating income margin is set to bottom-out at 14.1% in FY12/20, and the Company is aiming for it to increase to 21.5% in FY12/23. The effects of higher sales should offset the rise in depreciation costs associated with increased investment. The average growth rates, with FY12/19 as the base year, are assumed at 7% for net sales and 10% for operating income for the four years. Also, during this period, it assumes that the semiconductor market will grow by 5%. With that said, at FISCO, we think the Company's target is an achievable level.

The medium-term management plan for the reclaimed wafer business and the prime wafer business

(¥mn)

	FY12/19		FY12/20		FY12/21		FY12/22		FY12/23	
	Results	YoY	Forecasts	YoY	Forecasts	YoY	Forecasts	YoY	Forecasts	YoY
Net sales	24,501	-3.8%	22,700	-7.4%	27,000	18.9%	29,800	10.4%	31,600	6.0%
Operating income	4,717	-18.0%	3,200	-32.2%	4,800	50.0%	6,100	27.1%	6,800	11.5%
Operating income margin	19.3%	-	14.1%	-	17.8%	-	20.5%	-	21.5%	-
Ordinary income	5,416	-11.8%	3,400	-37.2%	5,000	47.1%	6,400	28.0%	6,900	7.8%
Ordinary income margin	22.1%	-	15.0%	-	18.5%	-	21.5%	-	21.8%	-
Profit attributable to owners of parent	3,035	-16.2%	2,400	-20.9%	3,000	25.0%	3,600	20.0%	4,000	11.1%
Earnings per share	236.98	-	187.07	-	233.84	-	280.61	-	311.79	-
Capital investment	6,752		15,400		5,700		4,500		Undecided	
(of which, the Chinese joint-venture company)	-		1,000		4,500		3,300		Undecided	
Depreciation expenses*	1,814		2,400		3,300		4,300		Undecided	

*Depreciation expenses were estimated by FISCO from the interview with the Company
Source: Prepared by FISCO from the Company's results briefing materials

(1) Reclaimed wafer business

For the reclaimed wafer business, the Company is aiming for a 40% share of the global market for 12-inch wafers. In addition to strengthening the production capacity in Japan and Taiwan, the Chinese joint venture company will start mass production from 2022. The 12-inch, reclaimed wafer monthly production capacity for the entire Group will increase from 400,000 wafers in FY12/19 to 500,000 wafers in FY12/22.

Looking at the capital investment plan, domestically the Company will invest ¥0.2bn in 2020, ¥1bn in 2021, and ¥0.2bn in 2022, to increase the monthly production capacity from 270,000 wafers in 2021 to 280,000 wafers 2022. In Taiwan, it will invest ¥0.2bn in both 2020 and 2021 and ¥1bn in 2022, to increase the monthly production capacity from 150,000 wafers in 2021 to 170,000 wafers in 2022. With 2022 as the main investment period, it plans to introduce inspection machines and polishing machines to respond to miniaturization. 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	◊	150,000 wafers	170,000 wafers
Dezhou plant*						50,000 wafers
Total	300,000 wafers	340,000 wafers	400,000 wafers	◊	420,000 wafers	500,000 wafers

*Scheduled to be completed in September 2020
Source: Prepared by FISCO from the Company's results briefing materials

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	0.2	1.0	Invest in miniaturization (inspection and polishing machinery) in 2022
Dezhou plant*	0.5	-	3.3	Invest in plant improvements in 2020, first investment period in 2022
Total	0.9	1.2	4.5	

*The Dezhou plant's portion is from the newly established joint-venture company (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 wafer manufacturing and sales business

In the prime wafer business, the plan is to increase the 8-inch wafer production capacity from the current 70,000 wafers per month to 120,000 wafers in 2021. However, in 2020, the production capacity will temporarily fall following the plant relocation. Looking at the time schedule, the equipment in the Beijing plant will be sequentially transferred to the Dezhou plant from January until the end of September 2020, and the plan is to end the production of 8-inch wafers.

Conversely, the equipment transferred to the Dezhou plant will start operations sequentially from October, with the aim of producing 70,000 wafers, the same as before, in 2021. Also, the newly established facilities will start operations sequentially from October, and the plan is for them to produce 50,000 wafers in 2021. As the investment amount for strengthening the production capacity, the Company plans capital investment of ¥14bn in FY12/20.

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

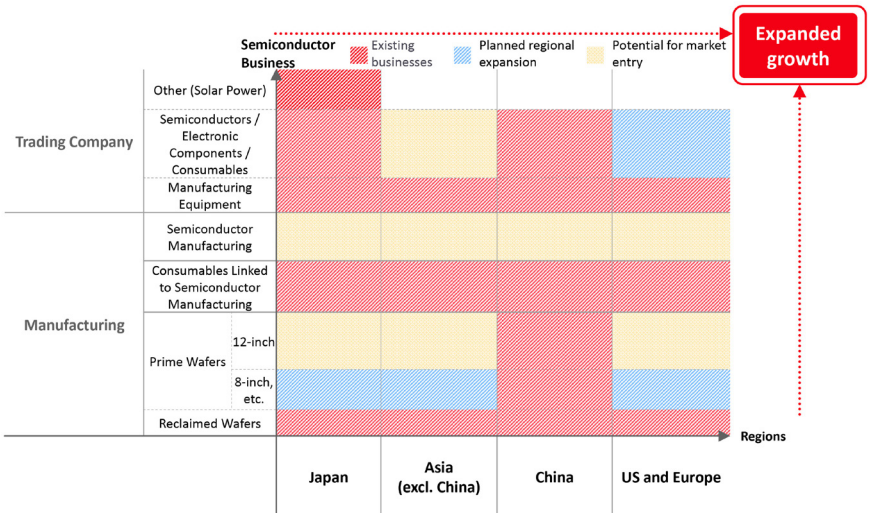
The Chinese government is developing its semiconductor industry as a national policy, and it is aiming to increase the rate of domestic production, which is currently only around 15%, to as high as 70% by 2025. Among fabless manufacturers, HiSilicon Technology, which is a subsidiary of Huawei Technologies, has already demonstrated that it has world-leading design and development capabilities through its Kirin chip set for smartphones, and its sales scale has grown to as a high as US$7bn. However, it is fact that China still lags behind other countries for semiconductor manufacturing technologies and materials technologies, and 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 stealing 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, the percentage of total sales of sales to China was 30.0%, but if the Company realizes 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.

(4) Business areas and the development of sales region 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, US, and European markets, but the Company is aiming to catch up and to begin sales to the world. 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 US markets as well.

The business areas the Company is targeting



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

The outlook is for sales and profits to decline in FY12/20 due to a temporary fall in production following the relocation of a China plant

3. Company forecasts for FY12/20

The Company's FY12/20 consolidated results forecasts are for net sales to decrease 7.4% YoY to ¥22,700mn, operating income to fall 32.2% to ¥3,200mn, ordinary income to decline 37.2% to ¥3,400mn, and net income attributable to owners of the parent to decrease 20.9% to ¥2,400mn. The main reasons for these declines include the economic slowdown in China, temporal fall in the production volume due to the relocation of a subsidiary's plant, and increase in depreciation costs.

FY12/20 consolidated results forecasts

(¥mn)

	FY12/19		FY12/20 E			
	1H results	Full-year results	1H forecast	YoY	Full fiscal year forecast	YoY
Net sales	12,515	24,501	11,200	-10.5%	22,700	-7.4%
Operating income	2,755	4,717	1,400	-49.2%	3,200	-32.2%
Ordinary income	2,920	5,416	1,400	-52.1%	3,400	-37.2%
Profit attributable to owners of parent	1,723	3,035	1,000	-42.0%	2,400	-20.9%
Earnings per share (EPS) (¥)	134.54	236.98	77.95		187.07	

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

Looking at the results forecasts by Group company, the outlook is that the Company's net sales to decrease 1.6% YoY to ¥9,300mn and its operating income to decline 14.5% to ¥1,700mn. Although demand for reclaimed wafers is expected to be steady, it is assuming a strong yen, of an assumed exchange rate of ¥108 to US$1 (compared to the actual rate of ¥111 to US$1 in the previous fiscal period), so profits are expected to decline by around ¥0.1bn due to exchange-rate fluctuations, while the increases in personnel costs and other costs will also cause profits to decrease.

At the Taiwanese subsidiary, the forecasts are for higher sales but lower profits, with net sales to increase 15.5% YoY to ¥4,000mn and operating income to decrease 15.6% to ¥1,000mn. Demand for reclaimed wafers will trend steadily, but operating income will fall mainly due to increases in depreciation costs and other costs. Also, at the Chinese subsidiary, the forecasts are for net sales to decrease 31.4% YoY to ¥6,900mn and operating income to decline 87.2% to ¥200mn. Net sales will decline primarily because of the economic slowdown in China and the temporary fall in production volume due to the plant relocation. In profits also, although the temporary costs for the plant relocation recorded in the previous fiscal period will not be recorded, profits will decline because, in addition to the decrease in sales, depreciation costs will increase following the capital investment in 8-inch prime wafers. The forecasts for the other subsidiaries are net sales of ¥2,500mn and operating income of ¥300mn.

Forecasts

Results outlook by Group company

(¥mn)

		FY12/19		FY12/20 E	
		Results	YoY	Company forecasts	YoY
RS	Net sales	9,447	-10.5%	9,300	-1.6%
	Operating income	1,989	-24.4%	1,700	-14.5%
	Profit margin	21.1%	-3.8pt	18.3%	-2.8pt
Taiwanese subsidiary	Net sales	3,464	19.3%	4,000	15.5%
	Operating income	1,185	22.0%	1,000	-15.6%
	Profit margin	34.2%	0.8pt	25.0%	-9.2pt
Chinese subsidiary	Net sales	10,058	-15.6%	6,900	-31.4%
	Operating income	1,564	-23.9%	200	-87.2%
	Profit margin	15.5%	-1.7pt	2.9%	-12.6pt
Other subsidiaries	Net sales	1,532	-	2,500	63.2%
	Operating income	-21	-	300	-
	Profit margin	-	-	-	-

* Other subsidiaries include Union Electronics Solutions and DG Technologies. Union Electronics Solutions was added to the scope of consolidation from FY12/18, but it has been omitted as its effects on results was negligible.
Source: Prepared by FISCO from the Company's results briefing materials

Shareholder return policy

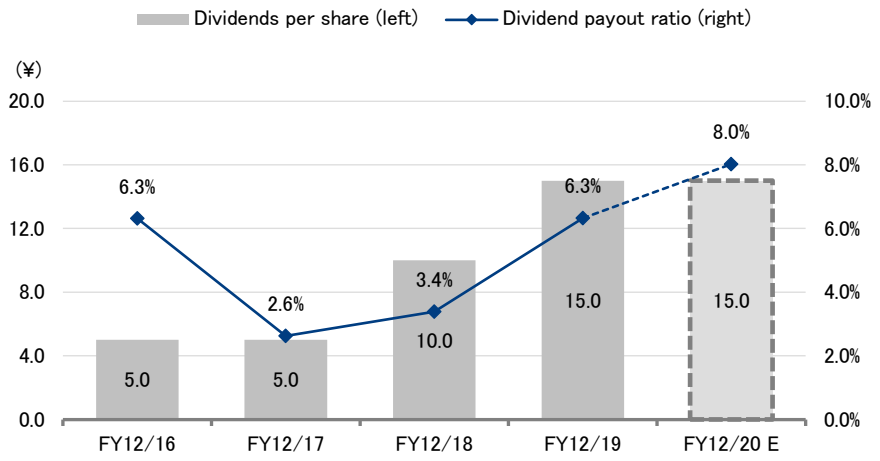
Aiming to continuously maintain dividend payments and a dividend level that reflects results

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 8.0%), 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, proving its stance of focusing on consideration for rewarding shareholders through the rise in the share price through revenue growth, while also stably paying dividends.

Shareholder return policy

Dividends per share and dividend payout ratio



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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