COMPANY RESEARCH AND ANALYSIS REPORT

RS Technologies

3445

Tokyo Stock Exchange First Section

31-May-2018

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Summary

Announcement of Prime Wafer Business Plan for China
Low risk entry into the market through joint-venture with a local company
Rising expectations regarding high growth potential over the medium-to-long term

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 a global production share of approximately 40% in mainstay reclaimed 12-inch wafers. In 2018, the Company entered the prime wafer business in China to establish an additional earning base and to increase the 8-inch wafer production capacity.

1. Announced entry into prime wafer business in China

In December 2017, the Company announced its entry into the prime wafer business in China. Until then, the Company has specialized in reclaimed wafers, but will now become an integrated manufacturing of new wafers. Integrated manufacturing of prime wafers includes the single crystal silicon ingot making ('pulling'), which is very difficult with substantial risks. The company President Nagayoshi Ho, who is originally from China, has taken the full advantage of joint-venture strategy and minimized the risks. Based on our research, we believe the Company's 8-inch prime wafer business has a strong chance of success.

2. Entering the enormous Chinese market, which accounts for roughly 40% of global semiconductor consumption, through the joint-venture with a local company

The Company entered the prime wafer business by adding GRINM Semiconductor Materials Co., Ltd. (GRITEK), a company with extensive experience and track record, as a subsidiary of the Company. GRITEK is a top-level manufacturer and supplier of 8-inch wafers in China where considerable growth potential lies. In addition to being the largest market that consumes roughly 40% of the world's semiconductors, we expect the Chinese semiconductor market to achieve unparalleled growth because of the Chinese government policy to nurture the industry. We view the Company's success in this business very likely owing to its strong connections in China.

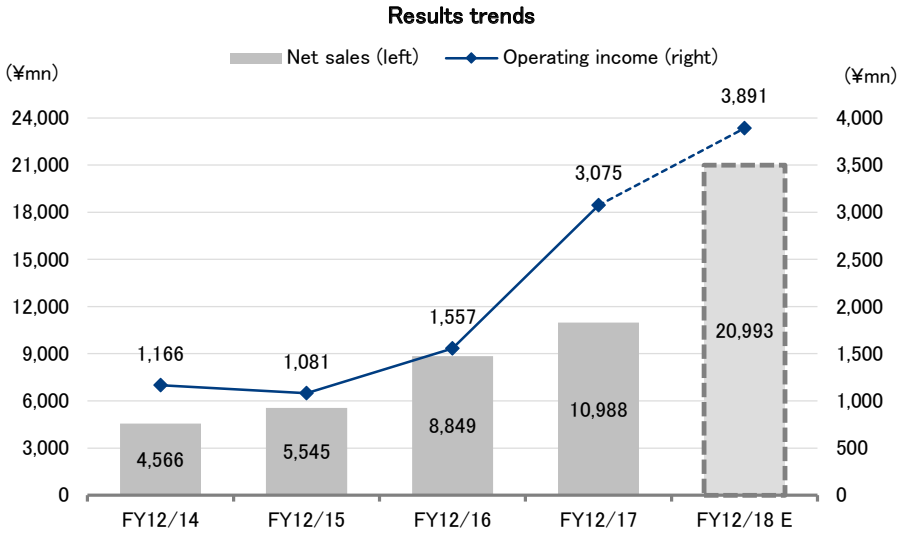
3. Expect continued strong growth in reclaimed wafer business and skyrocketing earnings by adding prime wafer business

RS Technologies continues to steadily develop its reclaimed wafer business, an established earnings driver for the Company. The Company plans to increase production capacity by roughly 15% in 2019 and it has been developing new markets by leveraging its metal film removal technology. The Company also plans to sharply increase GRITEK's production capacity by 4x (stage 1) and 7x (stage 2). Based on these growth strategies, the company targets FY12/21 sales of ¥29,000mn and operating income of ¥6,300mn. While the Company has not released a forecast for FY12/23, the year it plans to finish its prime wafer production capacity increase, we think the consolidated sales could surpass ¥50bn and the consolidated operating income could top ¥10bn, if it can expand its reclaimed wafer business through capital investment and M&A and achieve further growth in the prime wafer business.

Summary

Key Points

- In the process of quadrupling 8-inch wafer production capacity in China; aiming to increase the capacity by sevenfold over medium-term
- Two-part growth strategy of increasing reclaimed wafer production capacity and opening up new markets
- If the Company can smoothly expand prime and reclaimed wafer businesses, we think the sales could reach ¥50 billion over medium-term



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

Business summary and growth strategy

Started in wafer reclamation processing; developed businesses in Japan and Taiwan

1. History and business environment

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 business and currently has two sites, the Sanbongi Factory in Osaki City, Miyagi Prefecture (formerly Rasa Industries' plant) and the Tainan Factory in Taiwan, which began operation in February 2014.

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Business summary and growth strategy

Main events in the Company's history

December 2010	RS Technologies was established, mainly to conduct a silicon wafer reclaim business. It launched its business after purchasing the equipment that RASA Industries used for its wafer reclaim business and also concluded a lease agreement with it for the Sanbongi Factory's industrial buildings. Furthermore, it hired some of the employees who had left RASA Industries.
January 2011	Sanbongi Factory began operations
November 2011	Sanbongi Factory acquired the ISO 90001: 2008 certification.
March 2013	It acquired a used goods dealer's license and started sales of machinery.
October 2013	It launched a solar power station business at the Sanbongi Factory.
February 2014	It established a consolidated subsidiary in Taiwan.
March 2015	It was listed on the TSE Mothers market
December 2015	It completed the construction of the Taiwanese subsidiary's Tainan Factory.
September 2016	Its listing was transferred to the TSE First Section
December 2017	Announced entry into Chinese prime wafer market

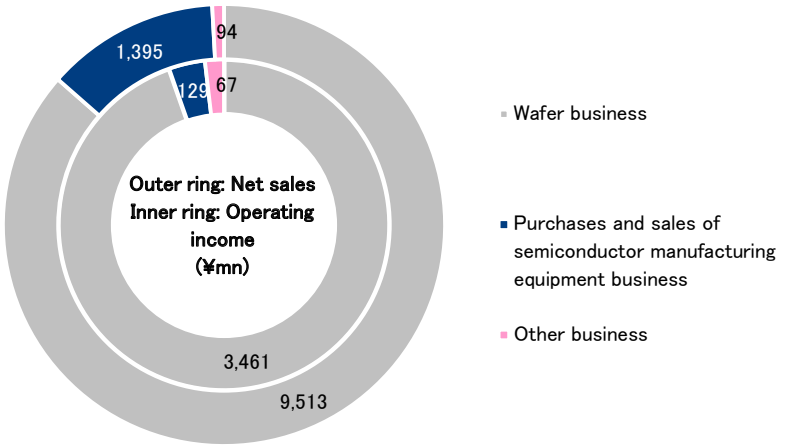
Source: Prepared by FISCO from the Company's securities report, etc.

In FY12/17, the Company had three business segments, the wafer business, the purchases and sales of semiconductor manufacturing equipment, and the others segment. The wafer business consisted of the above-mentioned reclaimed silicon wafer business. This business is discussed in detail below.

As the name indicates, the purchases and sales of semiconductor manufacturing equipment business involves the purchase of used semiconductor manufacturing equipment from semiconductor manufacturers around the world and then their sale to Chinese companies. The Company aims to become a full-fledged, so-called, general trading company in China in the future. The distribution of used manufacturing equipment is common for liquid crystal panel manufacturing equipment, and a similar development is expected to emerge in the future for semiconductor manufacturing equipment. But, the Chinese semiconductor industry is still in its infancy and as yet the distribution of used equipment has not become fully established.

Other businesses include the earnings from technical consulting and solar power generation at Sanbongi Factory.

Percentages of sales (FY12/17 results)



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

Silicon wafers are an essential material for semiconductor chips

2. Overview of silicon wafer business

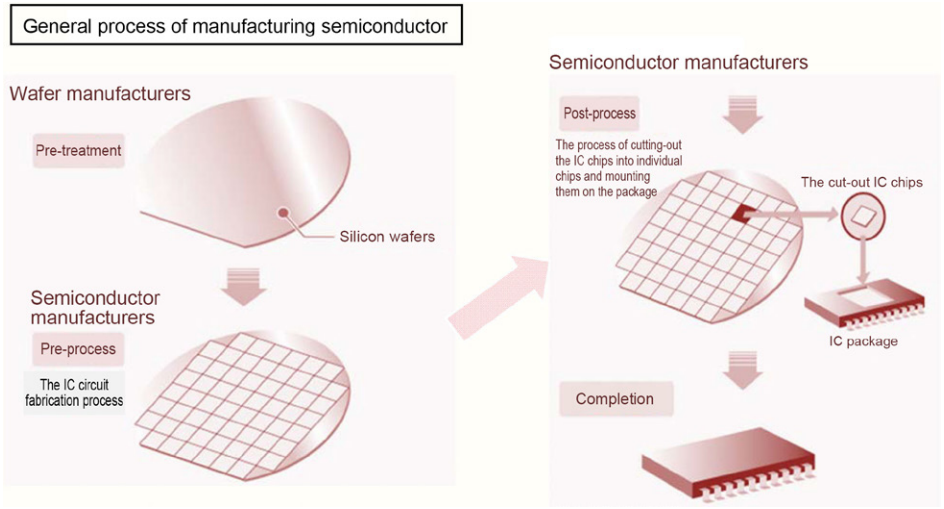
In order to understand the Company's silicon wafer reclaiming business, its roadmap for the future, and its strengths and growth potential, it is essential to understand the manufacturing process of and role played by silicon wafers as well as the manufacturing methods used to produce them. We provide 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. An IC includes the CPU, which is 'the brain' of the PC, and memory to store information (such as flash memory and DRAM). Speaking of semiconductors today, it commonly means a "product that applies the properties of a semiconductor," or in other words IC, and it also refers to the terms like semiconductor chips or IC chips.

There are various substances with semiconductor properties, but presently silicon is widely used for the mass production of IC. For this usage, an ingot of single crystal silicon is pulled out of molten polycrystalline silicon and then sliced into thin wafers. These wafers are called "silicon wafers." Semiconductor manufacturers use various types of semiconductor manufacturing equipment to fabricate detailed circuits on these silicon wafers to manufacture semiconductor chips.

Semiconductor manufacturing process



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

Silicon wafers come in various sizes, but the trend is for larger sizes. This is because the manufacturing costs per semiconductor chip can be lowered by fabricating as many semiconductor chips as possible on a single silicon wafer. Currently, 12-inch (300mm) diameter wafers are the largest and the mainstream. There are also smaller sizes, such as 8 inches, 6 inches, and 5 inches, while 18-inch (450mm) wafer is set to appear in the future. Larger wafers are more difficult to manufacture and process, and it is important to note that these difficulties are the technological barriers to a new entrant.

(2) Prime wafers and monitor wafers

As mentioned above, the semiconductor production begins with processing silicon wafers, but not all silicon wafers are used to make semiconductor chips. As previously explained, the semiconductor manufacturing process is a series of extremely detailed processes, so it is necessary to test and evaluate the processes at each stage. The silicon wafers used for these testing purposes are usually called “test wafers,” “dummy wafers,” or “monitor wafers” (in this report, they are collectively referred to as “monitor wafers”). Wafers that are processed all the way through to make semiconductor chips are called prime wafers.

Silicon wafers are formed by cutting cylindrical silicon crystal ingots into disk-shaped wafers. A single silicon crystal ingot can be cut into several hundred silicon wafers. Even wafers from the same ingot have subtle differences depending on where they were cut from the ingot. This can be compared to different parts of a blue-fin tuna as each part tastes differently. A specific wafer based on its physical properties is chosen to be processed on a given semiconductor production line, according to the applications it is best suited for.

Currently, approximately 20% of all wafers are used as monitor wafers. Although you initially need new wafers for testing and evaluation purposes, the need will arise among semiconductor manufacturers to reuse (reclaim) the used monitor wafers in order to reduce the costs of manufacturing. In response to this need, the Company provides the silicon wafer reclaim service, in which it polishes and cleans the surfaces of used monitor wafers to its original condition so they can be used again.

The Company is to produce prime wafers in China. Wafer processing consists of front-end processes, which are basically silicon crystal ingot pulling, and back-end processes, which include the slicing of ingots into wafers and polishing and cleaning of the surface of the wafers. The manufacturers that handle both front-end and back-end processes are called integrated manufacturers and most silicon wafer makers are the integrated manufacturers. While all these processes require advanced technology, the success of silicon wafer manufacturing businesses depends largely on front-end process yield. 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 prime wafers that can be produced from one silicon crystal ingot. There is a large price difference between a prime wafer and a monitor wafer.

Basic two-pronged growth strategy: expand original reclaimed wafer business and enter Chinese silicon and semiconductor businesses

3. Growth strategy of RS Technologies

As mentioned above, the Company has decided to enter the prime wafer market, thereby changing its medium-to-long term management strategy. The Company’s new medium-to-long term management strategy consists of two themes, (1) expansion of market share in the reclaimed wafer market and (2) entering the Chinese silicon and semiconductor market.

Medium- to long-term management policy

1. Increase share of the market for reclaimed wafers
① Increase production capacity
② Capture growing demand
③ Exploit the potential global market for reclaimed wafers
2. Entering into the Chinese semiconductor market
① Increase 200mm prime wafer production capacity
② Increase 300mm prime wafer production capacity
③ Enter Chinese market for target materials (semiconductor components)
④ Increase sales in China of SPE and related materials

Source: Prepared by FISCO from the Company's medium-term management plan briefing materials

1) Increase share of the market for reclaimed wafers

In line with the Company's original management plan, it has expressed its determination to shore up its position as the top reclaimed wafer manufacturer in the world. Increasing production capacity and capturing growing demand are side by side. In connection with this, as mentioned above, the Company has announced plans to invest in increasing its reclaimed wafer production capacity in both Japan and Taiwan. The Company also views its proprietary metal film removal technology as a key element in the development of untapped markets for reclaimed wafers. As we discuss below, the Company is making steady progress toward commercialization of this technology.

2) Entering into the Chinese silicon and semiconductor market

This theme is included in the Company's medium-to-long term management plan which refers to businesses including the sales of semiconductor production equipment (SPE) and related consumables. However, the decision to enter the prime wafer market in China have changed the content and priorities of the Company's businesses in China considerably. While the investment underway to increase the 200mm prime wafer production capacity is, of course, the top priority, we find it very interesting that the next priority is to enter the 300mm prime wafer market. The Company's fourth priority is growth in its Chinese SPE and related materials businesses. We believe the importance of this business remains completely unchanged and its growth potential might have even increased. In terms of business growth in China, we advocate looking not only at the prime wafer business, but also examining all of the Company's operations closely.

Details and outlook for prime wafer business

Entry into Chinese market by adding a major Chinese silicon wafer manufacturer into subsidiary

1. Outline of the plan

On December 1, 2017, the Company announced that it would enter the Chinese prime wafer market by adding GRINM Semiconductor Materials Co., Ltd. (GRITEK), a wholly owned subsidiary of Chinese state-owned company General Research Institute for Nonferrous Metals (GRINM), as a consolidated subsidiary.

This was accomplished by forming a joint venture Beijing GRINM RS Semiconductor Materials Co., Ltd. (BGRS) between the Company and GRINM, and by making the operational company GRITEK a wholly owned subsidiary of BGRS.

The joint venture BGRS was formed with the following ownership arrangement: GRINM (49% ownership), RS Technologies (45%), and Fujian Kuramoto (6%). When you combine GRINM's stake with Fujian Kuramoto, a Chinese company based in Fujian province, BGRS is 55% Chinese owned, and therefore BGRS and GRITEK are treated as Chinese companies. At the same time, Fujian Kuramoto is owned by a member of President Nagayoshi Ho's Chinese family, giving RS Technologies effective control (51%) and making GRITEK a consolidated subsidiary of RS Technologies.

Being considered a Chinese company gives GRITEK sizable advantages over foreign companies in terms of capital investment and business operations and it is eligible for subsidies from the Chinese central government and local governments.

The abovementioned measures for making GRITEK into a consolidated subsidiary were completed on January 30, 2018. In March 2018, capital was increased by roughly ¥9.1 billion through public offering and third-party allocation and the Company therefore has all of the funds necessary for the prime wafer business over the near term (some money was also invested in the reclaimed wafer business).

History of the prime wafer business (December 2017 – March 2018)

Date	Event
December 1, 2017	Announcement of decision to make GRITEK a consolidated subsidiary and plans to establish a related joint venture and enter the Chinese prime wafer market
January 10, 2018	Borrowed ¥4.0 billion from Sumitomo Mitsui Banking Corporation related to the establishment of BGRS
January 30, 2018	Completion of establishment and capital pay-in for joint venture BGRS, making GRITEK a wholly owned subsidiary of BGRS and a consolidated subsidiary of RS Technologies
March 6, 2018	Announcement of equity financing (total amount to be procured: ¥10.5 billion, with ¥1.1 billion used to increase reclaimed wafer production capacity and the remainder to be used for the Chinese prime wafer business, including repayment of loans)
March 13, 2018	Determination of issue price (¥7,110) and amount to be procured (¥9.183 billion)

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

Overview of funds procured and applications

(¥mn)

	Item	Procurement amount	Remark
Procurement	General public offering	8,261	1,220,000 shares/¥6,771.6
	Capital increase by third party allocation	921	136,100 shares/¥6,771.6
	Approximate amount	9,183	After deducting capital procurement costs
Applications	Loan repayment	4,200	Loan for BGRS capital pay-in
	BGRS capital increase	2,800	
	Prime wafer equipment	1,083	
	Reclaimed wafer plant improvements (Sanbongi Factory)	400	
	Reclaimed wafer plant improvements (Tainan Factory)	700	
	Application total	9,183	

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

Five players in Chinese market supply 8-inch wafers; production supply chain mostly in place

2. Conditions in Chinese silicon wafer market

(1) Status of main players

The Chinese market has grown to the point where it consumes 40% of global chip supplies, but only 10% of the output is produced by Chinese companies.

The market for silicon wafers, a major material used in semiconductor production, also resembles the structure described above. As mentioned above, many sizes of wafers, with the largest being 12 inches, are used for semiconductor production. The largest and most advanced wafers being produced in China are 8-inch (200mm) wafers. While some Chinese chipmakers use 12-inch wafers, nearly all 12-inch wafers are imported from overseas (including Japan). We therefore think Chinese domestic self- sufficiency for semiconductor materials including silicon wafers is even lower than that of semiconductor chips (approximately 10%).

We understand there are currently just over 10 silicon wafer manufacturers in China and roughly five (including GRITEK) can supply 8-inch wafers. We estimate that each of these five companies has a monthly production capacity of between 50,000 and 100,000 wafers, making the total monthly capacity roughly 300,000 wafers. Though not all of these manufacturers are necessarily shipping at full nominal capacity, GRITEK is one of the few companies producing 8-inch wafers above nominal capacity.

All of these companies are planning aggressive production capacity increases. While the capacity increase schedule is different for each company and the details are not clear, we expect Chinese 8-inch wafer monthly production capacity to more than triple from its current level of 300,000 wafers to over 1 million wafers by 2020-2021.

Production capacity and expansion plans of Chinese 8-inch wafer manufacturers

Company name	Affiliation	Current capacity (wafers/month)	Planned expansion (wafers/month)	Remark
GRITEK	Chinese company	50,000	150,000	Consolidated subsidiary of RS Technologies
Tianjin ZHONGHUAN Semiconductor Joint-STOCK Co, Ltd.	Chinese company	50,000	100,000	
Ferrotec Holdings	Overseas company (Japan)	50,000	300,000	Two plants (Hangzhou and Shanghai)
Wafer Works	Overseas company (Taiwan)	100,000	100,000	
MCL Electronic Materials Ltd. (MCL)	Chinese company (America's Technology)	50,000	100,000	
Total of five companies		300,000	750,000	

Source: Prepared by FISCO from the Company material

(2) Conditions in the Chinese market

The reason behind these companies' plans to aggressively invest in capacity increase is that the market is highly likely to expand rapidly in China due to the supports from the national and local governments. We understand China's current total monthly production capacity for 8-inch wafers is 500,000. Some market observers forecast that this will rise to 1 million by 2021-2022. The 'Made in China 2025' project announced by the Chinese government in May 2105 targets integrated circuit (IC) self-sufficiency of 40% by 2020 and 70% by 2025. If these targets come true, the Chinese domestic demand for silicon wafers will rise sharply and the demand for 8-inch wafers will likely far outstrip 1 million per month.

Silicon wafers produced in China are mainly shipped to Chinese semiconductor plants for several types of semiconductor chips. Since the wafers made in China are only 8-inch wafers, they are not used for memory chips or CPUs which uses 12" wafers. The main customers are manufactures for logic ICs, application-specific integrated circuits (ASICs), and power ICs.

The manufacture of silicon wafers requires various types of production equipment such as single-crystal pulling machines, dicers, and polishers, and key parts and materials such as quartz crucible, polishing compounds (polishing powder) and polishing cloth. It is important to develop a supply chain for these materials to increase the output. We understand that polycrystal silicon for semiconductor may be obtained in China. So is quartz crucible. Production equipment can be obtained from manufacturers in South Korea, Japan, and China. While not all materials in the supply chain can be obtained in China, silicon wafer production in China is possible if the remaining items are imported from South Korea or Japan.

Strategy is to quickly expand business scope by quadrupling GRITEK's 8-inch wafer production volume

3. Business strategy of RS Technologies Group

RS Technologies decided to enter the prime wafer business by forming an alliance with a top-level Chinese company rather than going alone. This resulted in the joint venture that made GRITEK a consolidated subsidiary of the Company. GRITEK (established in 2001) and parent company GRINM (established in 1952) have many years of experience in integrated silicon wafer production and they are currently one of the few companies capable of producing 8-inch wafers at nominal production capacity.

The Company plans to take the advantage of GRITEK's strengths and kick off its prime wafer business by increasing the 8-inch production capacity. The Company plans to increase its monthly 8-inch wafer production capacity by 150,000, from its current level of 50,000 to 200,000 by the end of 2020.

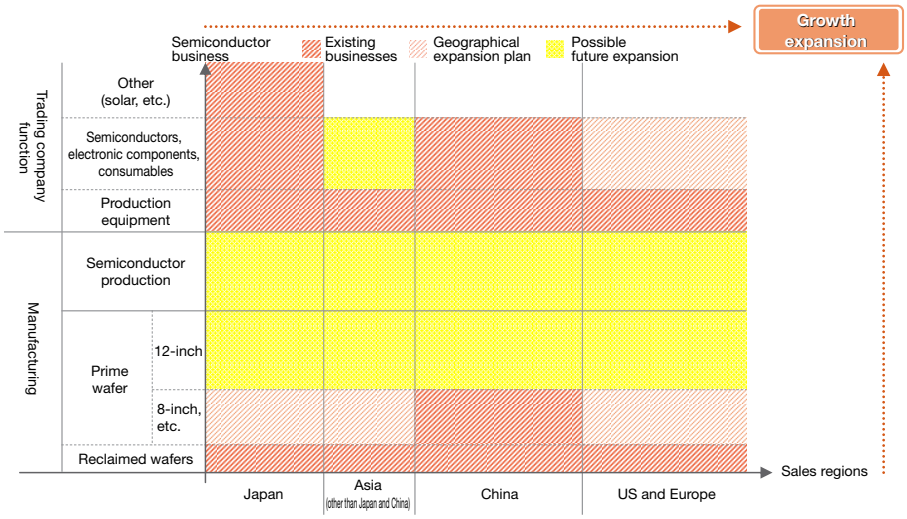
The Company has announced the plans to install production equipment with monthly production capacity of 150,000 wafers at a new plant with building floor space of roughly 50,000 square meters on a 150,000-square-meter plot of land in Tangshan City, Hebei Province. The building has already been constructed and we understand the purchase orders for major pieces of equipment such as lifting machines have already been placed. GRITEK has monthly production capacity of 50,000 wafers in Beijing, but the Company plans to move this capacity to the new site to consolidate the production in one central location once the new site is up and running.

The Company plans capital investment of ¥9.4 billion to increase the production capacity by 150,000 wafers per month by 2020. As the Company expects to receive subsidies from the Chinese national government and local governments for the land and buildings, it plans to use nearly all of the ¥9.4 billion for production equipment. As mentioned above, the Company completed capital procurement in March 2018 and is ready to go in terms of financing.

In anticipation of rapid growth of silicon wafer demand in China, the Company is considering a second stage of production capacity increase (an additional150,000 per month) starting in 2021. This would bring monthly 8-inch wafer production capacity to 350,000, seven times the current level. However, the Company has yet to decide the details, including the implementation schedule.

Looking at the Company's roadmap for the semiconductor business, its original reclaimed wafer business is its base while it has also been developing SPE and consumables businesses, taking the role of a trading company. The Company has decided to move ahead with the manufactur of 8-inch prime wafers and is considering a step-up to 12-inch wafers at a proper junction.

Business roadmap for RS Technologies



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

Based on GRITEK's experience and its talented human resources, we think the prime wafer business is likely to succeed

4. Prime wafer business forecast

(1) Earnings forecast

The Company has released earnings forecast for the next five years in the prime wafer business. Five years from now, in FY12/23, the Company forecasts net sales of ¥23,390mn and operating income of ¥5,690mn (combined total for GRITEK, which will handle the prime wafer business, and parent company BGRS).

We believe we need to be cautious on several points with this forecast. First, the forecast factors in earnings contribution from the second stage of production capacity increase (150,000 per month), but no decisions have been made regarding this step. While we think the Company is likely to move forward with the second stage of capacity increase, details such as the scale of capacity increase could be changed. Another factor is the Company's price assumptions. We understand the Company's forecast is based on mid-2017 wafer prices. While wafer prices have been on rise since then, wafers have, to some extent, become commoditized and it is possible for prices to decline. We believe it is more realistic to view the abovementioned earnings forecast as an indication of the earnings potential of the prime wafer business.

The Company forecasts a decline in operating income in FY12/19 and we believe this is attributable to depreciation costs and the costs associated with moving the operations. The Company plans capital investment of ¥9.4 billion for the first stage of production capacity increase and plans to begin full depreciation in FY12/19, using a conservative accounting method. The company plans to gradually install and start operations of equipment and it will begin posting depreciation costs in advance starting in FY12/19. This is expected to have a negative impact on profits. Moving expenses will be posted when GRITEK transfers equipment from the Beijing plant to the new plant.

We believe that, depending on trends in the reclaimed wafer business, the abovementioned profit decline could shrink considerably. This is because we expect a roughly 15% increase in reclaimed wafer production capacity in 2019. We expect the ramping up of the additional capacity to be smooth and the prices to remain steady or rise based on the current supply-demand balance. We think this scenario looks likely if the Company can install the equipment in 1H.

(2) Our view of the prime wafer business and focus points going forward

We think the Company's entry into the prime wafer business has a high probability of success. In entering the business, the Company has prioritized risk reduction and we view this as the most important aspect of this move.

The crystal pulling process is an important aspect of production and, in the course of our discussions with Company representatives and further research, our concerns in this area were substantially alleviated. This is due to two factors. The first is the conversion of GRITEK into a subsidiary. GRITEK has an established pulling operation which includes 8-inch wafers. We believe the conversion of GRITEK into a subsidiary lowers risk considerably compared with a scenario wherein the Company would attempt to enter the Chinese market on its own. The other factor is that the Company has been independently preparing to enter the prime wafer business for quite some time. The important aspect of this preparation is its measures to secure engineering and human resources. While the Company has not provided details regarding this issue, we understand that it has hired multiple highly experienced engineers in Japan and sent them to China in order to consider and prepare for entry into the Chinese prime wafer market. We believe the confirmation by these engineers that the Company could succeed in the prime wafer business in China was the direct catalyst leading to the decision to move ahead with the launch of the business.

We have few concerns regarding business risk on the sales side. The main reason is that the market has the support of the Chinese national government. As one aspect of the its efforts to increase China’s self-sufficiency ratio in terms of semiconductor production, government grants subsidies equal to 20% - 30% of the price of wafers to domestic corporations. We believe this will directly improve the cost competitiveness and margin of GRITEK’s products. In addition, GRITEK already has a solid customer base. GRITEK currently has roughly 30 customers, some of which we understand have very close ties to Chinese semiconductor manufacturers. As mentioned above, owing to strong growth in demand for wafers in China, we see little risk on the sales side if production goes smoothly.

Our focus going forward is the start of production for the first stage of capacity increase (150,000 wafers per month). At the earliest, we think the Company could gradually begin installing equipment in 1H 2019, followed by test runs and the start of commercial production. If equipment ramps up smoothly at this early stage, we would see a much higher chance of success for subsequently installed equipment. On the other hand, if the Company has trouble at this stage, the ramp up to capacity of 200,000 wafers per month may be delayed. We need to monitor the progress.

Growth strategy and progress in reclaimed wafer business

Two-part growth strategy: increasing production capacity and creation of new markets

1. Growth strategy for the reclaimed wafer business

Even after the Company's decision to enter the prime wafer market, its reclaimed wafer business remains very important. The reclaimed wafer business is positioned as a growth engine along with the prime wafer business.

We believe the Company has a two-part growth strategy for its reclaimed wafer business. The first part is growth through expansion of the Company's production capacity. The Company's quantitative target in this area is to capture 40% of the global market share. The second part is development of untapped markets, in other words, growth through creation of new markets. The key to achieve this objective is the Company's proprietary metal film removal technologies.

Below, we discuss the Company's progress on both parts of its strategy.

15% increase (50,000 wafers/month) in planned capacity in 2019; we expect an even greater increase in actual production capacity

2. Plan to increase reclaimed wafer production capacity

The Company has announced plans to increase reclaimed wafer production capacity at the Sanbongi Factory and the Tainan Factory. The Company mainly handles 12-inch reclaimed wafers and the additional production capacity will also be for 12-inch wafers.

Currently, the Company's 12-inch monthly reclaim capacity is 300,000 wafers (200,000 at the Sanbongi Factory and 100,000 at the Tainan Factory). The Company plans capital investment of ¥400mn to increase monthly capacity at the Sanbongi Factory by 20,000 wafers and ¥700mn at the Tainan Factory to increase capacity by 30,000 wafers. The Company expects the new capacities at both factories to become operational in 2019.

12-inch reclaimed wafer production capacity

Factory	Size	Monthly production capacity at term-end			
		2016	2017	2018	2019
Sanbongi Factory	12-inch wafer	180,000	200,000	200,000	220,000
	8 inches or less	120,000	120,000	120,000	120,000
Tainan Factory	12-inch wafer	100,000	100,000	100,000	130,000

Source: Prepared by FISCO from the Company material

We view the scale and timing of this production capacity increase as appropriate. Both the Sanbongi and Tainan factories have been operating at full capacity and are finding it increasingly difficult to keep up with demand from customers. Normally, when production capacity is ramped up gradually, capacity utilization could temporarily decline, resulting in lower profit. We think, however, a monthly capacity increase of 20,000 to 30,000 strikes a favorable balance between responding to customers' needs and maintaining high capacity utilization and profit margins.

Over the past few years, the Company has achieved production levels above its nominal capacity through measures such as increasing productivity by removing bottlenecks and optimizing its process capabilities. While the planned capacity increase will require substantial investment to install new production equipment, we think the actual increase in capacity could surpass the plan announced by the Company. If our view is correct, we think that by around the end of 2019, monthly production capacity for 12-inch reclaimed wafers could be 250,000 – 270,000 at the Sanbongi Factory and 150,000 – 160,000 at the Tainan Factory.

Global monthly demand for 12-inch wafers is estimated at 5.5 million – 6.0 million units and roughly 20% of these (1.1 million – 1.2 million) are the reclaimed wafers. The Company has targeted a global market share of 40% for some time, and we view this production capacity expansion plan as a major step toward achieving the goal.

Some customers have certified the use of the Company's proprietary metal film removal technology; moving toward full-scale start of business

3. Development of new market with metal film removal technology

When customers are using monitor wafers for testing and evaluation purposes, some chip makers actually use metals such as copper to form a test circuit on wafers. Currently, such monitor wafers with metal circuit are discarded and not reclaimed. The reason is that when metal circuits are formed, the metal sometimes permeates into the interior (bulk) of the wafer and cannot be completely removed by polishing the wafer surface.

It is estimated that, of all monitor wafers produced (5.5 million – 6.0 million per month), a roughly 5% (approximately 280,000 per month) of wafers are discarded because they have metal circuit on them. This is a sizable volume roughly equal to the Company's total production capacity for 12-inch wafers. The Company developed technology that allows monitor wafers with metal circuits to be reclaimed. We believe RS Technologies is currently the only company with this type of technology and it could therefore dominate the new market with approximately 280,000 wafers per month.

However, for this technology to be used, it must be certified by customers. The Company has taken measures to receive certification from a number of its key customers and has received certification from some of its major customers. We believe wafer reclamation using metal film removal technology will begin in FY12/18 and we will be carefully watching the opening of this new market.

Earnings trends and outlook

Strong growth in sales and income on higher reclaimed wafer volume and price

1. FY12/17 results

The results of FY12/17, net sales rose 24.2% YoY to ¥10,988mn, operating income climbed 97.4% to ¥3,075mn, ordinary income advanced by 122.2% to ¥3,223mn, and profit attributable to owners of parent company jumped 154.1% to ¥2,210mn.

After announcing its initial forecast, the Company raised its forecast twice (in August 2017 and January 2018) and results surpassed even these upwardly revised forecasts.

FY12/17 results

(¥mn)

	FY12/16		FY12/17				
	Full-year	YoY	Initial forecast	Revised forecast August 2017	Revised forecast January 2018	Full-year result	YoY
Net sales	8,849	59.6%	8,556	9,450	10,750	10,988	24.2%
Gross profit	2,516	34.4%	-	-	-	4,345	72.7%
Gross profit margin	28.4%	-	-	-	-	39.5%	-
SG&A expenses	958	21.3%	-	-	-	1,269	32.4%
Ratio of SG&A expenses to net sales	10.8%	-	-	-	-	11.6%	-
Operating income	1,557	44.1%	1,939	2,550	3,000	3,075	97.4%
Operating income ratio	17.6%	-	22.7%	27.0%	27.9%	28.0%	-
Ordinary income	1,450	54.7%	1,825	2,650	3,100	3,223	122.2%
Profit attributable to owners of parent	869	185.8%	1,177	1,630	1,950	2,210	154.1%

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

In the core wafer business, the Company achieved strong growth in sales and income, as net sales were ¥9,513mn (up 33.2% YoY) and operating income was ¥3,461mn (up 101.4%). Operating margin of 36.4% was well above the FY12/17 level of 24.1%. As mentioned below, rising prices and sales volume resulted in sales growth, which drove growth in operating income.

Expectations for price increase for reclaimed wafers have also risen, following the rise in prices for prime wafers in 1Q of 2017. While the Company has adopted a conservative stance regarding price increases, we understand it raised prices for reclaimed wafers by roughly 5% in 4Q 2017 in response to strong overall demand.

The Sanbongi Factory has been operating at full capacity for quite some time and the Tainan Factory has been operating at full capacity since early 2017. Monthly designed capacity is 200,000 units for the Sanbongi Factory (for 12-inch wafers, additional capacity for 8-inch wafers and smaller) and 100,000 units for the Tainan Factory (12-inch wafers only). However, both factories are operating above designed capacity by removing the bottlenecks and improving the yields (through re-evaluation of over specification). This has resulted in production-volume-driven sales growth.

In the business of purchases and sales of used semiconductor production equipment, net sales declined by 13.4% YoY to ¥1,395mn and operating income fell by 41.3% to ¥129mn. We view this as a reactive decline from unusually strong sales and income in FY12/16 when there was a temporary demand for LCD modules. For the continuing business basis, transaction volumes for SPE and consumables have been rising steadily.

Breakdown by business segment

(¥mn)

		FY12/16			FY12/17					
		1H	2H	Full year	1Q	2Q	3Q	4Q	Full year	YoY
Net sales	Wafer business	2,944	4,200	7,144	2,102	2,250	2,339	2,820	9,513	33.2%
	Purchase and sales of semiconductor manufacturing equipment business	885	725	1,611	430	152	537	275	1,395	-13.4%
	Other business	47	45	93	20	30	25	18	94	1.2%
	Subtotal	3,877	4,971	8,849	2,552	2,434	2,902	3,114	11,003	24.3%
	Adjustments	0	0	0	0	-14	0	0	-15	-
	Total	3,877	4,971	8,849	2,552	2,419	2,902	3,114	10,988	24.2%
Operating income	Wafer business	511	1,206	1,718	790	766	725	1,178	3,461	101.4%
	Purchase and sales of semiconductor manufacturing equipment business	168	53	221	59	25	68	-23	129	-41.3%
	Other business	33	33	66	12	24	18	11	67	1.3%
	Subtotal	713	1,293	2,006	863	816	812	1,165	3,658	82.3%
	Adjustments	-206	-242	-448	-130	-145	-147	-159	-583	-
	Total	506	1,050	1,557	733	671	664	1,005	3,075	97.4%

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

Forecasts sharp rises in sales and profit as GRITEK is consolidated; firm earnings in 1Q

2. Full-year forecast for FY12/18

For FY12/18, the Company forecasts net sales of ¥20,993mn (up 91.0% YoY), operating income of ¥3,891mn (up 26.5%), ordinary income of ¥3,897mn (up 20.9%), and net income attributable to owners of the parent of ¥2,585mn (up 17.0%).

On May 14, 2018, the Company announced 1Q FY12/18 net sales of ¥5,204mn (up 103.9% YoY) and operating income of ¥1,189mn (up 62.2%). In 1Q, the Company made strong 24.8% progress toward its forecast full-year net sales and 30.6% progress toward its operating income target.

Overview of full-year forecast for FY12/18

(¥mn)

	FY12/17			FY12/18					
	1Q	1H	Full-year	1Q	YoY	1H (E)	YoY	Full year (E)	YoY
Net sales	2,552	4,971	10,988	5,204	103.9%	10,043	102.0%	20,993	91.0%
Gross profit	999	1,960	4,345	1,656	65.8%	-	-	-	-
Gross profit margin	39.1%	39.4%	39.5%	31.8%	-	-	-	-	-
SG&A expenses	265	556	1,269	467	76.2%	-	-	-	-
Ratio of SG&A expenses to net sales	10.4%	11.2%	11.6%	9.0%	-	-	-	-	-
Operating income	733	1,404	3,075	1.189	62.2%	1,763	25.5%	3,891	26.5%
Operating income ratio	28.7%	28.3%	28.0%	22.8%	-	17.6%	-	18.5%	-
Ordinary income	919	1,598	3,223	934	1.6%	1,681	5.1%	3,897	20.9%
Profit attributable to owners of parent	605	1,069	2,210	471	-22.2%	1,106	3.4%	2,585	17.0%

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

The main reason for the FY12/18 net sales to be expected to rise sharply, nearly doubling YoY, is the consolidation of GRITEK, which handles the prime wafer business. Starting in FY12/18, the scope of consolidated accounting will consist of businesses consolidated as of FY12/17 (mainly the reclaimed wafer business) plus GRITEK's prime wafer business.

In FY12/18, the Company forecasts net sales of ¥20,993mn. As it forecasts net sales at GRITEK of ¥9,070mn, we infer that it expects net sales from existing businesses of ¥11,923mn, which is 8.5% higher than FY12/17 net sales of ¥10,988mn.

We believe net sales from existing businesses are likely to surpass the Company's forecast. This is because some sales in the business of purchases and sales of used semiconductor production equipment are not factored into the Company's forecast. The Company commented that it did not factor in these sales because the nature of the equipment business makes it difficult to forecast results.

For this reason, we believe nearly all of the forecast net sales of ¥11,923mn is attributable to the reclaimed wafer business and this is 25.3% higher than the ¥9,513mn in sales posted by the reclaimed wafer business in FY12/17. We view this growth rate forecast as reasonable. In response to rising prices for prime wafers in FY12/17, the Company raised prices on reclaimed wafers by roughly 5% in 4Q FY12/17. While we do not expect another price increase in FY12/18, the price hike implemented in FY12/17 will contribute fully to earnings in FY12/18. Also, while we do not think full-scale increases in production capacity will contribute to sales volume growth until FY12/19, we expect growth in actual production volume resulting from steady increases in productivity and further yield-enhancement to result in increased revenue.

The Company forecasts FY12/18 companywide operating income of ¥3,891mn, with GRITEK accounting for ¥1,280mn. The Company also expects an increase in costs of roughly ¥200mn related to employees seconded to GRITEK. Adjusting for these two factors, we believe the Company expects operating income from existing businesses of ¥2,811mn, which is 8.6% lower than in FY12/17 (¥3,075mn).

We think the Company is likely to surpass its forecast of YoY decline of operating income in existing businesses, because we think its net sales forecast looks low. As mentioned in the discussion on sales above, very little earnings contribution from the trading company business has been factored into the Company's forecast. Another reason is that the Company's forecast for operating margin is lower than the previous years. The Company's forecast for operating margin in existing businesses is 23.6%. As very few earnings from the trading company business are factored into the forecast, we assume this operating margin is mainly for the reclaimed wafer business. In FY12/17, operating margin in the wafer business segment was 36.4%. Looking at 1Q-3Q FY12/17 (to adjust for the one-off positive impact from price increases implemented in 4Q), we note that operating margin was 34.1%. When considering that, as mentioned above, price increases implemented in FY12/17 will have a full-year impact in FY12/18. Even if the operating margin declines, we do not think the YoY decline will be 10 percentage points or greater.

We believe the Company's operating income forecast for GRITEK is based on previous years' results and we think results are likely to be in line with the Company's forecast. As prime wafer prices in China are on an uptrend, we think operating income could surpass the Company's forecast if production goes smoothly as it did in FY12/17.

Net sales likely to reach ¥50bn over medium-term on contribution from smooth startup of prime wafer business and steady growth of reclaimed wafer business

3. Medium-term performance forecast

The Company's forecast for the prime wafer business is discussed above, but it has also announced companywide (including the prime wafer business) medium-term targets. In FY12/21, the final year covered by the medium-term earnings forecast, the Company forecasts net sales of ¥29,000mn and operating income of ¥6,300mn. These targets include both existing businesses and GRITEK (and BGRS). Subtracting forecasts for GRITEK from companywide forecasts gives us forecasts for RS Technologies. However, it is important to note that this forecast includes almost no sales from the purchases and sales of semiconductor manufacturing equipment business.

For performance from FY12/19 onward, the Company forecasts sizable YoY income growth in FY12/20. We believe this is because the Company expects reclaimed wafer production facilities scheduled to be completed in 2019 to begin operation at full-production scale in 2020. While we also expect strong YoY growth in FY12/20, as mentioned above, we view the Company's FY12/18 income forecast as overly conservative. If our view is correct, income could start at a higher level in FY12/18 and rise to even higher levels in FY12/19 and beyond. Also, if the production capacity increase scheduled in 2019 is completed in the first half of the year, we think the profit growth in FY12/19 could exceed the Company's forecast.

FY12/21 is the final year covered by the Company's consolidated medium-term earnings forecast and the forecast therefore does not include second stage of capacity increase scheduled to be completed in FY12/23. If the Company can achieve further growth in the reclaimed wafer business and the prime wafer business through capital investment and M&A, we think consolidated net sales could reach around ¥50bn in FY12/23. Also, based on past financial disclosure, we note that the Company's cost of capital is lower than that of rivals and we therefore think FY12/23 consolidated operating income could surpass ¥10bn (as we think GRITEK's forecast is likely to change, we think it should be viewed simply as an indication of the company's earnings potential).

Details of medium-term earnings forecast

Earnings (¥mn)

		FY12/17	FY12/18	FY12/19	FY12/20	FY12/21	FY12/22	FY12/23
RST	Net sales	10,988	11,923	12,070	12,680	14,010	-	-
RST	Operating income	3,075	2,811	3,160	3,890	4,030	-	-
GRITEK	Net sales	-	9,070	8,930	12,320	14,990	18,420	23,390
GRITEK	Operating income	-	1,280	640	1,110	2,470	2,950	5,690
Labor costs		-	-200	-200	-200	-200	-	-
Consolidated	Net sales	10,988	20,993	21,000	25,000	29,000	-	-
Consolidated	Operating income	3,075	3,891	3,600	4,800	6,300	-	-

Production capacity at term end (10,000 units/month)

		FY12/17	FY12/18	FY12/19	FY12/20	FY12/21	FY12/22	FY12/23
Sanbongi Factory	Reclaimed wafer processing 12-inch	20	20	22	22	22	22	22
Tainan Factory	Reclaimed wafer processing 12-inch	10	10	13	13	13	13	13
GRITEK	Prime wafer 8-inch	5	5	5~10	20	20	20~35	20~35
Prime wafer sales volume 8-inch (forecast basis)		5	5	5	5~10	10~15	15~20	20~25

Operating margin (%)

	FY12/17	FY12/18	FY12/19	FY12/20	FY12/21	FY12/22	FY12/23
RST	28.0	23.6	26.2	30.7	28.8	-	-
GRITEK	-	14.1	7.2	9.0	16.5	16.0	24.3
Companywide	28.0	18.5	17.1	19.2	21.7	-	-

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

Shareholder return policy

FY12/17 annual dividends flat YoY on adjusted basis, ¥5 per share

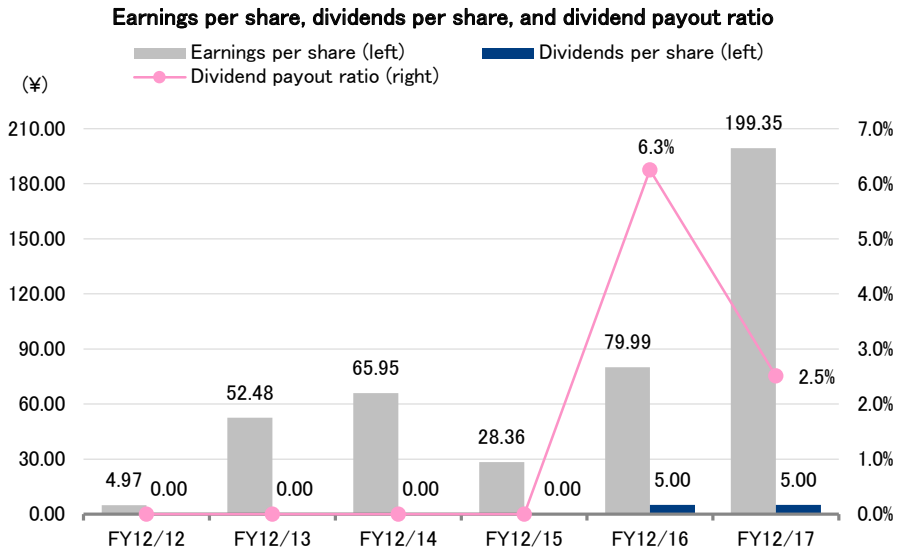
Making fair returns to shareholders is an important concern of Company management, and the Company's basic policy is to return value to shareholders by paying dividends. The Company decides on its dividends after considering a comprehensive range of factors, including current profits, the targets of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

Through FY12/15, the Company paid no dividends because it prioritized the accumulation of funds to invest regularly in new plant and equipment. However, the Company began paying dividends in FY12/16, paying annual dividends of ¥10 (regular dividends of ¥5 per share and commemorative dividends of ¥5 per share). In FY12/17, the Company conducted a 2-for-1 stock split on July 1, 2017 and paid year-end dividends of ¥5 per share. Dividends were therefore unchanged YoY on an adjusted basis.

Shareholder return policy

As in previous years, the Company did not announce a plan for shareholder returns in its initial FY12/18 forecast. We expect the Company to announce a dividend forecast after its full-year earnings picture becomes clearer. As mentioned above, the Company has decided to enter the prime wafer business in China. We believe the Company is currently able to maintain dividend levels while investing in the prime wafer business. Even if the Company prioritizes investment in the prime wafer business, we believe this would eventually lead to maximization of shareholder returns because the business has very high growth potential.

The Company has a shareholder benefits system. The Company will present shareholders holding 100 shares or more as of December 31, the end of the Company's fiscal year, with a QUO card worth ¥3,000.



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

Information security

High level of awareness of information security

RS Technologies is involved in the leading-edge field of semiconductors and therefore manages important information such as technical data and customer data with a high level of awareness regarding information security. The Company has established information security systems necessary for listed companies including passwords settings and limited access to information. In addition, the Company is involved in B-to-B businesses and, unlike companies involved in B-to-C businesses, does not handle large volumes of customer data or credit card data. We therefore think the Company faces relatively little risk from cyberterrorism targeting such information or the leaking of such information from inside the Company.

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