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AGC group: Advancing toward vision 2025

Professor Nitin Pangarkar wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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In early 2019, AGC Group (AGC) with Japan-based headquarters AGC Inc. (known as Asahi Glass Co., Ltd. Before July 1, 2018), a global leader in glass technology, was at a critical juncture in its evolution. In 2016, AGC had released its Vision 2025 statement, which set a goal for the company to continue to be highly profitable as a leading global provider of materials and solutions.[[1]](#footnote-1) Despite the recent uptrend in performance (see Exhibit 1 for a five-year summary of AGC’s results), AGC needed to get several critical decisions right to achieve Vision 2025. One decision involved the depth and breadth of its globalization, as indicated by various key globalization and development milestones in AGC’s past (see Exhibit 2). With a presence in 30 countries, spanning all the key continents, the company appeared to be one of Japan’s most globalized companies. However, AGC derived a large percentage of its sales from Asia, mainly due to the strong competitive position of many of its products in that continent (see Exhibit 3). To achieve more consistent globalization, AGC needed to increase the proportion of its sales and profits that were derived from countries outside Asia.

History, vision, mission, and values

Toshiya Iwasaki, a nephew of the founder of the Mitsubishi Group, founded AGC in 1907. As a chemistry student with a burning desire to reduce Japan’s dependence on imported sheet glass, Iwasaki set about to overcome what was then considered a major challenge—producing sheet glass domestically. Earlier attempts in Japan had failed, but by 1909 Iwasaki had succeeded in his goal by producing Japan’s first sheet glass. The company also earned its first profit in 1912 and established its first international operation in China in 1925. Early diversification occurred during World War I because of shortages in procuring two products necessary in glass making: refractory bricks, which were used to line furnaces for making glass, and soda ash, a key raw material for producing glass. The company started making these products in-house, and later supplied both products to external customers, thus laying the foundation of its subsequent diversification into ceramics and chemicals. Similar to many Japanese companies, AGC was adversely affected by the eruption of World War II, which led to the loss of some of its international operations, including its operation in China.[[2]](#footnote-2)

AGC’s mission was to be a unique materials and solutions provider to improve the daily lives of people around the world. Its shared values included seeking innovation and operational excellence; respect for diversity; being a good global citizen, especially with respect to sustainable practices; and upholding the highest ethical standards (see Exhibit 4).

Since 2002, AGC’s group vision had simply been expressed as “Look Beyond.” This vision implied that the company would continue to anticipate and envision the future, have perspective beyond its fields of expertise, pursue innovations, and avoid complacency. The group vision comprised the company’s mission, shared values, and spirit.

In 2015, Takuya Shimamura was appointed president and chief executive officer of AGC and formulated Vision 2025 as the company’s long-term management strategy. Vision 2025 was also expected to help AGC adapt to, and capitalize on, the broader changes in the business environment, such as the evolution of the transportation infrastructure, the Internet of Things, and advances in medical care. The company also formulated AGC Plus, which constituted its management policy, to help it deal with a volatile and challenging environment. AGC Plus stipulated the fundamental principles that AGC officers and employees should follow, including providing safety, security, and comfort to society; creating new value and functions for customers and business partners and building trust with them; enhancing job satisfaction among employees; and increasing the group’s corporate value to customers. In addition to AGC Plus, the company had formulated several mid-term management plans, such as AGC Plus 2017 and AGC plus 2020.

Over its history, which spanned more than 100 years, AGC claimed that it had developed three distinct competitive advantages: a wide-ranging customer base; a variety of material technologies in the fields of glass, electronics, chemicals, and ceramics; and a production technology development capability that included operational excellence.

Evolution of the product portfolio

After World War II, the company expanded to new product areas such as glass bulbs for television (in 1955, with a technology licence from Corning Glass Works) and safety glass for automobiles (in 1956). Over the next few years, the company continued its expansion to other product areas, including glass fibre, automobile headlight glass, laboratory glass, and heat-resistant glass housewares by using licensing arrangements to fill gaps in its technological knowledge.

The shortage of soda ash around the time of World War I had led AGC to diversify into producing this key raw material for glass making. Later, to exploit common raw materials used in the production process, it started making caustic soda. In the 1950s, the company began deeper diversification into chemicals, especially alkalis and halogen elements such as chlorine, fluorine, bromine, and iodine. It also started making specialty chemical products such as chlorofluorocarbons, and became a leader in producing many specialty chemicals products.

AGC began developing the third important product group of Electronics in the 1960s, when it started to distribute integrated circuits for an affiliate of Corning Glass Works. By the mid-1970s, recognizing the importance of the television market, the company successfully developed electronic elements to improve picture quality (called Glass Delay Lines). Spurred by concerns about the impact of the 1973 oil crisis on its chemicals business, the company continued to diversify further into electronic products such as liquid crystal displays, circuit boards, aluminum capacitors, and thin film magnetic memory disks (i.e., computer hard disks). The electronics business became an independent division in 1982 and was upgraded to a general division in 1989.[[3]](#footnote-3)

The refractories business, which arose because of the shortage of refractory bricks in Japan, later evolved into the broader ceramics product group. Ceramics had several applications in electronics. Ceramics was the smallest of the company’s product groups in terms of revenue contribution; however, it held considerable potential for future growth because of applications in diverse areas such as furnaces and ecological solutions for environmental and energy-related businesses.[[4]](#footnote-4)

By early 2019, AGC had accumulated world-leading expertise in several core technologies related to making glass, ceramics, and fluorochemicals. These technologies could be deployed to develop a wide range of products to serve customer needs (see Exhibits 5 and 6). Combining these technologies could open more opportunities to offer even more new products. In other words, AGC was in a strong position to build a base of technologies that could be useful to develop high value-added and varied products.

AGC’s extensive diversification was assisted by four main factors. First, for several decades after the end of World War II, the top management at AGC granted its divisions the freedom to seek new product and geographic market opportunities, without imposing a clearly defined strategic direction on them. Second, the “can-do” spirit epitomized by its founder permeated the company and helped it overcome obstacles, whether technological or otherwise. Third, its openness to licensing technologies to fill gaps and form joint ventures facilitated its entry into new businesses. Over time, AGC formed various relationships with diverse partners, including Corning Glass Works (several different types of partnerships), Komag Inc. and PPG Industries (both from the United States), and Mitsubishi Electric (from Japan). It also undertook key acquisitions, including Glaverbel SA and AFG Industries, when the opportunities arose. Both of these acquisitions provided important positions for the company in Europe and the United States, respectively. Fourth, the company adopted aggressive and unconventional (at least for the Japanese context) strategies such as acquisitions and the recruitment of engineers to build technology expertise within specific businesses. For example, in 1985, AGC recruited 50 electronics engineers from outside the company to establish an electronics product development centre. Although the practice of targeting and recruiting (i.e., headhunting) people was unconventional among Japanese corporations at the time,[[5]](#footnote-5) it was consistent with the spirit of overcoming obstacles that was articulated by AGC’s founder.

A path to achieve the vision

A key aspect of AGC’s Vision 2025 was the aim to continue being a highly profitable leading global material and solutions provider. In the vision, the company designated glass, chemicals, display glass, and ceramics as core businesses that would provide stable sources of earnings over the long term. Several sub-strategies underpinned basic strategy 1 (see Exhibit 7), which basically aimed to improve the profitability of mature businesses.

Basic strategy 2 aimed to establish highly profitable businesses through expansion of high value-added businesses. Key sectors for establishing these businesses included mobility, electronics, and life sciences. AGC hoped to leverage key trends to offer specific solutions for each of these sectors. For example, key trends in mobility included assisted or automatic driving and connected vehicles, among others. AGC hoped to offer solutions to this sector such as next-generation communication antennas and parts and materials for eco-friendly vehicles (see Exhibit 8).

Vision 2025 categorized businesses and outlined broad strategic thrusts for each type of business. The vision also identified the basic policy and behaviours to achieve specific goals. That policy comprised four main directives. First, always view the business from the market’s perspective so that you can respond to customers’ needs and continue building trust with them. Second, achieve sustainable growth in both core and strategic businesses by boldly pursuing strategic merger and acquisitions opportunities along with an organic growth approach. Third, take advantage of high growth in Asia by leveraging regional operations and actions in the geographical area from Southeast Asia through the Middle East. Fourth, concentrate the group’s management resources in the business fields that have high earnings and growth potential and achieve business structure with improved asset efficiency.

Strategy and Business characteristics

Businesses in AGC’s portfolio shared several commonalties. Many were high-technology businesses that required significant upfront investment in research and development (R&D). Several businesses required continuous improvements in product and process technology, which implied high barriers to entry for outsiders. Almost all businesses also required heavy investment in plant and machinery, further raising the barriers to entry, especially for smaller entrants. High plant-level investment also limited the number of AGC plants around the world, which required careful plant location decisions. Process efficiency was critical for many businesses, but especially for the chemicals businesses because of the commodity nature of many of its products. Quality control was equally critical. For example, in the electronics business, the smallest quality issue in AGC components could lead to rejection of batches of product by customers. Some businesses in AGC’s portfolio, such as the chemicals business, were also characterized by captive consumption within the AGC group.

Exploiting adjacencies was a key aspect of AGC’s corporate strategy. Since its inception, AGC had moved into adjacent product categories (specifically, backward integrations), often in response to supply constraints. Initial moves into products such as caustic soda and refractory bricks were consistent with this motivation. Adjacent moves also included the desire to exploit economies of scope and diversification into glass products with higher value added, such as heat-resistant glassware, labware, and television glass bulbs, among others. Similarly, AGC expanded to several chemicals business areas to take advantage of opportunities in adjacent product categories.

Globalization strategy

AGC had been selective in its globalization efforts. Globalization of key customers, such as automobile and consumer electronics firms, was a key driver of AGC’s globalization efforts, especially its early efforts. The fundamental principle of AGC business was to contribute to society through unique materials developed using the group’s expertise and technologies. Consistent with this principle, AGC and its employees strove to help develop the local economy and society of each country the company entered.

By early 2019, AGC had built a presence in 30 countries and regions. Among the different geographic regions, Asia accounted for the largest percentage of AGC’s sales and profits, possibly because of the company’s strong presence in its home market. Its presence outside Asia had traditionally been built with a few bold strokes, such as the acquisition of Glaverbel SA in 1981, which provided AGC with a large-scale entry in Europe. AGC entered the US market in 1985 and the Russian market in 1997. Globalization outside Asia had gathered speed recently, with the opening of plants in Mexico and Brazil. The AGC plant in Mexico was among the most environmentally conscious plants of its kind in Latin America. In 2016, an automotive glass plant was established in Morocco to serve the Middle East and African markets.

The size of most AGC businesses in a specific country was directly correlated with the decision to open a manufacturing plant in that country. Many of AGC’s products had characteristics that made them expensive to transport, in absolute or relative terms. For example, glass was expensive to transport because of its fragility and weight, whereas value was the issue with chemicals. Fragility was also the reason for the high transportation costs of electronic products. Other factors included just-in-time supply; cost competitiveness of manufacturing a product in the focal country; and the sizes of the local, regional, and sub-regional markets. The international trade policies of a country were also a factor. Specifically, import duties were important, as was the availability of key resources such as skilled workers, logistics infrastructure, and a reliable supply of raw materials and utilities. In some cases, the decision could be affected by determining which key customers (e.g., assemblers of display panels) already had manufacturing plants in that particular country. Collocating with customers was also critical for the automotive glass business.

AGC had historically conducted most of its R&D in Japan, with some exceptions. Some R&D for the automotive glass business was done in the United States and Europe because of sophisticated customer and market requirements. Architectural business R&D took place in Europe (the Glaverbel SA acquisition had led to significant capabilities in Europe). R&D for selective chemical products was done in the United States. Most of the manufacturing technologies deployed by the company had also been first developed in Japan and then shared with affiliates in other countries. In a few instances, when the technology had matured, its deployment in Japan had been discontinued due to a lack of cost competitiveness. The manufacturing based on that specific technology was then shifted to developing countries.

AGC allowed the international subsidiaries of most product lines to have considerable autonomy in their decision-making, although some businesses were centralized for strategic reasons, such as high capital-intensity or technology-intensity. Typically, several expatriate managers at the subsidiaries were sent in from headquarters, which received reports on a regular basis and provided approvals for key initiatives such as major capital expenditures. However, the global subsidiaries retained considerable autonomy for decisions such as pricing.

AGC’s international strategy also needed to be responsive to evolving political and economic trends, such as India’s “Make in India” campaign launched by Narendra Modi, the country’s prime minister since 2014.[[6]](#footnote-6) That campaign, which encouraged local and multinational companies to make products in India, could sway AGC to consider locating additional manufacturing plants in India and benefit from cost savings and proximity to customers.[[7]](#footnote-7) Recent trade tensions between the United States and China[[8]](#footnote-8) had presented a fluid situation with possible impact on future strategy, especially in terms of plant location.

The Strategy in Asia

China, Indonesia, India, Taiwan, and Thailand were AGC’s top five Asian markets. Shoko Glass Co. Ltd., established in China before World War I, was AGC’s first business outside Japan. In the 1950s, AGC started operations in India.

Considerations for market selection and location in Asian countries were similar to those for the rest of the world. AGC operated glass plants (both architectural and automotive) in China, Indonesia, India, and Thailand, mainly due to the fragility and high transportation costs of glass. Deciding on a location for AGC’s chemicals business involved multiple factors, such as the current size of the market, growth potential, and low costs of raw materials and utilities, which meant that AGC operated chemical plants only in Indonesia, Thailand, and Vietnam. For the electronics business, AGC had plants in China, Korea, Thailand, and Taiwan mainly to be close to customers. Many of AGC’s products were sold to electronics assemblers. Taiwan and Korea were large centres for assembling electronics products. Interestingly, chemicals sold in China were imported from Japan, rather than being manufactured in China, despite its large market size. AGC also considered China a challenging market for some chemical products because of the availability of cheap local products.[[9]](#footnote-9)

The range of products manufactured in each country also varied. In China, Korea, and Taiwan, AGC produced large amounts of display glass because these countries served as manufacturing centres for various electronic devices that used display panels (e.g., smartphones, tablets, and laptops). In India, AGC focused on architectural and automotive glass, but not on electronics and chemicals. Sales of electronics products were also limited in Indonesia.

For automotive glass, customers placed great importance on just-in-time delivery, which was a key factor in AGC’s decisions for plant locations. The level of demand from local (or regional, in the case of Thailand) markets for automotive products was an important consideration for AGC plant locations in China and Indonesia, as well as Thailand, which was a centre for manufacturing and exporting cars to Asia and beyond.

The road ahead

These were exciting and challenging times for AGC. Technological developments had opened new prospects for growth. AGC needed to adopt appropriate and multi-faceted strategies to capitalize on opportunities. Several options and considerations were available to AGC in its quest to achieve Vision 2025.

Regarding the depth and breadth of future globalization, AGC needed to decide which countries to enter and the depth of penetration in each market. China was a particularly difficult choice. China demanded special strategic attention, as a result of its many dimensions as a market with many end consumers, key customers such as assemblers of display panels, and new emerging technologies such as autonomous vehicles. Regarding its mode of entry, AGC needed to decide whether to build the business organically, form joint ventures, or acquire companies in each specific country. AGC was familiar with the specific advantages and drawbacks of each mode of entry, having used each strategy before. Acquisitions represented a particularly resource-intensive and risky option.

A second key decision for achieving Vision 2025 involved two related issues. How could AGC extract operational efficiencies and greater profits from its core businesses, while simultaneously building positions in strategic businesses to create future revenue and profit streams? The latter would involve high-resource commitments, in the form of significant R&D and market development expenditures, and high risks from current and future competition. In fact, issues related to product technology and maturity were also intertwined with geographic and economic considerations.

In many emerging markets, including key Asian markets such as India, it seemed appropriate to emphasize the core businesses because it could take time for these markets to become ready for cutting-edge strategic businesses. However, China was a different environment that could require its own specific strategy. It housed large-scale assemblers of electronic devices, such as Foxconn, as well as developers, testers, and implementers of new technologies, such as 5G communication technology and autonomous driving technology. Many Chinese companies, such as Fuyao Glass, had also emerged as important competitors to traditional AGC businesses. Therefore, AGC would need to emphasize strategic businesses and possibly undertake R&D in China, which was a departure from its past strategy of conducting R&D mainly in Japan, and only occasionally in other developed countries.

While focusing on Asian markets, AGC needed to enhance its global presence by tapping into emerging markets outside Asia. It also needed to tap into advanced markets’ demands for products from its strategic businesses and to leverage its learning from these countries to stay on the cutting edge of technology, especially for its strategic businesses.

Finally, AGC needed to balance being cost-efficient in its mature businesses and innovative in its strategic businesses. Cost-efficiency required a carefully designed value chain to minimize production costs and ensure tight coordination across various country operations. Innovative strategic businesses required balancing autonomy with the centralization of key resources, such as centres of excellence, cutting-edge manufacturing plants, and R&D. Such a balance would capture learnings from local customers, competitors, and suppliers.

The trade war between the United States and Asian countries, especially China, represented a major source of uncertainty.[[10]](#footnote-10) If the tensions could not be resolved amicably, they would pose significant challenges to production networks and cross-border movement of goods. They could also affect demand for AGC’s products, especially the display glass used in smartphones and similar devices.

Clearly, AGC faced multiple, and sometimes competing, pressures. Strategies for addressing these competing pressures would affect its future performance. The company had taken important steps by articulating Vision 2025 and AGC Plus, but much remained to be done.

Exhibit 1: asahi glass co., ltd. Summary financial results, 2013–2017

(in ¥ Hundred million)

|  | **2017** | **2016** | **2015** | **2014** | **2013** |
| --- | --- | --- | --- | --- | --- |
| **Net sales** | 14,635 | 12,826 | 13,263 | 13,483 | 13,200 |
| Glass | 7,351 | 6,800 | 6,929 | 6,863 | 6,673 |
| Electronics | 2,624 | 2,581 | 2,886 | 3,197 | 3,460 |
| Chemicals | 4,376 | 3,166 | 3,185 | 3,172 | 2,907 |
| Ceramics and other products | 754 | 708 | 681 | 808 | 786 |
| Eliminations | (470) | (429) | (418) | (557) | (625) |
| **Operating profit** | 1,196 | 963 | 712 | 621 | 799 |
| Glass | 271 | 318 | 130 | (2) | (131) |
| Electronics | 273 | 250 | 290 | 370 | 741 |
| Chemicals | 637 | 400 | 305 | 241 | 177 |
| Ceramics and other products | 14 | (2) | (16) | 11 | 12 |
| Eliminations | 1 | (3) | 1 | 2 | (1) |
| Profit before tax | 1,144 | 676 | 845 | 412 | n/a |
| Profit attributable to the owners of the company | 692 | 474 | 429 | 159 | 161 |
|  |  |  |  |  |  |
| Interest bearing debts | 4,891 | 4,340 | 4,687 | 4,993 | 5,750 |
| Equity | 12,899 | 11,687 | 11,638 | 11,805 | 9,607 |
| Debt-to-equity ratio | 0.38 | 0.37 | 0.40 | 0.42 | 0.56 |
|  |  |  |  |  |  |
| Capital expenditures | 1,651 | 1,260 | 1,251 | 1,182 | 1,385 |
| Depreciation and amortization | 1,282 | 1,218 | 1,374 | 1,372 | 1,358 |
| Research and development | 439 | 392 | 389 | 448 | 469 |
| **Exchange rates: Japanese yen (¥) to US dollar** |  |  |  |  |  |
| On January 1 of each year | 0.00855 | 0.00830 | 0.00830 | 0.00950 | 0.01163 |
| On December 31 of each year | 0.00885 | 0.00855 | 0.00830 | 0.00830 | 0.00950 |

Note: n/a = not applicable.

Source: Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2017 (IFRS Basis)*, February 7, 2018, accessed August 26, 2019, www.agc.com/en/news/pdf/20180207e\_1.pdf; Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2016 (IFRS Basis)*, February 7, 2016, accessed August 26, 2019, www.agc.com/en/news/pdf/20170207e\_1.pdf; Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2015 (IFRS Basis)*, February 7, 2016, accessed August 26, 2019, www.agc.com/en/news/pdf/20160207e\_1.pdf; Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2014 (IFRS Basis)*, February 7, 2015, accessed August 26, 2019, www.agc.com/en/news/pdf/20150206e\_1.pdf; Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2013 (IFRS Basis)*, February 7, 2014, accessed August 26, 2019, www.agc.com/en/news/pdf/20140207e\_1.pdf.

Exhibit 2: asahi glass co., ltd.’s Key globalization milestones and other events

| **Year** | **Globalization Milestones** | **Other Significant Events** |
| --- | --- | --- |
| 1907 |  | * Establishment of Asahi Glass Co., Ltd. (AGC) by Toshiya Iwasaki |
| 1909 |  | * Belgian-type hand-blown sheet glass manufacture begins, a first in Japan |
| 1914 | * First exports of flat glass to England |  |
| 1925 | * Shoko Glass Co. Ltd. established in China as the first AGC business outside Japan |  |
| 1937 |  | * AGC stock listed on the Tokyo Stock Exchange |
| 1952 | * Agreement concluded to export caustic soda electrolysis equipment to Indonesia |  |
| 1955 |  | * AGC receives the Deming Prize for quality * AGC starts manufacturing glass bulbs for television |
| 1956 | * Indo-AGC established and starts production of glass bulbs and picture tubes for television | * Automotive glass business launches on a full scale to tap into the growing demand |
| 1963 | * Thai Asahi Glass Public Co. established |  |
| 1966 | * Asahi Glass and PPG (United States) set up Asahi Penn Chemical Co. Ltd. | * AGC starts production of float glass |
| 1972 | * Glass production operations begin in Indonesia (PT Asahimas Flat Glass Co.) |  |
| 1979 | * AGC invests in MCIS Safety Glass Bhd. (Malaysia) |  |
| 1981 | * AGC acquires Glaverbel SA (Belgium); full-scale entry into Europe’s flat glass market; also acquires MassGlas BV (Netherlands) |  |
| 1985 | * Full-scale entry into the United States (automotive glass, AP Technoglass Co.) * Asahi Technovision Ltd. established in Singapore |  |
| 1986 | * Full-scale entry into the chlor-alkali business (India) |  |
| 1988 | * AGC forms a joint venture with Corning Glass Works to take over its television glass bulbs business * AGC acquires a 20 per cent stake in AFG Industries (second-largest glass manufacturer in the United States) |  |
| 1989 | * Siam Asahi Technologies Co. Ltd. established in Thailand |  |
| 1992 | * Dalian Float Co. Ltd established in China * AGC converts stake in AFG Industries Inc. to 100 per cent, jointly with Glaverbel |  |
| 1996 | * PT Video Display Glass (Indonesia) established |  |
| 1997 | * Entry into Russia’s glass market |  |
| 1999 | * AGC acquires PTFE business of ICI (United States and United Kingdom) * AGC acquires majority interest of Hankuk Electric Glass Co. Ltd. (Korea) |  |
| 2000 | * Asahi Glass Fine Techno Taiwan Co. established |  |
| 2002 |  | * AGC Group vision “Look Beyond” |
| 2007 |  | * Group brand unified as AGC on 110th anniversary |

Exhibit 2 (continued)

|  |  |  |
| --- | --- | --- |
| 2013 | * Plant in Brazil established, one of the most environmentally friendly in South America |  |
| 2013 | * Regional headquarters established in Singapore with an aim to expand business in Southeast Asia |  |
| 2015 | * AGC acquires Nordglass, a Poland-based manufacturer of automobile replacement glass * Automotive glass plant in Mexico starts operations during the year | * AGC Plus management policy implemented |
| 2016 | * Automotive glass production base established in Morocco * Information gathering and marketing bases established in India and Dubai * Operations of a coating glass plant in Saudi Arabia begin * AGC doubles production capacity of PVC in Indonesia * AGC increases PV capacity by 50 per cent in Vietnam * AGC increases production of low-e glass by 50 per cent in Thailand * AGC acquires Biomeva, a Gemany-based contract manufacturer of biopharmaceuticals |  |
| 2017 | * AGC relocated its LCD float furnace from Japan to China * AGC acquires Vinythai, a Thailand-based manufacturer and marketer of chemicals * AGC acquires CMC Biologics, a contract manufacturer of biopharmaceuticals |  |

Note: PVC = polyvinyl chloride; PV = photovoltaic; low-e = low emissivity; LCD = liquid crystal display

Source: Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2017 (IFRS Basis)*, February 7, 2018, accessed August 26, 2019, www.agc.com/en/news/pdf/20180207e\_1.pdf; Mihir Desai, Masako Egawa, and Yanjun Wang, *The Continuing Transformation of Asahi Glass: Implementing EVA* (Boston, MA: Harvard Business Publishing, 2004). Available from Ivey Publishing, product no. 205030; David J. Collis and Tsutomu Noda, *Asahi Glass Company: Diversification Strategy* (Boston, MA: Harvard Business Publishing, 1994). Available from Ivey Publishing, product no.794113.

Exhibit 3: asahi glass co., ltd.’s Product range, revenue contributions, and staff strength of key geographic regions

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **Japan and Asia** | **Europe** | **Americas** |
| Percentage of total sales | 67 | 22 | 11 |
| Number of employees | 30,600 | 16,200 | 4,100 |
| Product range | Architectural glass  Automotive glass  Display glass  Electronic materials  Chemicals  Ceramics | Architectural glass  Automotive glass  Chemicals | Architectural glass  Automotive glass  Electronic materials  Chemicals |

Source: Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2017 (IFRS Basis)*, February 7, 2018, accessed August 26, 2019, www.agc.com/en/news/pdf/20180207e\_1.pdf.

Ehibit 4: Key operating principles of Asahi Glass Co., Ltd. (AGC group)

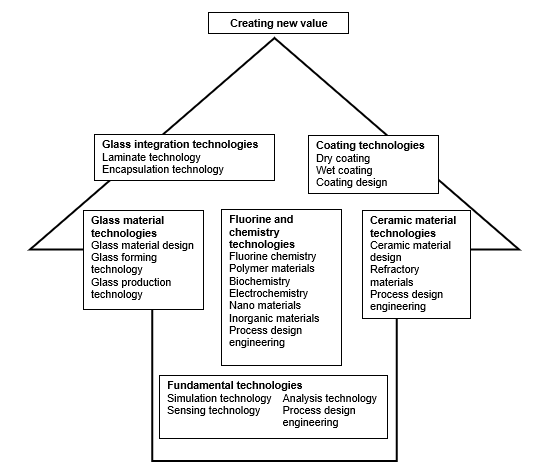
**Mission**: We, the AGC Group, aim to continue being the first choice solutions provider for our customers by building long-term trusted relationships with them through unique materials and solutions developed using our wide ranging material and production technologies. We will continue offering solutions that customers and society need, thereby making people’s lives better around the world every day.

**Shared values**: Innovation and operational excellence, diversity, environment, and integrity

**Spirit**: Never take the easy way out, but confront difficulties,

Source: Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2017 (IFRS Basis)*, February 7, 2018, accessed August 26, 2019, www.agc.com/en/news/pdf/20180207e\_1.pdf.

Exhibit 5: Technology map of Asahi Glass Co., Ltd.



Source: Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2017 (IFRS Basis)*, February 7, 2018, accessed August 26, 2019, www.agc.com/en/news/pdf/20180207e\_1.pdf.

Exhibit 6: Asahi Glass Co., Ltd.’s Key product categories, competitive positions, and sales contributions, 2014–2016 (in ¥ Billion)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Broad Product Category** | **Key Products** | **Competitive Position for Selected Products** | **Sales in 2014** | **Sales in 2015** | **Sales in 2016** |
| Architectural glass | Float glass  Low-emissivity glass  Double glazing glass for solar control and insulation  Safety glass  Decorative glass | Global number one in float glass | 686.3 | 692.9 | 680 |
| Automotive glass | Tempered automotive glass  Laminated automotive glass | Global number one in automotive glass |
| Display | Glass substrates for TFT-LCD | Global number two in substrates for TFT-LCD | 319.7 | 288.6 | 258.1 |
| Electronic materials | CMOS-CCD blue filter  CMP slurry  Synthetic quartz glass  Glass frit and paste  Glass moulded lenses | Global number one in glass materials for stepper lenses |
| Applied glass materials | Cover glass for electronic devices  Thin glass for electronic devices  Glass for light guide plates  Glass for photovoltaic devices |  |
| Chlor-alkali and urethane | Raw material for vinyl chloride monomer and polymer  Caustic soda  Urethane materials |  | 317.2 | 318.5 | 316.6 |
| Fluorochemicals and specialty chemicals | Electropolymeric films  Fluorinated water and oil repellents  Pharmaceutical and agrochemical intermediates and active ingredients  Iodine-related products | Global number one in fluorinated resins |
| Ceramics | Refractory materials  Fine ceramics  Sputtering targets |  | 80.8 | 68.1 | 70.8 |
| Logistics and engineering |  |  |

Note: ¥ = JPY = Japanese yen; ¥1 = US$ 0.009 on January 1, 2019; TFT-LCD = thin-film transistor liquid-crystal display; CMOS-CCD = complementary metal-oxide semiconductor charge-coupled device; CMP = chemical mechanical polishing

Source: Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2017 (IFRS Basis)*, February 7, 2018, accessed August 26, 2019, www.agc.com/en/news/pdf/20180207e\_1.pdf.

Exhibit 7: Asahi Glass Co., Ltd.’s Strategies for Enhancing its Core Businesses

|  |  |
| --- | --- |
| **Business** | **Basic Strategy** |
| Architectural glass | Select and concentrate on high-growth countries and countries where the group has a competitive advantage.  Emphasize innovative products and technology. |
| Automotive glass (existing) | Respond to the needs for more advanced functions and performance and growth of eco-friendly vehicles and autonomous driving systems. |
| Display glass | Optimize the allocation of production bases to respond to the demand shift in the liquid-crystal display glass market.  Cultivate markets for new display applications. |
| Essential chemicals | Further strengthen the business foundation of chlor-alkali business in Southeast Asia. |
| Performance chemicals | Take advantage of the global demand increase in high performance materials for the growth of Fluorochemicals business. |
| Ceramics | Discover new value propositions with a mix of materials, engineering, and services.  Establish business bases in Southeast Asia and expand global sales. |

Source: Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2017 (IFRS Basis)*, February 7, 2018, accessed August 26, 2019, www.agc.com/en/news/pdf/20180207e\_1.pdf.

Exhibit 8: Future trends and relevant Asahi Glass Co., Ltd. (AGC) products

|  |  |  |
| --- | --- | --- |
| **Situation** | **AGC Products for the Situation** | **End Products or Uses for the AGC Products** |
| Supporting mobility | Automotive glass  Cover glass for console panels  LED/OLED lighting components  Urethane materials for car seats  Fluoropolymer resins and rubber for automotive components  Train platform screen doors  Railway glass  Truck glass | Cars  Trucks  Trains and stations |
| Supporting displays and optical equipment | Glass materials and components for optical equipment  Glass substrates for display devices  Glass materials for and components for storage devices  Glass substrates for display devices  Optical materials for digital cameras  Cover glass | Personal computers  Projectors  Mobile phones  Cameras |
| Supporting construction and social infrastructure | Fluoropolymer resin for coatings  Fluoropolymers for membrane structures  LED and OLED lighting equipment  Show window glass  Insulated glass doors for refrigerators and frozen showcases  Low-e insulating glass for residential use | Any application using paints (coatings) such as bridges  Roads  Any lighting application (indoor or outdoor)  Refrigerators, freezers |
| Supporting the environment | Cover glass for lightweight photovoltaic modules  protective fluoropolymer resin film for photovoltaic devices  Fuel cell related materials  Fluoropolymer resins for coatings  Fluroelastomer for petroleum extraction machinery  Glass-fibre reinforced plastic for photovoltaic frames  Glass ceramic substrates for LED lighting  Fuel-cell related materials  Glass ceramics substrates for high-power LED lighting  Materials for lithium-ion battery | Solar energy related applications—residential or commercial  Coatings for windmills |
| Supporting consumer products | Heat-resistant glass  Chemicals used in dishwashing detergents, baking powder, disinfecting tap water, and cosmetics (fillers)  Mirrors | Detergents  Food preparation |
| Supporting life sciences | Biopharmaceutical active ingredients  Laboratory use and tissue culture ware  Bulking agent for liquid chromatography  Agrochemical active ingredients  Prepared specimens for microscopes | Laboratories |

Note: LED = light-emitting diode; OLED = organic light-emitting diode; low-e = low-emissivity

Source: Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2017 (IFRS Basis)*, February 7, 2018, accessed August 26, 2019, www.agc.com/en/news/pdf/20180207e\_1.pdf.

1. Asahi Glass Co., Ltd., *Consolidated Financial Results for the Fiscal Year Ended December 31, 2017 (IFRS Basis)*, February 7, 2018, accessed August 26, 2019, www.agc.com/en/news/pdf/20180207e\_1.pdf. [↑](#footnote-ref-1)
2. David J. Collis and Tsutomu Noda, *Asahi Glass Company: Diversification Strategy* (Boston, MA: Harvard Business Publishing, 1994). Available from Ivey Publishing, product no. 794113. [↑](#footnote-ref-2)
3. Collis and Noda, op. cit. [↑](#footnote-ref-3)
4. Asahi Glass Co., Ltd., op. cit. [↑](#footnote-ref-4)
5. Collis and Noda, op. cit. [↑](#footnote-ref-5)
6. Make in India website, accessed December 2, 2019, http://www.makeinindia.com/home. [↑](#footnote-ref-6)
7. Based on information from the case author’s interviews with AGC managers. [↑](#footnote-ref-7)
8. “US-China Trade War,” *South China Morning Post*, accessed September 13, 2019, www.scmp.com/topics/us-china-trade-war?gclid=CjwKCAjwnrjrBRAMEiwAXsCc46C\_78ORoFhVJZol0bWvAQkonvylp70MlD4ETFhXJBRqxxM6efBU-RoCZ6AQAvD\_BwE. [↑](#footnote-ref-8)
9. Based on information from the case author’s interviews with AGC managers. [↑](#footnote-ref-9)
10. “US-China Trade War,” op. cit. [↑](#footnote-ref-10)