



**AGC Inc.**

ESG Briefing Session

September 10, 2021

## Presentation

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**Tamaki:** Hello everyone. Thank you very much for joining us today. We will be holding an ESG briefing session of AGC Inc.

My name is Tamaki from the Corporate Communications & Investor Relations Division, and I will be your host today. I would now like to introduce today's attendees. Mr. Shinji Miyaji, Representative Director, Senior Executive Vice President, CFO.

**Miyaji:** Thank you very much.

**Tamaki:** Mr. Miyaji, CFO, will give a presentation first, followed by a question-and-answer session. The event is scheduled to end at 2:45 PM. Thank you for your cooperation.

Now, please go ahead, Mr. Miyaji.

**Miyaji:** Thank you for your time today.

This is the first time for us to explain ESG in this way, so there are actually many things I would like to say, but I cannot say them all. Today, I would like to focus a little on the table of contents.

## The fundamental principles of the AGC Group



### In 1907, Asahi Glass was founded by Toshiya Iwasaki



Photo: Toshiya Iwasaki

#### Founding spirit

**"Never take the easy way out, but confront difficulties"**

"There are various other businesses that we can pioneer, but **I want to run a business that is good for Japan and those who live in the country. For me, it's the manufacturing of flat glass.**"

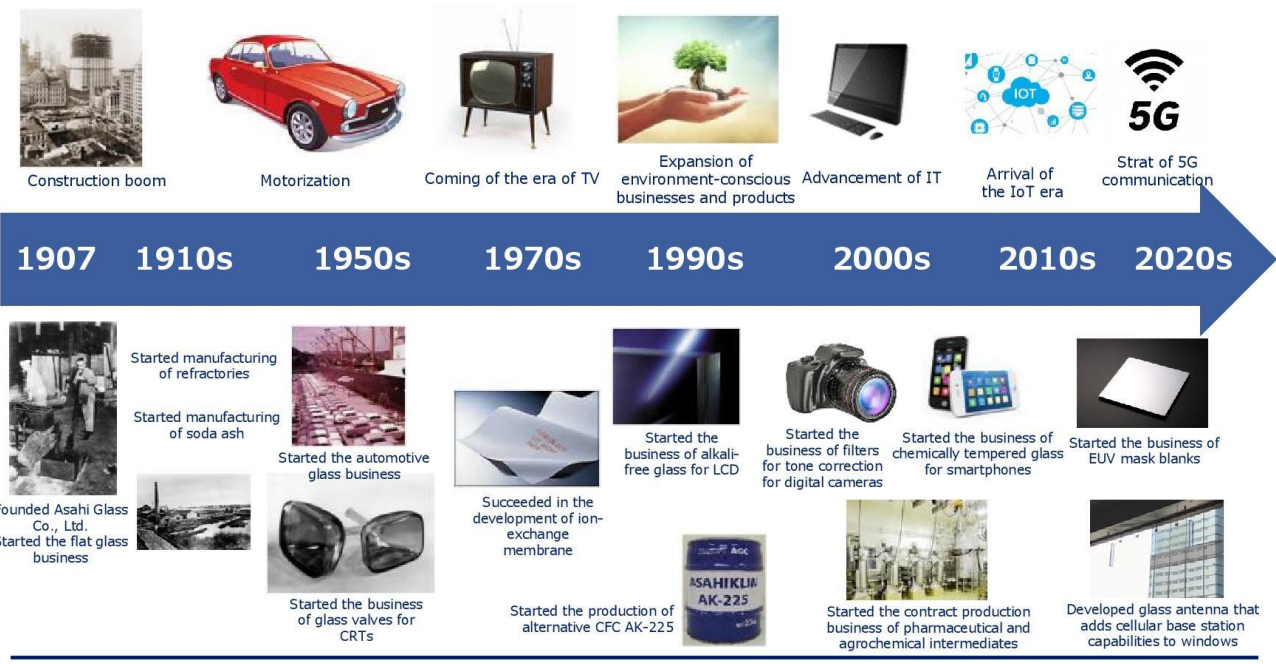
First of all, I would like to start with a little bit of history about our company.

As many of you may know, our company was founded in 1907 as a member of the Mitsubishi Group by Toshiya Iwasaki, a nephew of Yataro Iwasaki, when he was only 24 years old, with the aim of producing flat glass domestically.

As a result of the hardships he faced during the establishment of the Company, the founding spirit of "never take the easy way out, but confront difficulties" is still deeply rooted in us as the global founders' spirit.

## Diversification of the business **AGC** Your Dreams, Our Challenge

- Provide the necessary materials and solutions in line with changes of the times



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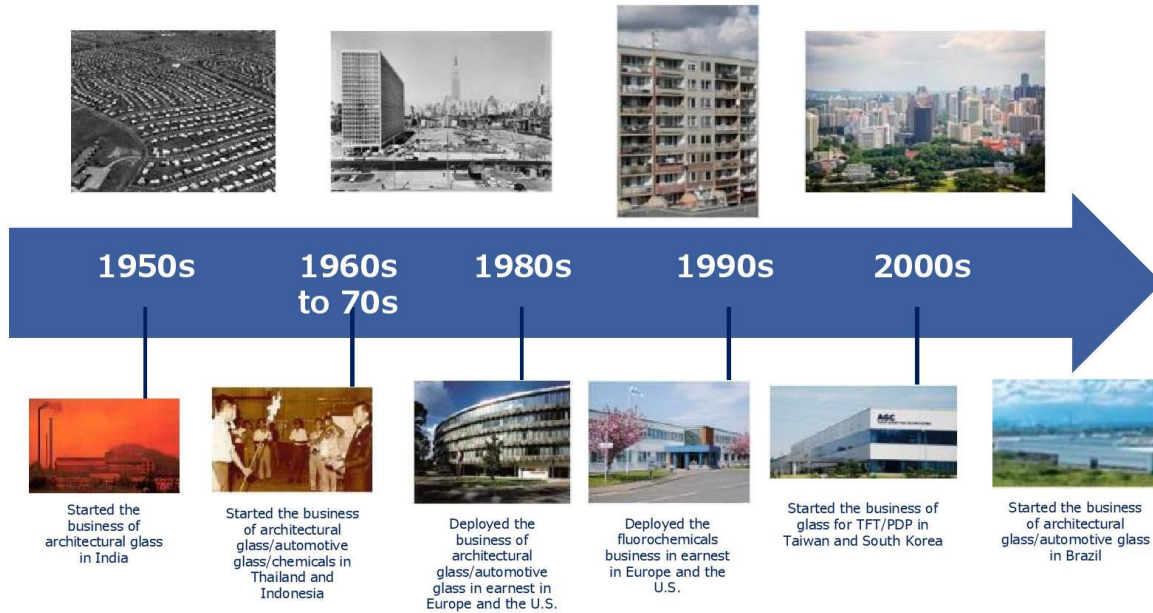
This next slide, the history of business diversification, is 1 of the slides I consider to be the most important.

Originally, the business started from architectural use. The upper part of the slide was mainly related to glass, but the business has been changed according to the changing times. Providing what the times demand is what has led us to our current form.

In the lower part of the slide, you see chemical and other businesses. We have been able to expand our business while maintaining the spirit of our founding without staying in the business of the early days. This is also a very important slide.

# Global expansion

- In cooperation with business partners and local employees, the AGC Group contributed to the development of local economy and society around the world



Next is the history of global expansion.

Today, we are a global company with 70% of our sales overseas and 80% of our employees overseas. We have been able to achieve this by taking the business we launched in Japan and expanding it in response to local conditions as the region grows and develops.

The founding spirit of the Company, the spirit of contributing to the local community, was very important to the founder, and we have inherited that spirit to this day, placing great importance on operating for the benefit of the local community.

We do not think it is good to do everything in Japan, so we have always had the headquarters for architecture in Europe, and the current headquarters for biotechnology is in Seattle, USA. As a result of our flexible approach to placing headquarters in a large market, we have been able to achieve a very large development.

## Background to the full-scale establishment of the governance system

Until 1990s

- Diversification of the business
- Global expansion
- Start of consolidated management
- Deterioration of earnings after collapse of economic bubble

**Management strategy: "Shrink to Grow"**

1998  
to  
2004

**Establish a full-scale governance system  
toward integrated global management**

Next is governance.

In terms of governance, the major change to the current governance system was made during the 6 years from 1998 to 2004, when we intensively made changes to the governance system that lead to the current system.

I happened to be engaged in the planning for 6 years at the time of the project, and this was the core of my work.

# Direction of management



- Re-established the management base including corporate governance toward the integrated global management

1	Formulation of the group vision	5	Enhancement of the human resource base
2	Reform of the board of directors	6	Establishment of the cultivation of management human resources
3	Introduction of the executive officer system	7	Workstyle reform
4	Introduction of the in-house company system		

As you can see the 7 items listed here, we started with a vision that would serve as the basis for consolidated management, followed by governance reforms, and then human resources measures to support the reform. We successively institutionalized them.

## The AGC Group vision *"Look Beyond"*

- Formulated the vision to be shared in the AGC Group in 2002\*
- *"Look Beyond"* is the basis of our sustainability management



\*Our mission was renovated in 2015

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In order to share our vision globally, and to create something that can be used for a long time, we created this "Look Beyond," which is shared by all employees.

Although some of its components have been changed, we have not changed any of our shared values, namely Innovation & Operational Excellence, Diversity, Environment, and Integrity, since 2002, and we believe that these values are still valid and important. Founder's spirit, or our spirit, is positioned as the base concept.

- Clearly separated the oversight functions and the management functions
- Reformed the board of directors and introduced the executive officer system



## (1) Reform of the board of directors

Changed the role of the board of directors into a "body that approves basic policies and oversees the management of AGC."

- ✓ Reduced the number of directors to 7 from 20
- ✓ Elected two outside directors \*Adopted a three-outside-directors system in 2005
- ✓ Shortened the term to one year from two years
- ✓ Transferred a significant portion of the authority for management functions to the President & CEO



## (2) Introduction of the executive officer system

Elected executive officers in charge of "execution of the management and business of the AGC group"

- ✓ Clearly distinguished them from the directors stipulated in the Commercial Code (Companies Act)
- ✓ The term is one year

Here is the framework for governance reform.

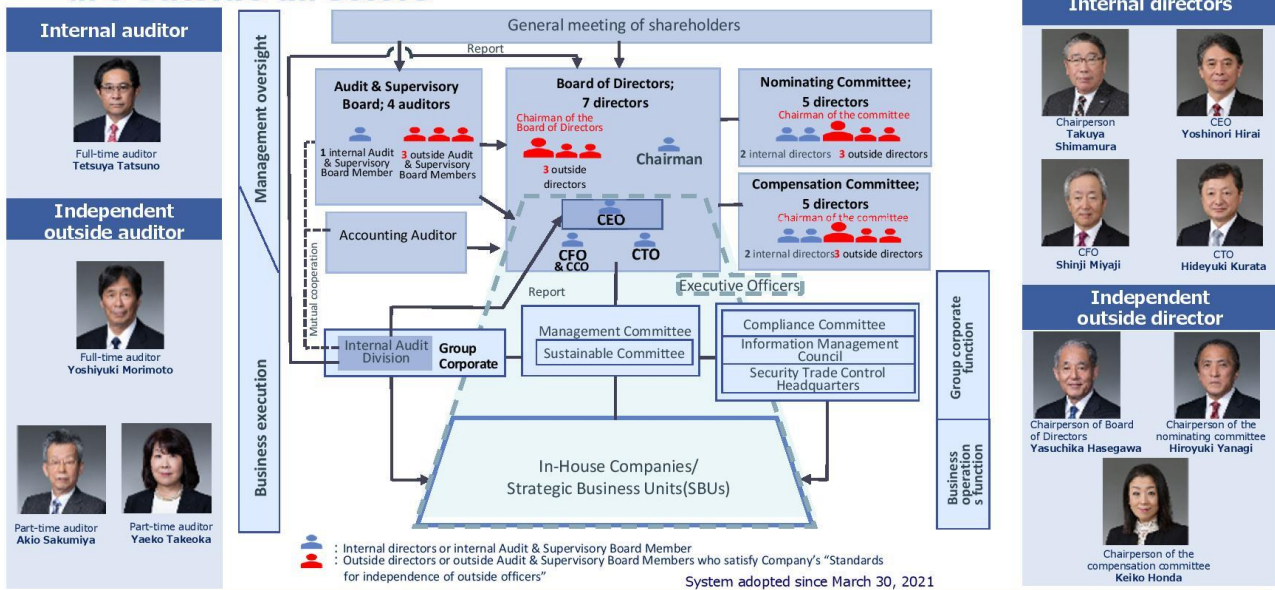
In 2002, we basically introduced an executive officer system, at which point we shifted to a company system. Since our businesses were relatively diversified, we renewed the system under the major concept that the Board of Directors should supervise the management while ensuring proper governance on the executive side.

This has been passed down to the present.



# AGC's corporate governance system

- Became a company with board of corporate auditors in 2002
- Set up a nominating committee and a compensation committee as voluntary discretionary organizations where a majority of members are outside directors



As a result, the current structure was concretely and gradually improved since then until now, and the current structure is written here.

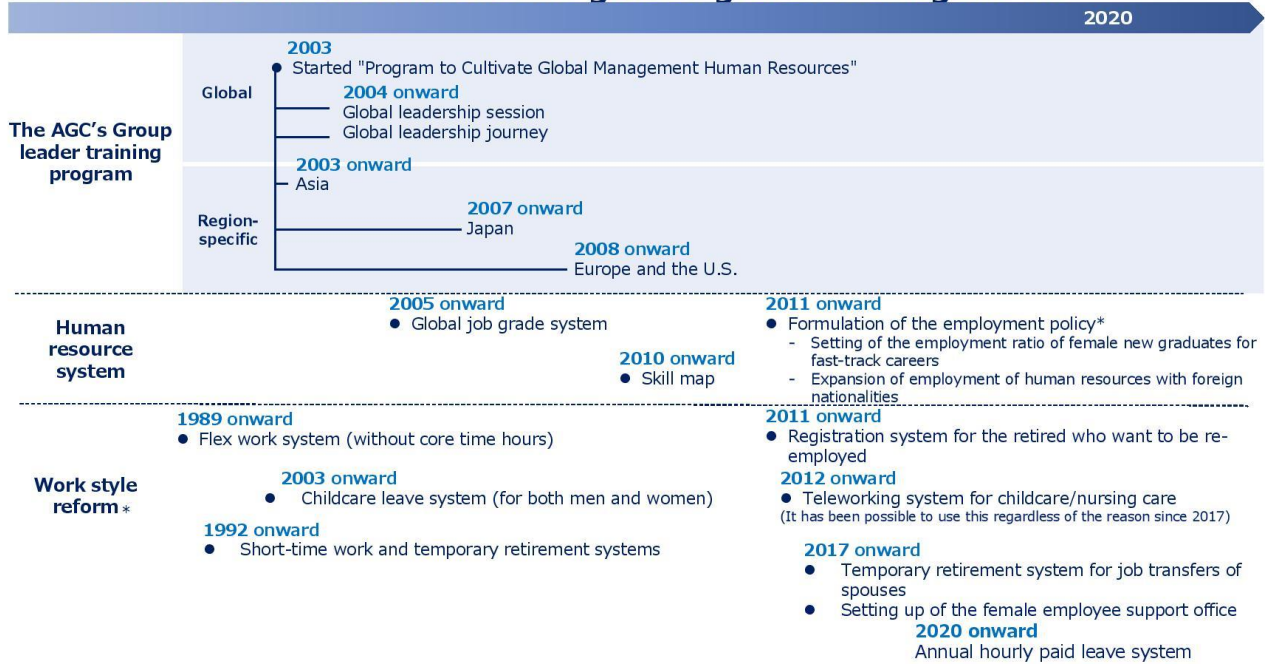
The Board of Directors consists of 7 members: 3 external members; the Chairman, who is non-executive; and 3 executive members, who are CEO, CFO, and CTO.

It has been decided that the Chairman of the Board of Directors is also from outside the Company, and it has been clearly stated that the Chairman of the Nomination Committee and the Compensation Committee are all from outside the Company. In the Nominating Committee and the Compensation Committee, the majority are from outside of the Company.

This is how we operate.

# Systems to build a solid human resources base

## ■ Reinforce the human resource systems to promote the diversity of human resources and the integrated global management



\*Activities by AGC Inc.

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The slide shows a variety of systems, mainly the human resource system.

In response to the major shift to globalization in 2002, we have been working on a more comprehensive program since 2003.

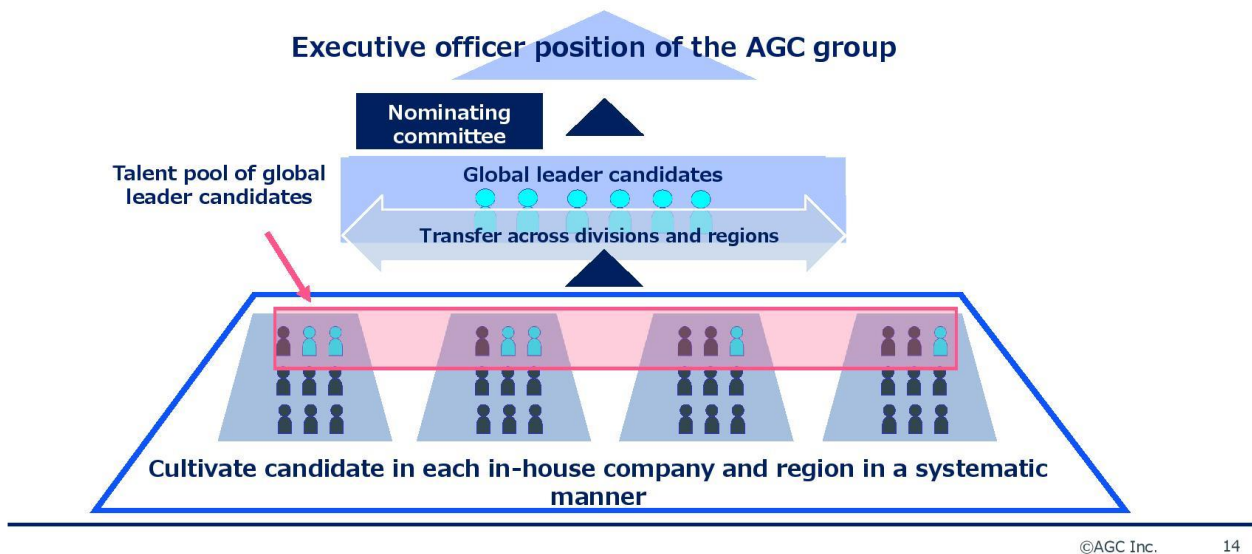
As the CFO myself, I believe that investment in human resources is the most efficient way to invest, so we have been very active in investing in human resources without reducing our investment in human resources caused by poor performance.

In particular, we are putting a lot of effort into the AGC's Group leader training program globally, which is shown at the upper part of the slide, and the global job grade system shown in the middle of the slide, which is the foundation of the program, has been in operation since 2005. In Japan, we have been working steadily to create job grades, determine job descriptions, and measure job sizes for all section chiefs and above globally, and we have 16 years of experience in this area.

As for the top position, it is not mentioned here, but I think we are probably the only Japanese manufacturing company that continues to send about 2 people to the AMP program at Harvard Business School every year since 2002.

## Program to cultivate global leaders

- Explore global leader candidates from all around the world regardless of nationalities and business divisions
- Cultivate and strategically allocate the candidates from the viewpoint of optimizing the entire group



I won't go into details today, but we select candidates for global leadership from all over the world, regardless of nationality or department, and we have programs for each region. Once a person advances to the top ranks, he or she is truly a human resource for group management, and we try to transfer and train him or her across departments and regions, and after pooling these resources, the Nominating Committee has a system to check whether he or she is qualified as an executive or not.

## ■ Aiming to achieve a pleasant working environment for diverse human resources

### Our Shared values **“Look Beyond”** : Diversity

- We will respect the diversity of individuals with varied capabilities and personalities.
- We will respect cultural diversity of race, ethnicity, religion, language, and nationality.
- We will respect different perspectives and opinions at all times.

### "Workstyle reform" all-hands declaration (2017)

### **AGC People: the driver of our growth!**

By enabling each and every employee to fully demonstrate their capabilities, we are creating an organization that is stronger than the sum of its parts, as we achieve our business strategies and organizational targets while delivering corporate and individual growth.

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As you can see here, we consider human resources are significantly important, and describe it as AGC People.

In order to focus on human resources and to change the way we work, we have issued a workstyle reform all-hands declaration and are working on reforming the way we work. We, the top management, always have several hours of conversation among the top management every week, and it is not an exaggeration to say that most of the agenda is about human resources. We spend a lot of time on training, developing, and deploying people.

## Example of activities to promote diversity (promotion of female participation)\*

<p><b>Activities to support employees who are pregnant/raising children</b></p>	<ul style="list-style-type: none"> <li>● Short-time work and temporary retirement systems</li> <li>● Day-care use support system</li> <li>● Communication among employees raising children</li> <li>● Seminars for childbirth, childcare, etc.</li> <li>● Interviews for those who come back from childcare leave</li> <li>● Enhancement of programs to support coming back from childcare leave</li> </ul>
<p><b>Activities to enable motivated women to work actively</b></p>	<ul style="list-style-type: none"> <li>● Training for those who come back from childcare leave</li> <li>● Female mentor system</li> <li>● Promotion of female participation in existing training and external training</li> <li>● Enhancement of the systems to support employees raising children</li> </ul> 
<p><b>Activities to enable diverse human resources to work actively</b></p>	<ul style="list-style-type: none"> <li>● Flex work system without core time hours</li> <li>● Teleworking system regardless of the reason</li> <li>● Annual hourly paid leave system</li> <li>● Temporary retirement system for job transfers of spouses</li> <li>● Female health seminar</li> <li>● Female employee support office</li> </ul>

\*Activities by AGC Inc.

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This diversity and promotion of female participation are initiatives mainly in Japan.

In terms of systems, we are at a level where we are not ashamed to be a leading company in Japan, but in terms of the actual ratio of women in the workforce, we still have a lot of work to do, and I think this is a really big issue.

In this area, we are also leading other Japanese companies. There are some aspects that are very difficult to deal with in terms of various materials and business conditions, but we will do our best to make improvements.

# Engagement improvement measures

## ■ Globally expand measures aiming to improve employee engagement

### 2005 onward

- Started the engagement survey

### 2006 onward

- CEO commendation



### 2015 onward

- Dialogue meeting between the top management and employees



### 2006 onward

- Published the group magazine



### 2011 onward

- Cross-divisional Network Activity



We put a lot of effort into engagement, and the previous president, Mr. Shimamura, and his team put a lot of effort into this area in particular, saying that the most important thing in a company is its culture.

To put it bluntly, we believe that culture is everything, and that good human resources will be attracted to a good culture, so we are working even harder to cherish the culture and create a better culture.

In particular, as you can see here, we are working to create a culture with a variety of mechanisms, and since we cannot proceed simply by crating slogans, we are creating various mechanisms.

## Engagement improvement measure: AGC Group CEO Awards

- Formulated the commendation system for all employees of the group in order to cultivate the culture of "recognition and commendation" in 2006
- 1,687 nominations between 2006 and 2020

### Award ceremony in each region



Asia including Japan



Europe



Americas

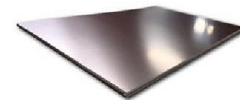
### Award-winning activities



Establishment of the program to cultivate data scientists



Coating on demand



Elucidation of the defect mechanism of CCL materials

In terms of improving engagement, we have established the AGC Group CEO Awards System in 2006.

We've been doing this for 15 years now, and we've been doing it for a long time, with the entire company working together on improvement and innovation activities, giving global awards for them, and gathering the individuals at the end for a festival. I'm a little disappointed that we can't gather due to the COVID-19 pandemic right now, but we are making full use of the Internet.

## Engagement improvement measure: Cross-divisional Network Activity

- Form cross-organizational communities based on expertise and skills
- Have employees voluntarily interact with each other through various activities such as study meetings and workplace tours
- Cultivate an open organization culture

Conceptual diagram

	Glass	Electronics	Chemicals	Ceramics	Corporate
Skill A	2 people icons		1 person icon		
Skill B	1 person icon	2 people icons	1 person icon		
Skill C			2 people icons	1 person icon	2 people icons
⋮					

Total of 40 skills

Here is another unique activity. We have an activity called CNA, or Cross-Divisional Network Activity.

As you can see in the conceptual diagram, we have a vertical company system for glass, electronics, and chemicals, and others, and each of the businesses are quite different, so without any initiatives implemented, they will end up in a silo.

In order to overcome this issue, we are thinking of transferring people, but not all people can be transferred, so we classify people by skills and have them study meetings and workplace tour freely and openly based on the skills. It's been a long time since we have started this, and it has become a third place with a lot of freedom of operation due to horizontal connections, and I think it is helping to break down the silos.



## Engagement improvement measure: Dialogues with the top management

- Started the global dialogue meeting between the top management and employees in 2015
- The purpose is to encourage voluntary actions
- Continued online even amid the COVID-19 pandemic



### Dialogue meeting with CEO (Held three times on average at each site)

**2018 result: 135 times**

Domestic: 14 sites

Foreign: 31 sites (12 countries and regions)

**2019 result: 120 times**

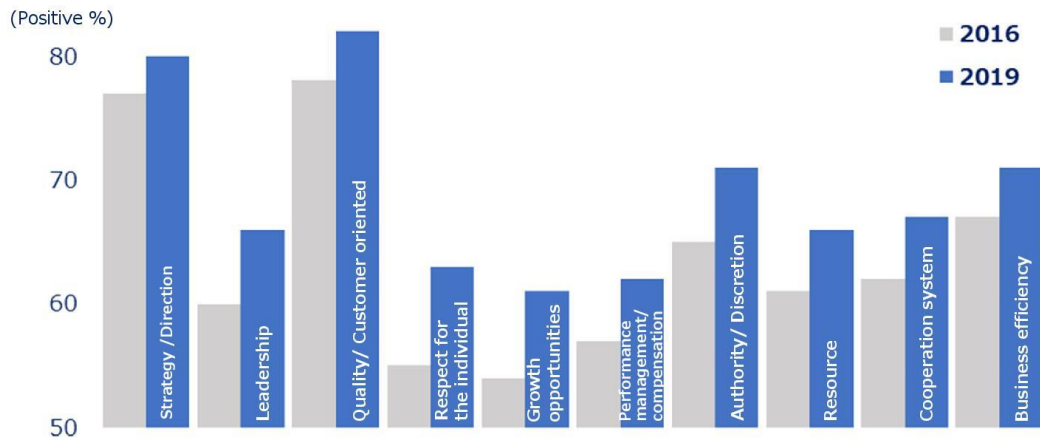
Domestic: 14 sites

Foreign: 26 sites (11 countries and regions)

We are spending a lot of time on the dialogue meeting that I mentioned earlier.

The number of times is written at the bottom on the right, and we are now using the Internet to do it, which is difficult to do, but honestly, we are doing our best. The day before yesterday was the 114th anniversary of our company's founding, and we held activities and events to connect with each other globally via the Internet.

## ■ 2019 survey showed all categories exceeded previous survey results



Overview of the engagement survey

- Conducted six times in total since 2005
- Conducted in 22 languages in 43 countries/regions in 2019
- Surveyed all employees of the group (received answers from 42,000 in 2019; the answer rate was 88%)

We have been doing an engagement survey every 3 years, and in the slide, 2016 is light gray, and 2019 is blue. As results of a variety of initiatives, we have seen improvement across the board.

It wasn't so bad before, but it has improved a lot, and we are getting a certain favorable response. Compared to other top-notch global companies, we still have a long way to go, so we will continue to do our best.

## ■ Resolve problems together through dialogue to improve the organization culture

Improvement activity process		Cases of improvement measures	
1	Analysis of the survey result	 AGC Chemicals Americas	 AGC Flat Glass (Dalian) Inc. (AFD)
2	Sharing of the survey result		
3	Sharing of problem awareness based on the survey result	<b>■ Case of Americas</b> Issue : It is difficult for employees to formulate career paths Improvement measure : Conduct a career planning interview <b>Show what the company can do for employees</b>	
4	Extraction of improvement issues	<b>■ Case of China</b> Issue : Communication across divisions is insufficient Improvement measure : Hold an off-site meeting <b>Conduct improvement activities of the company across divisions</b>	
5	Formulation of improvement measures		
6	Execution of improvement measures		

This is an example of how we are now working on an improvement program in line with the response.

## ■ Propelling innovation in materials to help solve social issues

Since its foundation, AGC has been working to solve social issues in response to the demands of the times through long-term R&D and taking on the challenges of commercialization based on a relationship of trust with customers.



**Through our unique materials and solutions, we will continue to fulfill Our Mission (Purpose) of "AGC, an everyday essential part of our world" and contribute to the realization of global and social sustainability.**

Next, I would like to talk about our efforts around carbon net zero.

We are working on solving social issues through innovation in materials.

In the past, we were more interested in pursuing economic value, but now we are trying to combine social value and economic value by creating economic value based on the premise of creating social value. We are now working on changing the basis of value.

# Social value the AGC Group wants to create

- Through its business activities, AGC will create social value in the following five areas to help solve social issues.

## Major Opportunities

- Developing social infrastructure
- Achieving a safe and comfortable mobility
- Addressing food crises
- Building an info-intensive and IoT society
- Facilitating better health and longevity

- Addressing climate change
- Effective use of resources

## Major Risks

- Creating a socially and environmental-conscious supply chain
- Ensuring fair and equal employment and workplace safety
- Considering relationships with local communities and the environment

Work toward the sustainability goals in all business activities

Contributing to the realization of safe and comfortable urban infrastructure

Contributing to the realization of safe and healthy lifestyles

Contributing to the realization of a sustainable global environment

Contributing to the maintenance of a healthy and secure society

Contributing to the creation of fair and safe workplaces

I will not go into detail, but this slide shows a rough summary of our company's analysis of key opportunities and key risks from the perspective of the SDGs over the past 2 years.

# Create social values through products, technologies, and company activities

Business Social values	Glass	Electronics	Chemicals	Ceramics
Contribution to the realization of a sustainable global environment	<ul style="list-style-type: none"> <li>- Float flat glass (products using recycled raw materials, Thinned glass)</li> <li>- Low-E double glazing glass</li> <li>- Coating glass</li> <li>- Photovoltaics-embedded glass</li> <li>- Thinned glass(chemically strengthened glass)</li> <li>- Automotive glass etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Display glass (products using recycled raw materials)</li> <li>- Solar cell TCO glass</li> <li>- Float cover glass for PV module</li> <li>- Optical Materials</li> <li>- Materials for high-speed communication</li> <li>- High power LED glass ceramics substrate etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Environmentally friendly refrigerant and solvents</li> <li>- Materials for fuel cells</li> <li>- Fluoropolymer</li> <li>- Fluoropolymer resin for coatings</li> <li>- Fluoropolymer resin for solar cell etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Refractory (products using recycled raw materials)</li> <li>- High thermal insulation ceramic wall for furnace</li> <li>- Refractory/engineering for biomass power boilers etc.</li> </ul>
Contribution to the realization of safe and comfortable urban infrastructures	<ul style="list-style-type: none"> <li>- Low-E double glazing glass</li> <li>- Disaster-resistant/security glass</li> <li>- Antennas installed in construction windows</li> <li>- Automotive glass</li> <li>- Cover glass for car-mounted displays</li> <li>- Sound insulation glass</li> <li>- Light control glass</li> <li>- Integrated glass antenna for cars</li> <li>- HUD components etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Display glass</li> <li>- Materials for onboard sensing/radar</li> <li>- Semiconductor processes and materials</li> <li>- Materials for high-speed communication</li> <li>- Glass substrates for AR/MR etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Polyvinyl chloride</li> <li>- Caustic soda</li> <li>- Sodium hypochlorite</li> <li>- Sodium bicarbonate etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Refractory/engineering for industrial furnace</li> <li>- Refractory/engineering for waste incinerator etc.</li> </ul>
Contribution to the realization of safe and healthy lives	<ul style="list-style-type: none"> <li>- Low-E double glazing glass</li> <li>- UV cut glass etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Display glass for medical monitors</li> <li>- Materials for high-speed communication</li> <li>- Laboratory glass ware</li> <li>- Tissue culture products etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Pharmaceutical active and intermediates ingredient</li> <li>- Agrochemical active and intermediates ingredients</li> <li>- Green house film</li> <li>- High-function membrane for water treatment</li> <li>- Sodium bicarbonate (infusion for dialysis) etc.</li> </ul>	

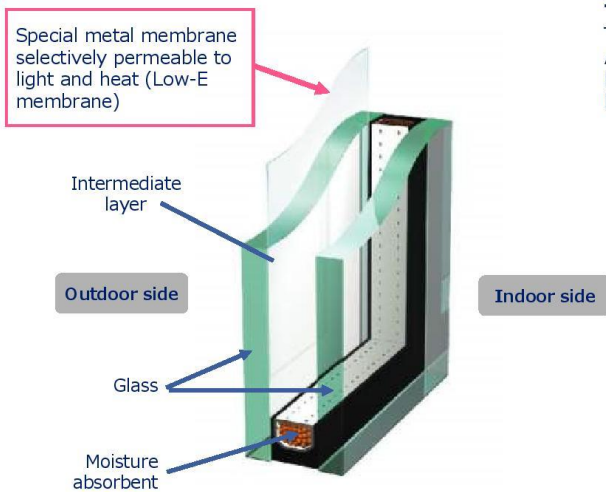
As you can see on the next page, in this sense, we have confirmed that various things are properly linked and connected in terms of the SDGs, and we have just decided on what we will focus on in this area and have created KPIs and started to implement them.

I think we will be able to talk about this in more detail from next year.

# Low-E double glazing glass

- Selectively transmit light and heat and helps to improve the energy efficiency of buildings
- Approximately 78% less heat transfer than single pane glass\*

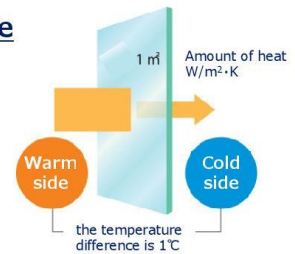
## Structure of Low-E double glazing glass



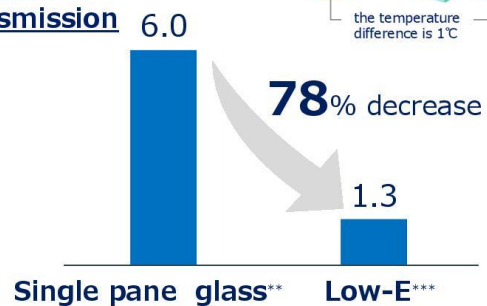
## Effect of Low-E double glazing glass

### Thermal transmission rate

Amount of heat passing per 1 m<sup>2</sup> for 1 hour with a temperature difference between inside and outside is 1 °C.



### Thermal transmission rate



\*Comparison of thermal transmission rate between 3mm float glass and Low-E double glazing glass \*\*3mm float glass \*\*\*Low-E double glazing glass with gas 27

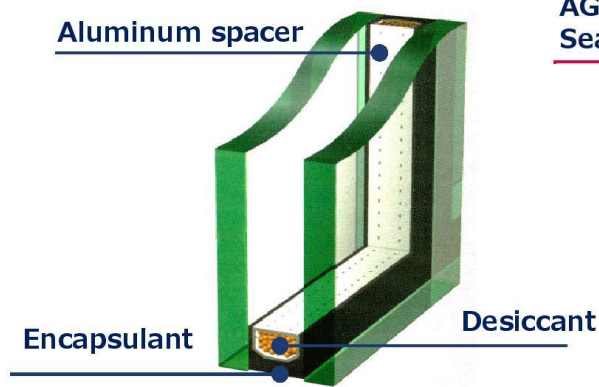
In terms of environmental contributions, I will talk about some examples of contributions by products.

As written, Low-E double glazing glass is making a very significant contribution to the environmental problem, and the widespread use of glass with thermal insulation properties shows great power. Especially insulation. Cutting the energy used for heating in cold climates produces a very significant effect.

As you can see to the right, most of the heat in a building comes and goes through the windows, so the ultimate way to make this work is to provide the same level of insulation as the walls. The widespread use of these products will be a great contribution to the environment.

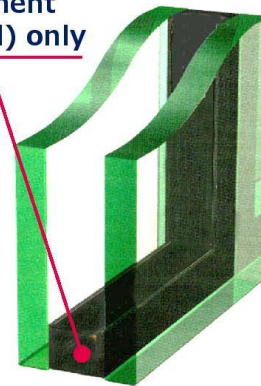
- Highly durable, long-life, high-insulation double glazing using AGC's original material
- Aluminum, desiccant, and sealing material are integrated with chemical technology for easy recycling
- Achieves longer life while maintaining window performance, contributing to reduction of CO<sub>2</sub> emissions during the life cycle

Structure of double glazing glass



Structure of Thermocline™

AGC original development  
Sealing material(butyl) only



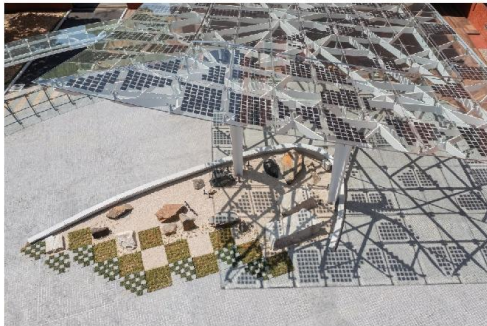
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In Japan, for example, shown left is the conventional double-glazing structure, and we have developed a new product called Thermocline, using our original resin as the sealing material instead of metal spacers. Although not shown here as an example, in Europe, we have developed and commercialized a vacuum insulated pail in collaboration with Panasonic.

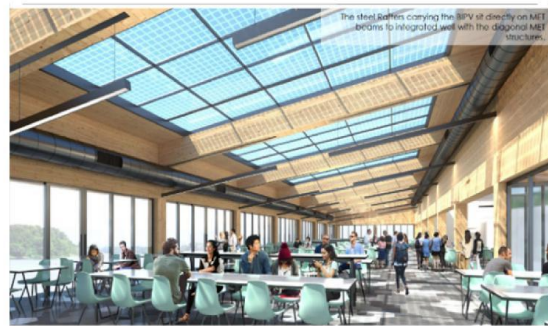
In Europe, as many of you may know, there is a so-called renovation wave in the EU, in which 35 million buildings will be renovated by 2030, and a great deal of money is being invested. Europe is naturally a region of renovation. Our products can be replaced without major changes to the window frame, and I believe that the fact that we have such a wide range of insulation products will be a great tailwind for us.



- Glass that can generate electricity by solar power
- Encapsulates a solar power generation cell in two glass plates
- Realizes both energy creation and design performances and help bring about a carbon-neutral society



Entrance canopy of  
Global Zero Emission Research Center of AIST



New Punggol campus of Singapore Institute of  
Technology

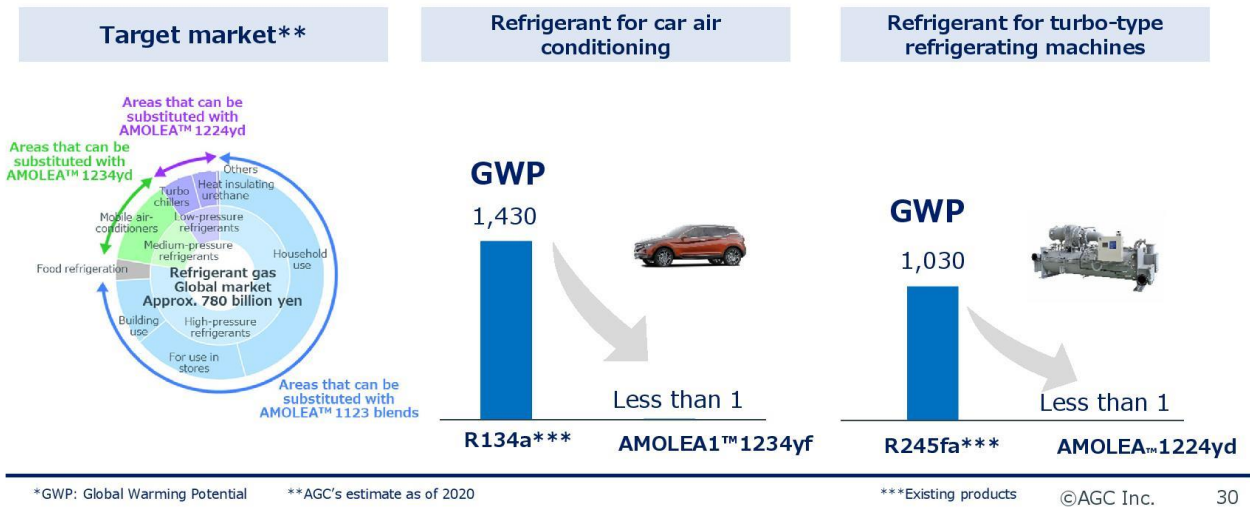
Another product that has been very active recently is the BIPV, Building Integrated Photovoltaic, which generates electricity directly from the windows and glass surfaces of buildings.

This is transparent solar power generation, which comes in a variety of designs, and we have been receiving a lot of inquiries recently, meaning the interest in zero-emission buildings is very high.

Especially in developed countries, there are few areas that receive sunlight, so using existing walls and window surfaces to generate electricity is attracting a lot of attention.

# Environment-friendly refrigerant/solvent: AMOLEA™ series

- Sells new environment-responsive refrigerant/solvent with extremely low global warming potential (GWP\*)
- Contributes to the prevention of global warming



Next, in the area of chemical refrigerants, we have long been a leader in the world of refrigerants with a very low global warming potential, and we are currently working on the AMOLEA series.

Refrigerants for car air conditioners and turbo chillers have already been put to practical use, and as you can see here, their global warming potential is extremely low.

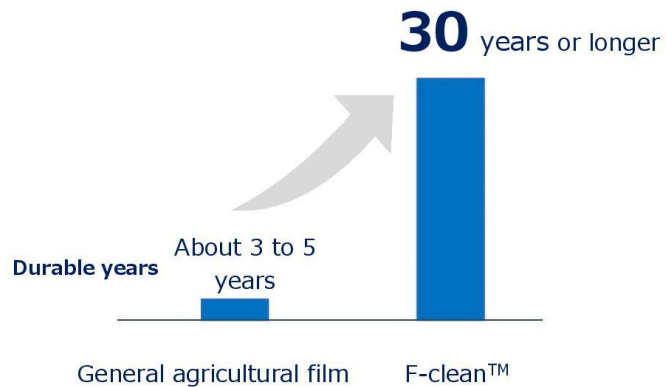
Now that AMOLEA is in the final testing phase for regular building and room air conditioners, we expect it to become a major business in the future, and we believe it will also make a significant contribution to the environment.

## Greenhouse film: F-clean™

- **Contributes to reduction of plastic waste thanks to its long life**
- **Contributes to improvements in the productivity and quality of agricultural products thanks to its high light transmittance**



Case of adoption in greenhouse



Here's another example, F-clean.

This product itself has been around for a long time, but if you look at it, you will see that its service life is 3 to 5 years for ordinary vinyl greenhouses, but once it is installed, it does not need to be replaced for more than 30 years, and it does not turn yellow, so it is very durable and ultimately environmentally friendly.

The same kind of material is used to create the walls of the Allianz Arena structure, and the same kind of material is used in greenhouses.

## Fluoropolymer resin for coatings: Lumiflon™

- Decreases the frequency of repainting and contributes to the reduction of CO<sub>2</sub> emissions in the life cycle thanks to its high weather resistance
- Has actually been used in various cases from buildings to transport equipment for 40 years since its release



Pearl River Tower  
(China)



Akashi Kaikyo Bridge  
(Japan)



Ferrari World Abu Dhabi  
(U.A.E.)

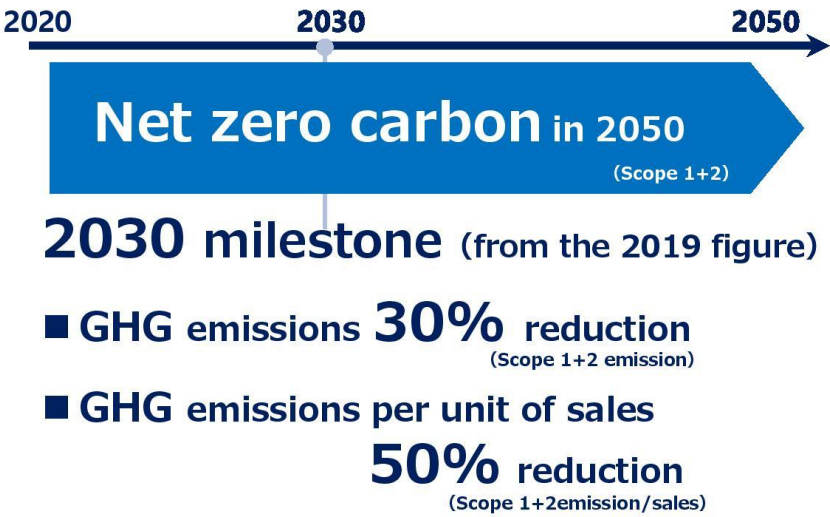
Another example of an environmentally friendly product is Lumiflon, which is used in special paints.

This has also been around for a while, and it is getting a lot of attention. Akashi Kaikyo Bridge, Marina Bay Sands in Singapore -- not in the picture -- and nearby Tokyo Sky Tree.

If you use our paint on something that can hardly be repainted, it will not need to be repainted for a long time, even decades. For this reason, this resin is fairly standard for buildings that are very difficult to repaint. This is a product that is not well known but has been attracting a lot of attention lately.

# Net zero carbon goal in 2050

- Expected to achieve the CO<sub>2</sub> reduction target set in 2014
- Continue to focus on reducing GHG through products and technologies
- Aim to achieve net zero carbon in 2050



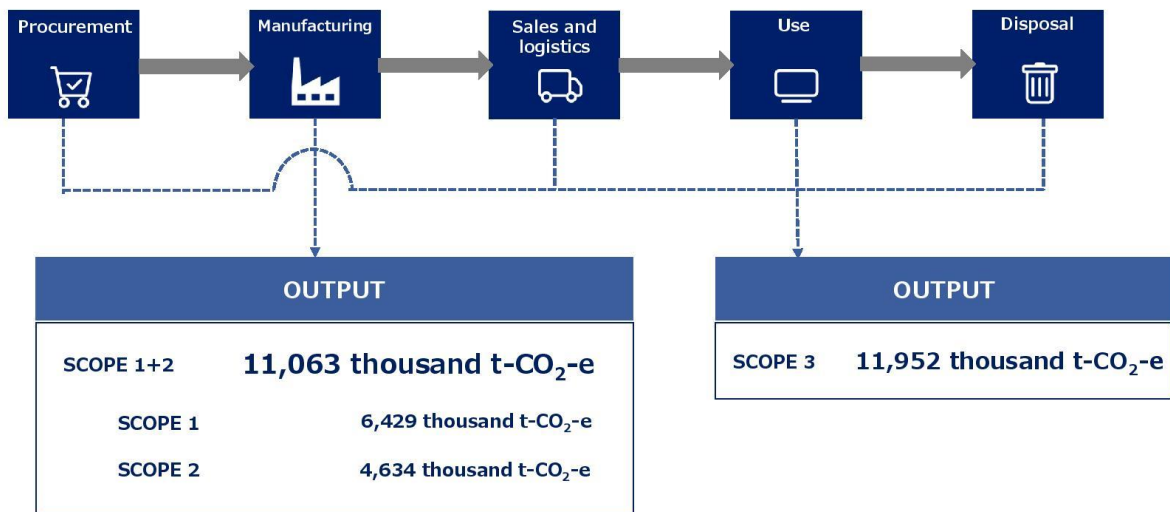
This time, we set a goal of net zero carbon emissions, 2050, in our mid-term plan.

Until now, we have announced that we have set a benchmark to recover the amount of emissions through environmental products, but the times have changed considerably, and we are now aiming for this carbon net zero.

As a milestone, we have set a target of reducing GHG emissions by 30% and unit energy consumption by 50% by 2030. As for the year 2030, it is not a pie in the sky, but a deadline that we can achieve if we work hard after considering how we can achieve it. I believe that we can achieve this goal. As for 2050, the hurdle is quite high, and I believe that we still have to work on major technological innovations, et cetera.

# GHG emissions and breakdown by Scope (2020)

- Up to 2020, activities focused mainly on the reduction of Scopes 1 and 2



As for output, the breakdown of the total volume of Scope 1, Scope 2, and Scope 3 is shown. As in the lower left corner, Scope 1 is comprising over 55% and Scope 2 over 45%.

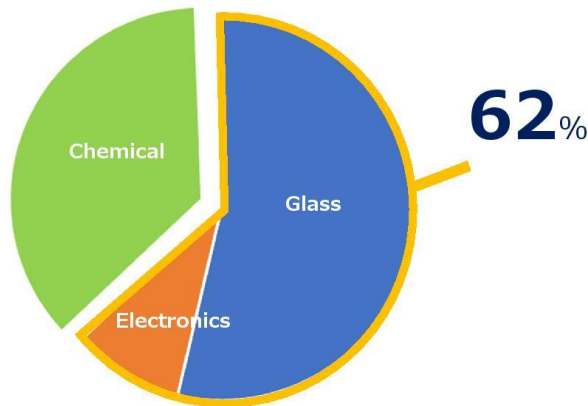
I mentioned earlier that we will reduce emissions by 30% by 2030. We are afraid that we have not written a rough scenario story, but of course our business will grow, and we do not intend to reduce our business.

As we expand our business, the amount of emissions will also increase in certain businesses, but we can at least offset this by improving the unit of production. That's Scope 1.

A significant portion of Scope 2 accounts for the electrolysis of chemicals and the chlor-alkali business. As for this, the energy mix is changing rapidly based on the Paris Agreement, so this will continue to decline. Therefore, if we combine this with our usual efforts to conserve energy and change our ports, we believe that we can achieve the 30% emission reduction by 2030 as I mentioned earlier.

## Breakdown by Scope 1 segment

- The emission source that accounts for the majority of Scope 1 is the float glass melting furnace of the glass and electronics segments
- The major emission source of the chemicals segment is the non-utility generator



Scope 1	
<b>Scope 1 total</b>	<b>6,429 thousand t-CO<sub>2</sub>-e</b>
● Glass	3,374 thousand t-CO <sub>2</sub> -e
● Electronics	614 thousand t-CO <sub>2</sub> -e
● Chemicals	2,404 thousand t-CO <sub>2</sub> -e

I'll go into a little more detail for the breakdown.

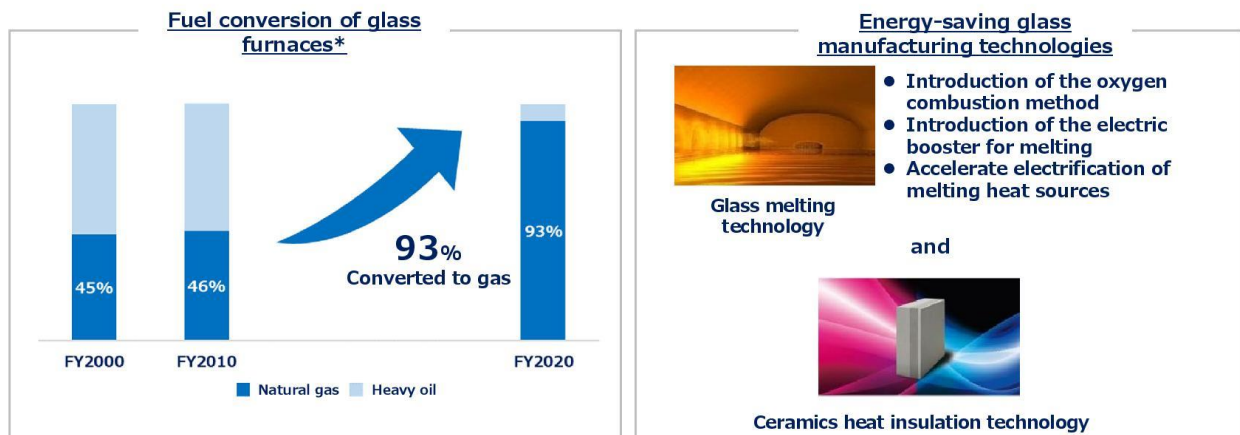
First, this is the total for Scope 1, mentioned earlier.

As you can see here, the emission source that accounts for the majority of Scope 1 is the float glass melting.

As for chemicals, we have our own power generation facilities, so Scope 1 emissions are mainly from our own power generation facilities.

## Glass melting process innovation

- Promote fuel conversion to natural gas whose CO<sub>2</sub> emissions caused by combustion are about 20% less than heavy oil
- Develop top-rated energy-saving glass manufacturing technologies in the world



\*Including the float furnaces of architectural glass, automotive glass, and glass for displays

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We somehow have to reduce the amount of this emission.

There are many things that can be done for glass melting furnace, and the 1 on the bottom left is almost done. We have been working steadily to reduce CO<sub>2</sub> emissions by switching from heavy oil to natural gas, and this is almost done.

On the right side, you can see our future efforts. There is no single, big solution to this problem, so we have to try to achieve it through a combination of various technologies.

1 way is to add oxygen in addition to gas, oxygen for combustion. This has already been put to practical use, and another method is to use hydrogen and ammonia in a mixed phase. Then, we put in an electric booster to provide as much assistance as possible with electricity. This has already been put to practical use, of course. In addition, we will work on the electrification of the heat source, which is a major technological development. This is 1 of the key points.

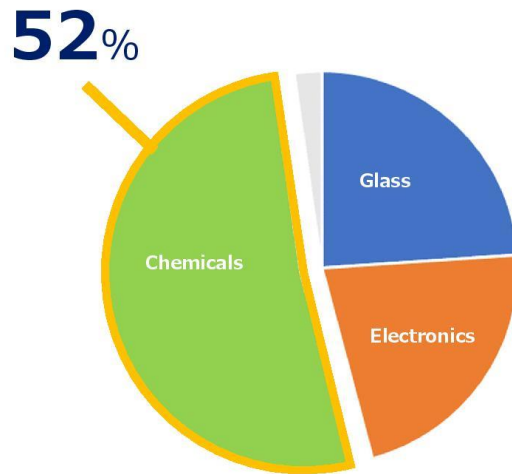
We also have ceramics, and we have ceramics technology that has very high heat insulation properties, so we will use a combination of these technologies to increase energy efficiency.



## Breakdown by Scope 2 segment

- The main emission source of Scope 2 is the chlor-alkali electrolysis facility of the chemicals segment

Scope 2	
<b>Scope 2 total</b>	<b>4,634 thousand t-CO<sub>2</sub>-e</b>
● Glass	1,103 thousand t-CO <sub>2</sub> -e
● Electronics	1,029 thousand t-CO <sub>2</sub> -e
● Chemicals	2,409 thousand t-CO <sub>2</sub> -e

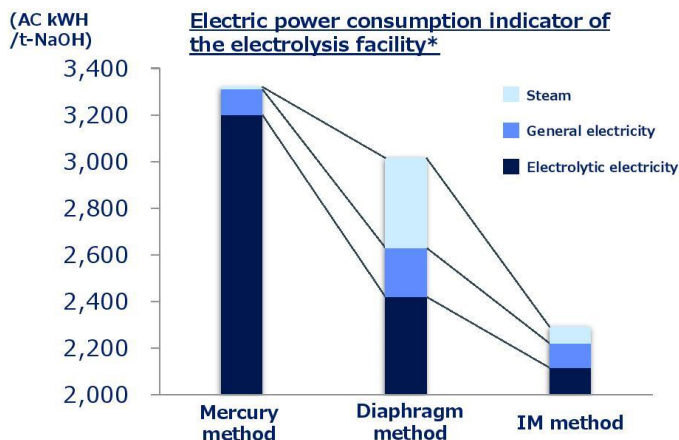


Then, Scope 2.

Chemicals account for a large part of the total, and chlor-alkali electrolysis equipment accounts for the largest part of this.

## Chlor-alkali electrolysis facility

- In 1975, AGC developed "ion-exchange membrane method (IM method)," whose environmental impact is extremely low (first in the world)
- The IM method greatly reduced the electric power consumption indicator
- AGC started the sales of the ion-exchange membrane Flemion™ and it contributed to the reduction of environmental impact of the industry



	Manufacturing caustic soda concentration [wt%]	Impacts on the environment and health
Mercury method	50	Concern of wastewater pollution by mercury
Diaphragm method	12	Concern of pneumoconiosis and mesothelioma**
IM method	32	Pollution-free/safe

\*When manufacturing 48% liquid caustic soda \*\*the diaphragm process which use asbestos

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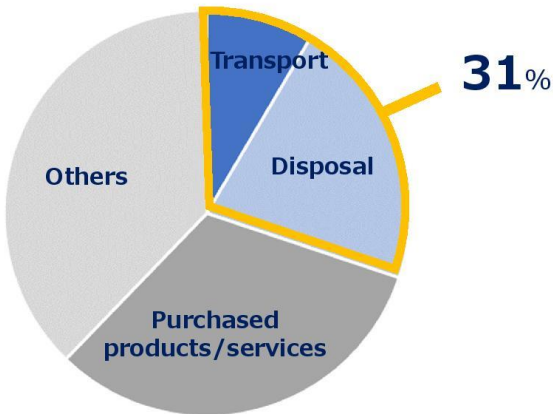
Talking about this discharge phenomenon, 1 of the first things we can do is to improve the electrolysis process.

As a matter of fact, we were the first company in the world to develop the ion-exchange membrane method, or IM method, which is now used as a matter of course all over the world, and we now manufacture chlor-alkali products 100% by the IM method.

There are still many methods, such as mercury method in the world. However, we are taking the initiative in doing this, and we have been working steadily to improve the IM method itself so that it uses even less electricity. In this sense, we believe that we are currently at the top of the industry.

# Breakdown by Scope 3 segment

- In terms of the amount of emissions, Purchased Products/Services is followed by Disposal and Transport



Scope 3	
Scope 3 total	11,952 thousand t-CO <sub>2</sub> -e
● Transport	1,102 thousand t-CO <sub>2</sub> -e
● Disposal	2,581 thousand t-CO <sub>2</sub> -e
● Purchased products/services	3,921 thousand t-CO <sub>2</sub> -e
● Others	4,348 thousand t-CO <sub>2</sub> -e

Next is Scope 3.

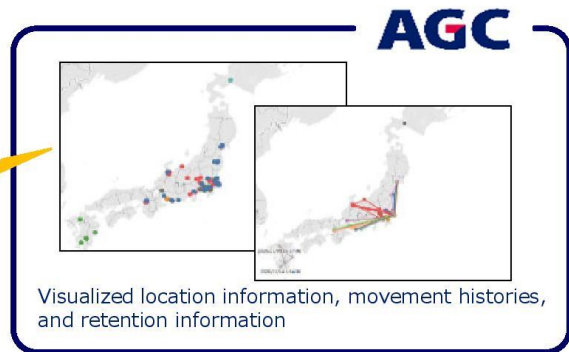
As for Scope 3, we have a lot of work to do, but I believe that Scope 3 will be the focus of attention in the future, so we will continue to focus on it.

## IoT for glass transport pallets

- Pallet IoT system for the pallets used for the transportation of glass
- Improve the transport efficiency with the transport plan reflecting pallet location information
- Reduce the CO<sub>2</sub> emitted during product transport by about 5%



Installed a logistics tracker in 1,400 large pallets



Visualized location information, movement histories, and retention information

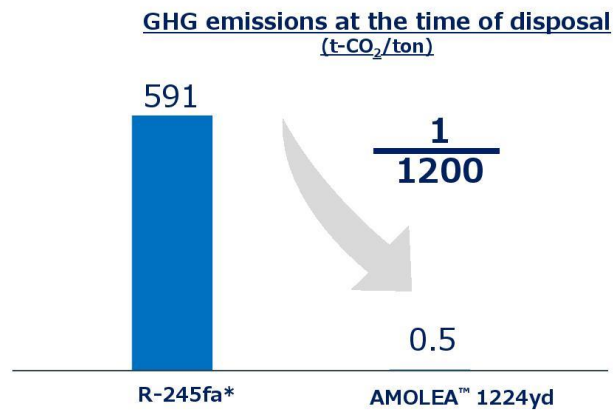
Let me bring up 1 example, which attracted a lot of attention.

If glass is not transported efficiently using a highly unique pallet like the one shown on the left, logistics costs will be extremely high. Since CO<sub>2</sub> emissions are high in logistics, we have put a special radio wave emitting device in this pallet to completely grasp the location information for practical use.

By doing this, we hope to continue our efforts to reduce CO<sub>2</sub> emissions indirectly by making logistics very efficient.

## New environment-friendly Refrigerant AMOLEA™ series

- Environmental regulations led to the dissemination of refrigerants with low global warming potential
- The CO<sub>2</sub> emissions of AMOLEA™ at the time of product disposal are extremely small
- Shift to AMOLEA™ contributed to a significant reduction in CO<sub>2</sub> emissions at the time of disposal



\*Existing products

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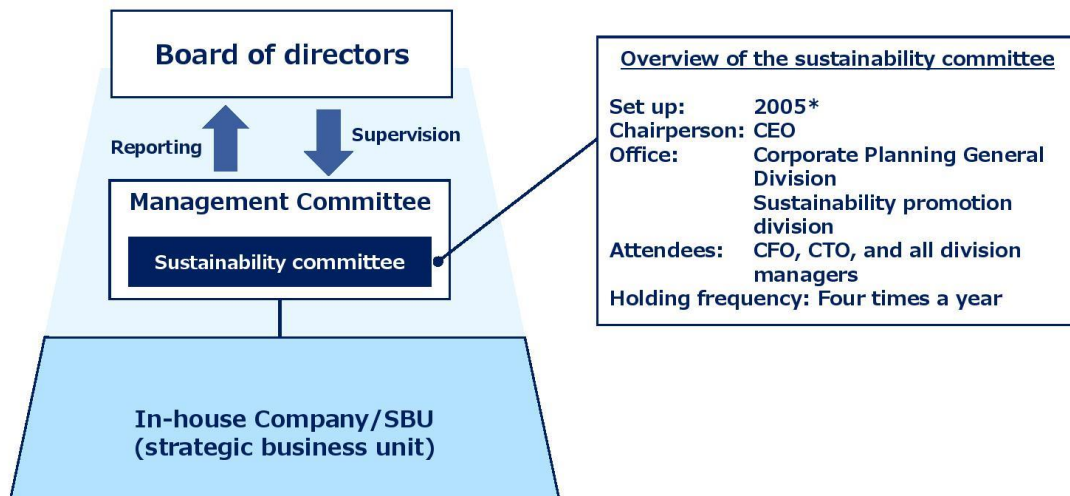
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Another product called AMOLEA, which I mentioned earlier, will also contribute greatly to the reduction of Scope 3.

These refrigerants are inevitably leaked when they are disposed, and they produce a lot of GHG gas. AMOLEA has very low GHG emissions to begin with, so in this sense, AMOLEA will make a significant contribution to Scope 3.

## For the promotion of sustainability management

- Set up the sustainability promotion division in the Corporate Planning General Division, which formulates Group-wide strategies
- The sustainability committee is in charge of decision-making and progress management of non-financial targets as an advisory body for the President & CEO



\*Set up as the CSR committee. Sustainability committee since 2021

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Finally, there is a very wide range of topics for these so-called ESG-related issues.

As I mentioned earlier, our goal is to create social value on the premise of economic value, so naturally we are working on various mechanisms to promote this.

At present, I am serving as the General Manager of the Corporate Planning General Division, and a few years ago, I created the sustainability promotion division within this division, which is responsible for overall management.

The Sustainability Committee is positioned on a par with the Management Committee, which is the most important decision-making body of the Company. And this Committee, chaired by the CEO, will be responsible for managing the progress of the initiatives mentioned above.

From now on, we are going to develop KPIs. With the KPIs, we would like to do the PDCA cycle and achieve our target.

**By providing differentiated materials and solutions,  
AGC strives to help realize a sustainable society  
and become an excellent company that grows and  
evolves continuously.**

Lastly, I would like to reiterate our vision for the year 2030.

In the midst of this major social movement, we are aware that there are risks, but it is a great business opportunity, and we would like to bring our business into a phase of expansion while receiving further tailwind from the ESG and SDGs.

That is all. Thank you very much.