

The AGC Group's ESG Initiatives



AGC Inc.

September 10, 2021

Your Dreams, Our Challenge

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1. Progress of the AGC Group's business diversification and globalization

**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.**"

Diversification of the business

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



Construction boom



Motorization



Coming of the era of TV



Expansion of environment-conscious businesses and products



Advancement of IT



Arrival of the IoT era



Strat of 5G communication

1907 1910s 1950s 1970s 1990s 2000s 2010s 2020s



Started manufacturing of refractories

Started manufacturing of soda ash



Started the automotive glass business



Started the business of glass valves for CRTs



Succeeded in the development of ion-exchange membrane



Started the business of alkali-free glass for LCD



Started the production of alternative CFC AK-225



Started the business of filters for tone correction for digital cameras



Started the business of chemically tempered glass for smartphones



Started the business of EUV mask blanks



Started the contract production business of pharmaceutical and agrochemical intermediates



Developed glass antenna that adds cellular base station capabilities to windows

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



1950s

1960s
to 70s

1980s

1990s

2000s



Started the business of architectural glass in India



Started the business of architectural glass/automotive glass/chemicals in Thailand and Indonesia



Deployed the business of architectural glass/automotive glass in earnest in Europe and the U.S.



Deployed the fluorochemicals business in earnest in Europe and the U.S.



Started the business of glass for TFT/PDP in Taiwan and South Korea



Started the business of architectural glass/automotive glass in Brazil

2. Governance reform toward the integrated global management

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

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

1 Formulation of the group vision

2 Reform of the board of directors

3 Introduction of the executive officer system

4 Introduction of the in-house company system

5 Enhancement of the human resource base

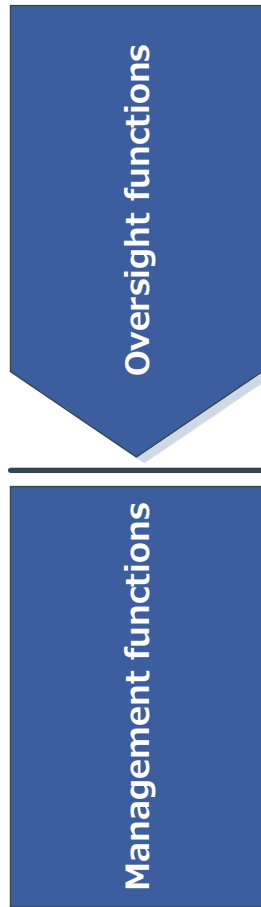
6 Establishment of the cultivation of management human resources

7 Workstyle reform

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



- 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

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

Internal auditor



Full-time auditor
Tetsuya Tatsuno

Independent outside auditor



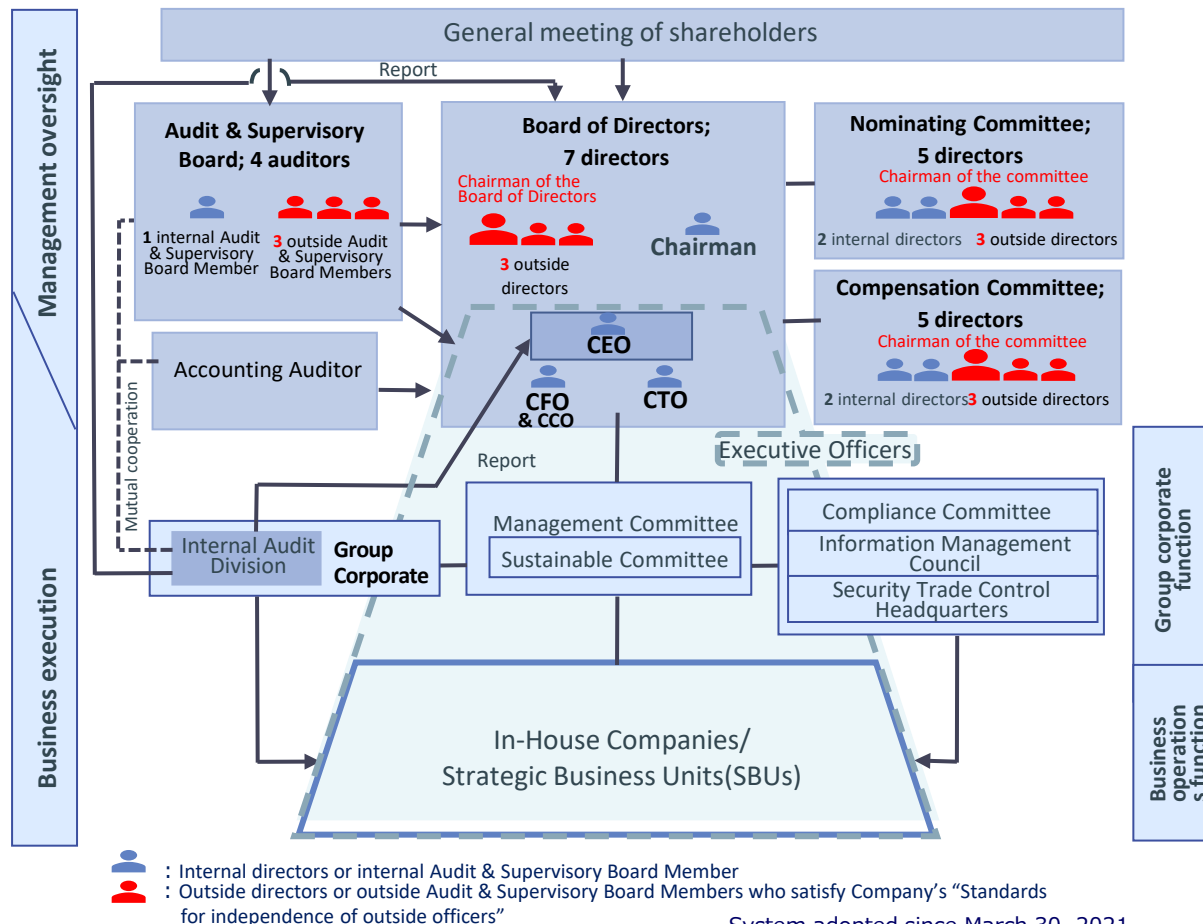
Full-time auditor
Yoshiyuki Morimoto



Part-time auditor
Akio Sakumiya



Part-time auditor
Yaeko Takeoka



System adopted since March 30, 2021

Internal directors



Chairperson
Takuya
Shimamura



CEO
Yoshinori Hirai



CFO
Shinji Miyaji



CTO
Hideyuki Kurata

Independent outside director



Chairperson of Board
of Directors
Yasuchika Hasegawa



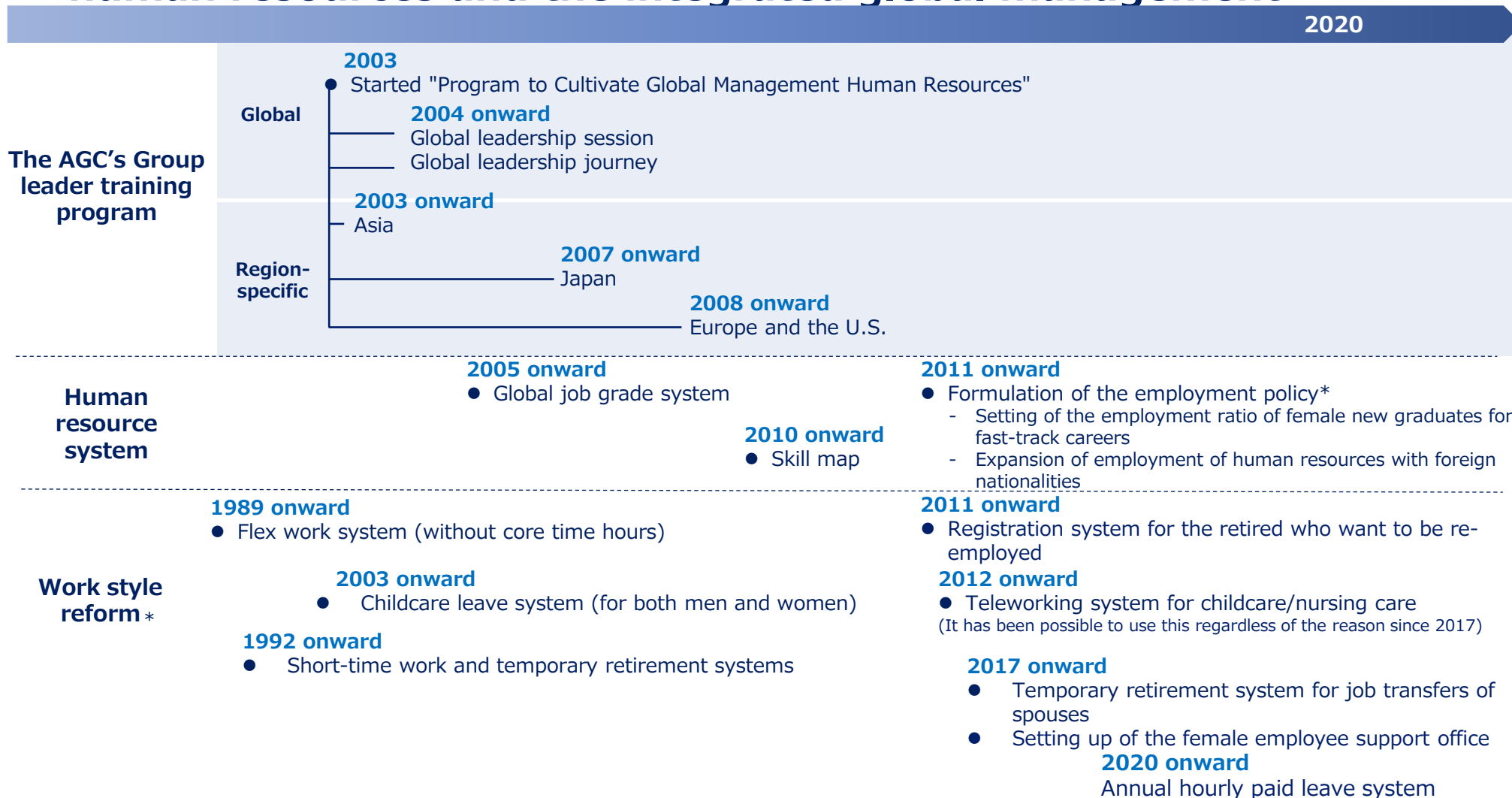
Chairperson of the
nominating committee
Hiroyuki Yanagi



Chairperson of the
compensation committee
Keiko Honda

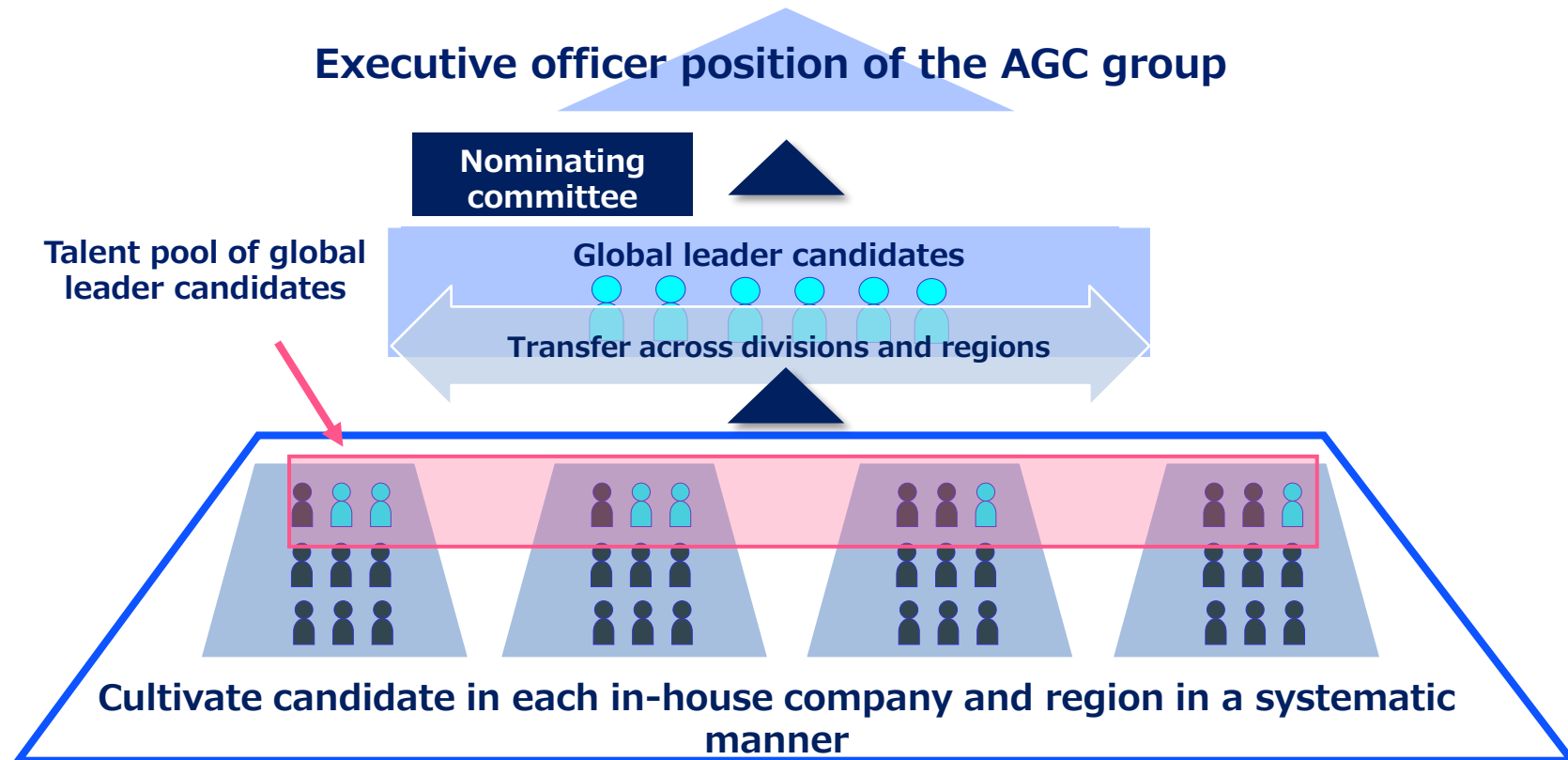
Systems to build a solid human resources base

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



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



- 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.

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

Activities to support employees who are pregnant/raising children

- Short-time work and temporary retirement systems
- Day-care use support system
- Communication among employees raising children
- Seminars for childbirth, childcare, etc.
- Interviews for those who come back from childcare leave
- Enhancement of programs to support coming back from childcare leave

Activities to enable motivated women to work actively

- Training for those who come back from childcare leave
- Female mentor system
- Promotion of female participation in existing training and external training
- Enhancement of the systems to support employees raising children



Activities to enable diverse human resources to work actively

- Flex work system without core time hours
- Teleworking system regardless of the reason
- Annual hourly paid leave system
- Temporary retirement system for job transfers of spouses
- Female health seminar
- Female employee support office

■ 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



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

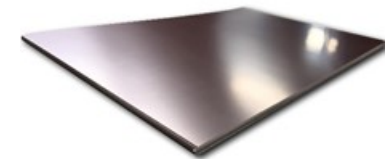
Award-winning activities



Establishment of the program to cultivate data scientists



Coating on demand











Elucidation of the defect mechanism of CCL materials

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					
Skill B					
Skill C					
⋮					

Total of 40 skills

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

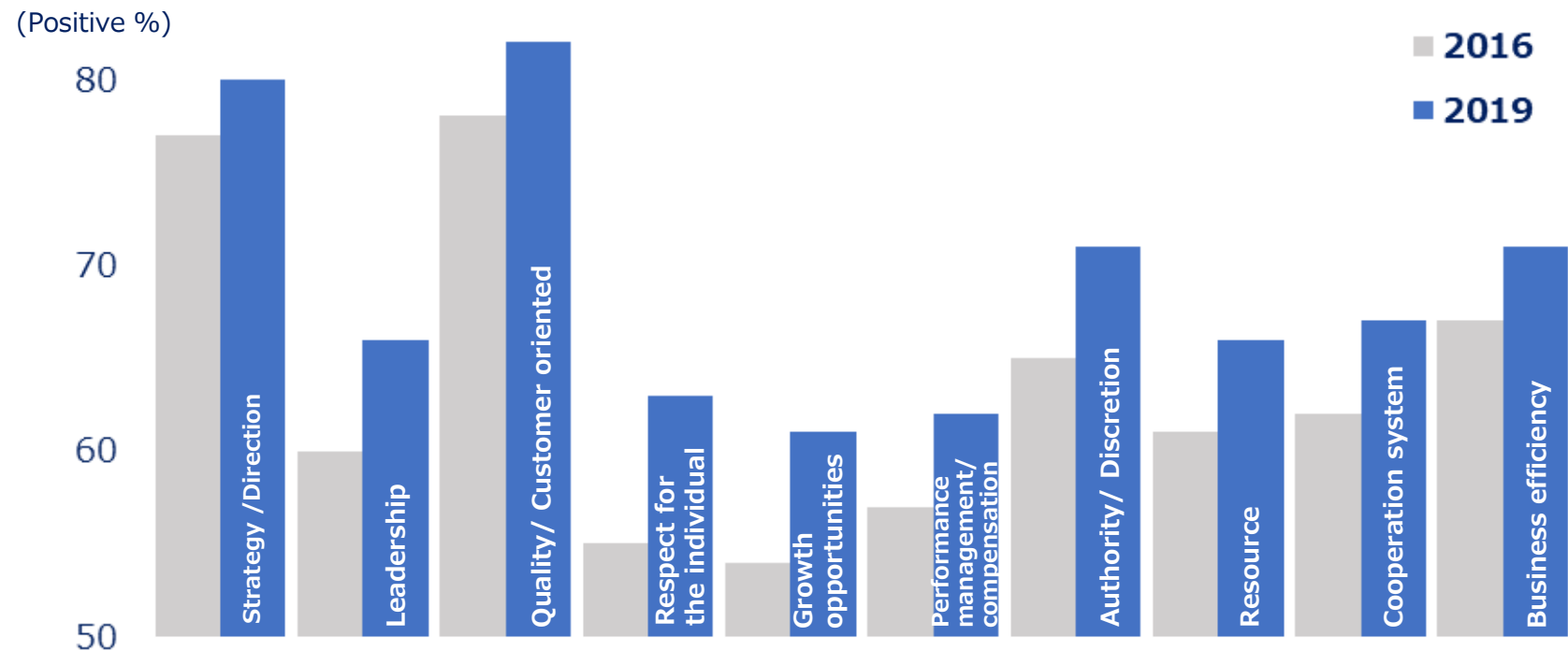
Foreign: 31 sites (12 countries and regions)

2019 result: 120 times

Domestic: 14 sites

Foreign: 26 sites (11 countries and regions)

■ 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%)

■ Resolve problems together through dialogue to improve the organization culture

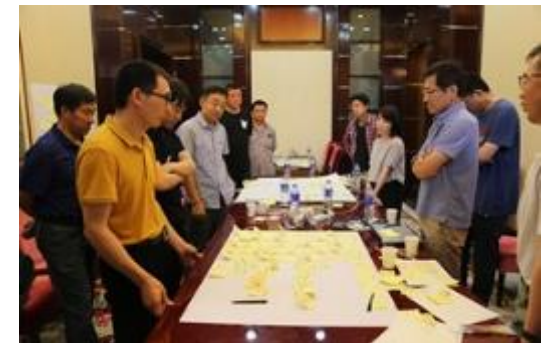
Improvement activity process

1	Analysis of the survey result
2	Sharing of the survey result
3	Sharing of problem awareness based on the survey result
4	Extraction of improvement issues
5	Formulation of improvement measures
6	Execution of improvement measures

Cases of improvement measures



AGC Chemicals Americas



AGC Flat Glass (Dalian) Inc. (AFD)

■ Case of Americas

Issue : It is difficult for employees to formulate career paths

Improvement measure : Conduct a career planning interview
Show what the company can do for employees

■ Case of China

Issue : Communication across divisions is insufficient

Improvement measure : Hold an off-site meeting
Conduct improvement activities of the company across divisions

3. Sustainability management and carbon net zero

■ 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.

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

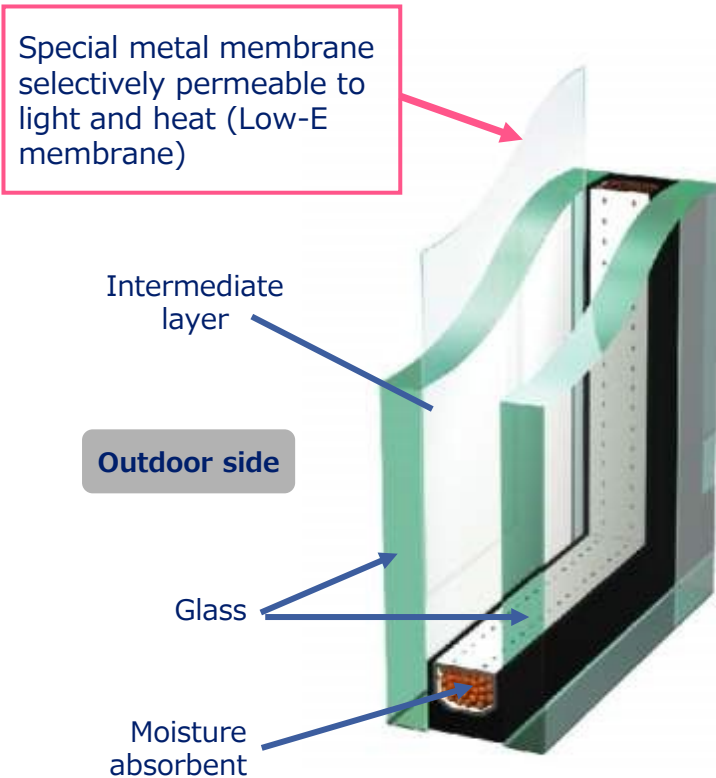
Create social values through products, technologies, and company activities

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

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*

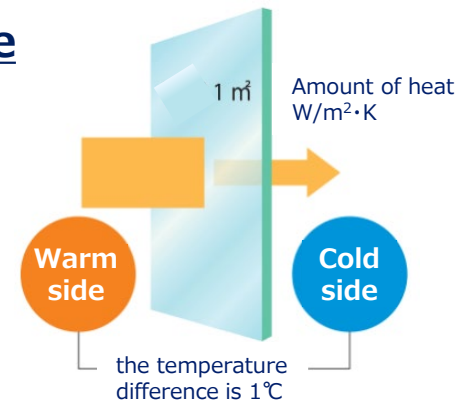
Structure of Low-E double glazing glass



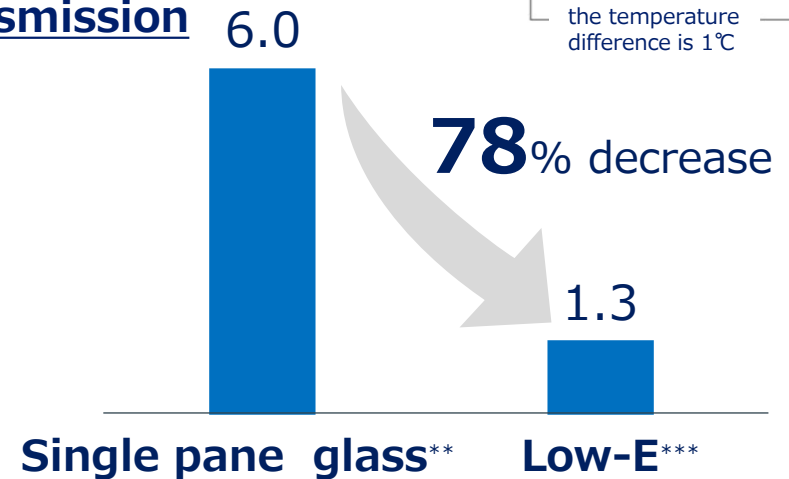
Effect of Low-E double glazing glass

Thermal transmission rate

Amount of heat passing per 1 m² for 1 hour with a temperature difference between inside and outside is 1 °C.



Thermal transmission rate



- 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 CO₂ emissions during the life cycle

Structure of double glazing glass

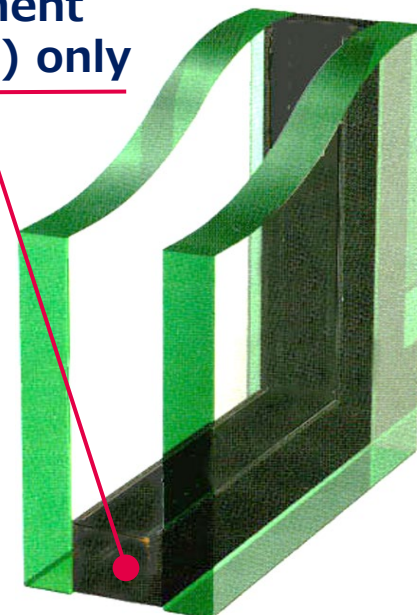
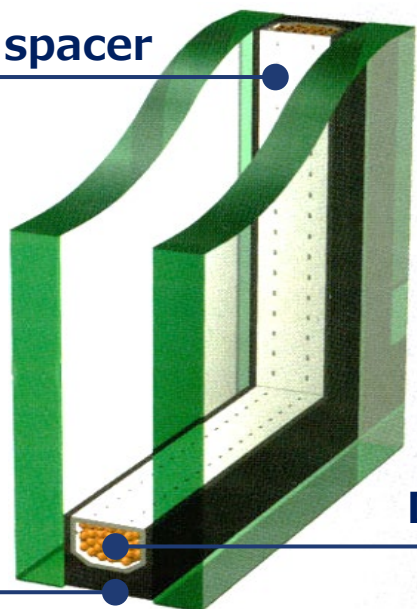
Structure of Thermocline™

Aluminum spacer

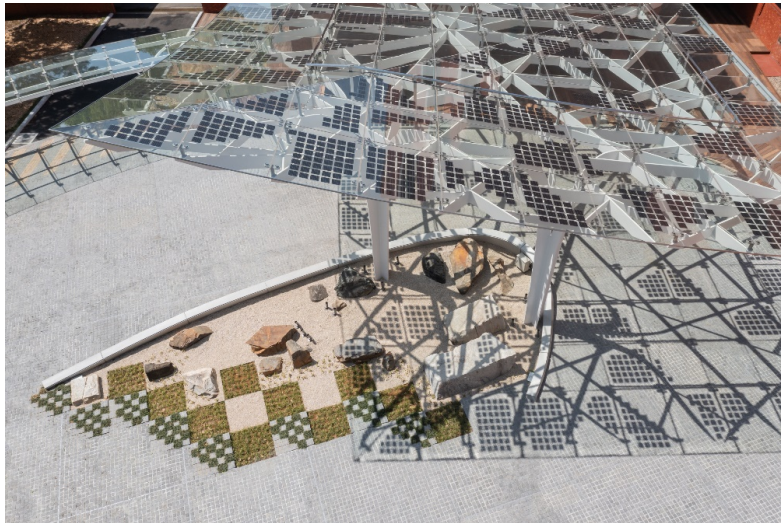
AGC original development
Sealing material(butyl) only

Encapsulant

Desiccant



- 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

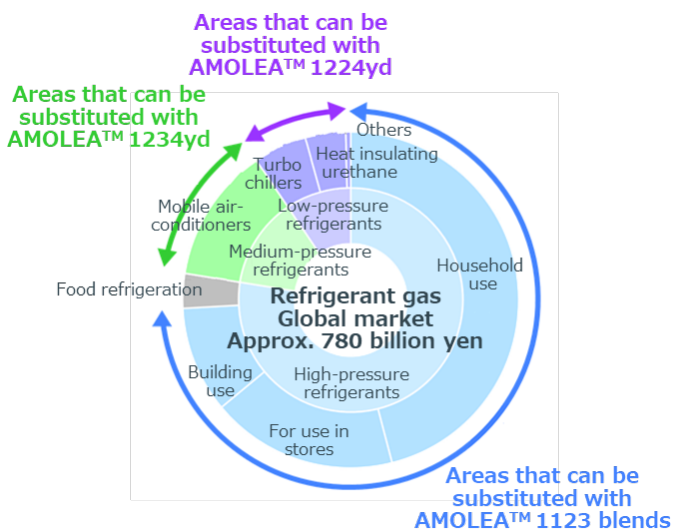
Environment-friendly refrigerant/solvent: AMOLEA™ series

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

Target market**

Refrigerant for car air conditioning

Refrigerant for turbo-type refrigerating machines



GWP

1,430



Less than 1

R134a***

AMOLEA1™ 1234yf

GWP

1,030



Less than 1

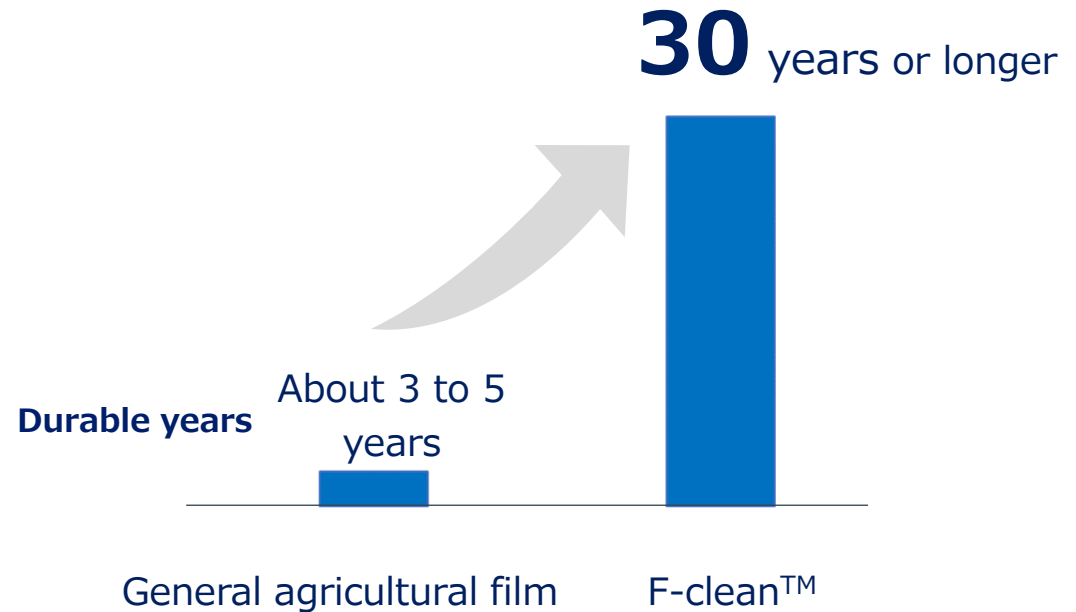
R245fa***

AMOLEA™ 1224yd

- **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



Fluoropolymer resin for coatings: Lumiflon™

- Decreases the frequency of repainting and contributes to the reduction of CO₂ 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.)

Net zero carbon goal in 2050

- Expected to achieve the CO₂ reduction target set in 2014
- Continue to focus on reducing GHG through products and technologies
- Aim to achieve net zero carbon in 2050



Net zero carbon in 2050

(Scope 1+2)

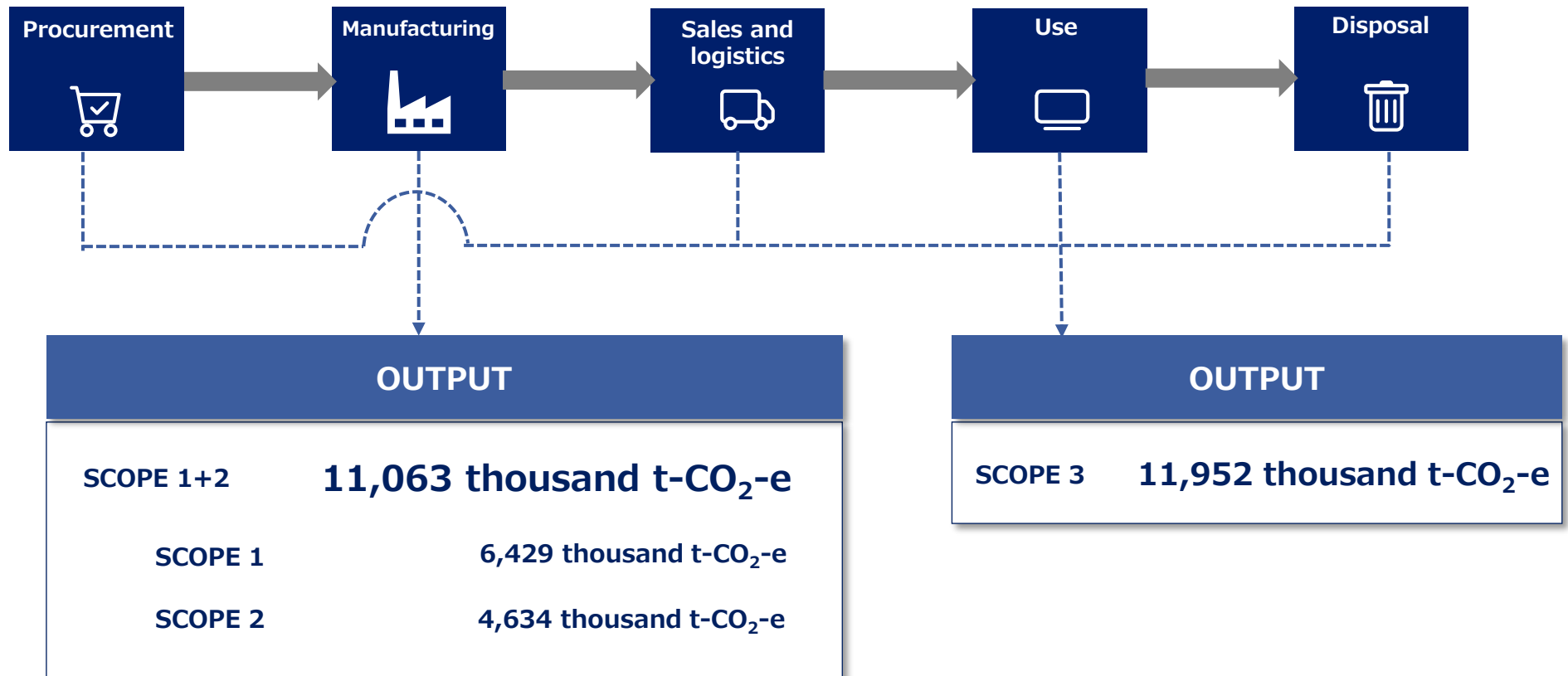
2030 milestone (from the 2019 figure)

■ GHG emissions **30%** reduction
(Scope 1+2 emission)

■ GHG emissions per unit of sales
50% reduction
(Scope 1+2 emission/sales)

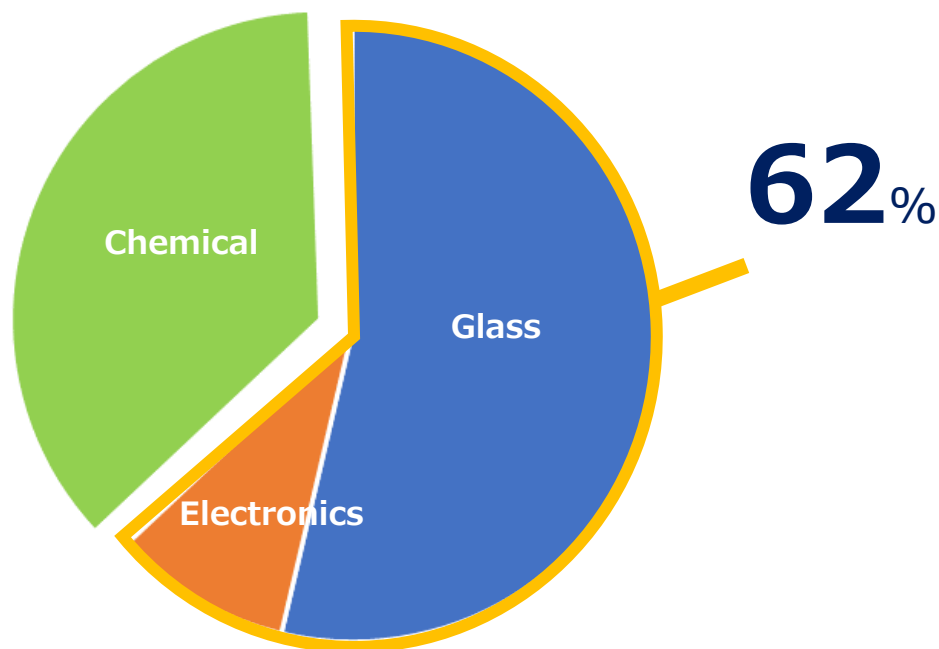
GHG emissions and breakdown by Scope (2020)

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



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

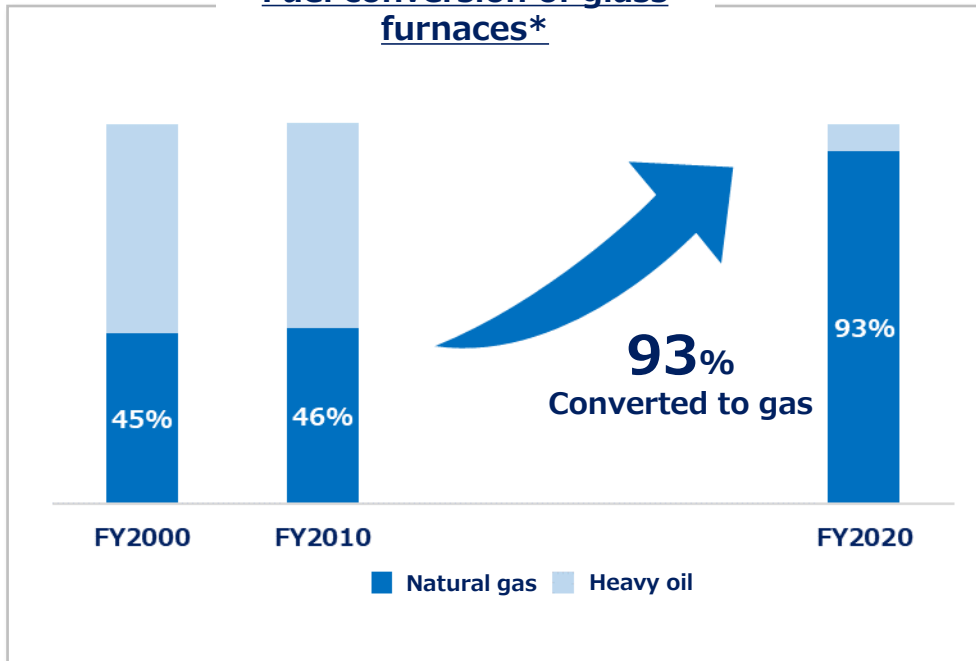


Scope 1	
Scope 1 total	6,429 thousand t-CO ₂ -e
● Glass	3,374 thousand t-CO ₂ -e
● Electronics	614 thousand t-CO ₂ -e
● Chemicals	2,404 thousand t-CO ₂ -e

Glass melting process innovation

- Promote fuel conversion to natural gas whose CO₂ emissions caused by combustion are about 20% less than heavy oil
- Develop top-rated energy-saving glass manufacturing technologies in the world

Fuel conversion of glass furnaces*



Energy-saving glass manufacturing technologies



Glass melting technology

- Introduction of the oxygen combustion method
- Introduction of the electric booster for melting
- Accelerate electrification of melting heat sources

and



Ceramics heat insulation technology

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

Breakdown by Scope 2 segment

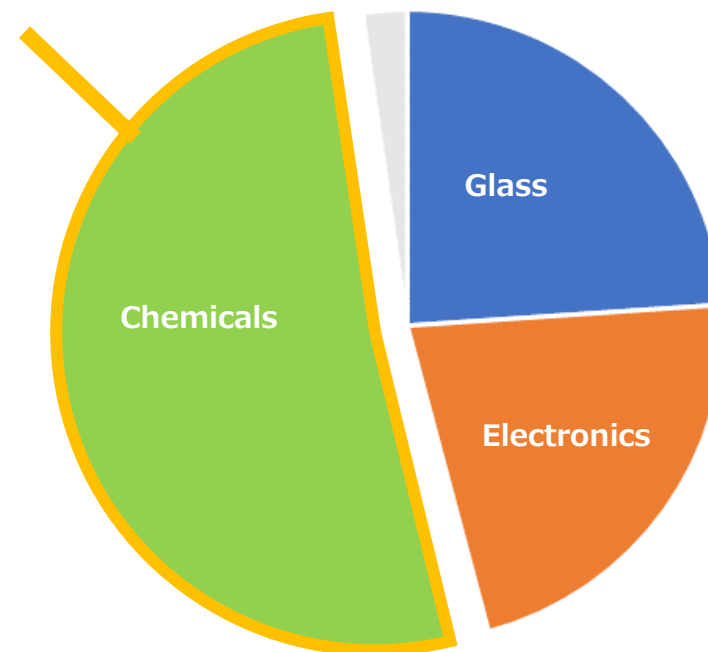
- The main emission source of Scope 2 is the chlor-alkali electrolysis facility of the chemicals segment

Scope 2

Scope 2 total 4,634 thousand t-CO₂-e

- Glass 1,103 thousand t-CO₂-e
- Electronics 1,029 thousand t-CO₂-e
- Chemicals 2,409 thousand t-CO₂-e

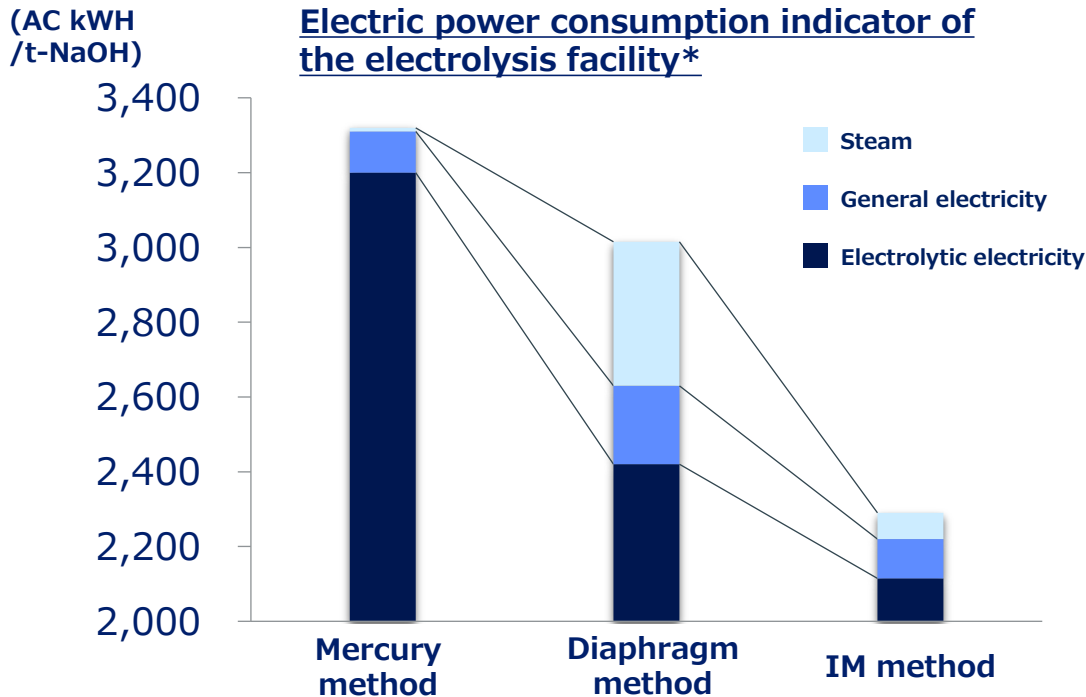
52%



Activities for reduction of GHG emissions (Scope 2)

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

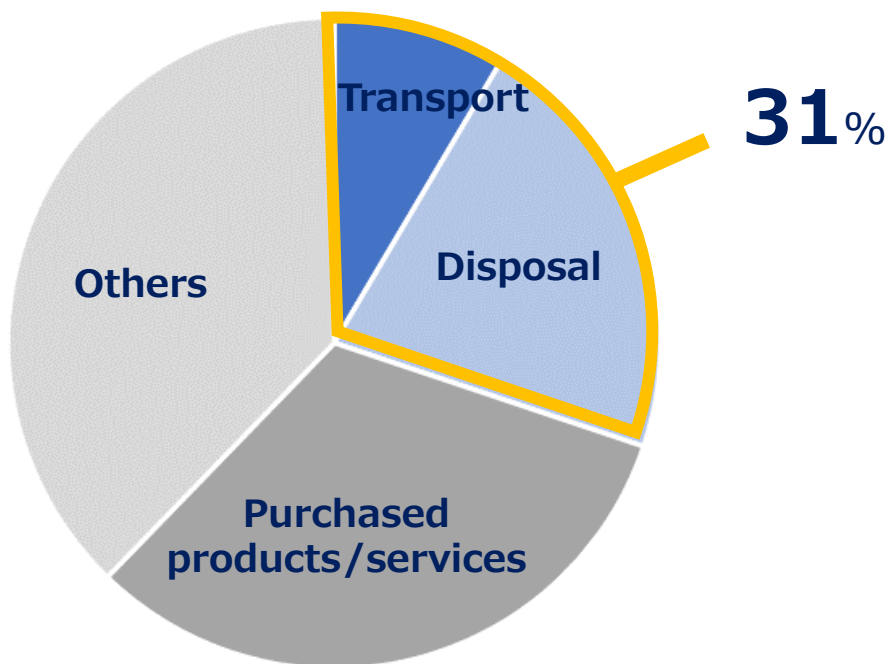


	Manufacturing caustic soda concentration [wt%]	Impacts on the environment and health
Mercury method	50	Concern of wastewater pollution by mercury
Diaphragm method	12	Concern of pneumoconiosis and mesothelioma**
IM method	32	Pollution-free/safe

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

Breakdown by Scope 3 segment

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



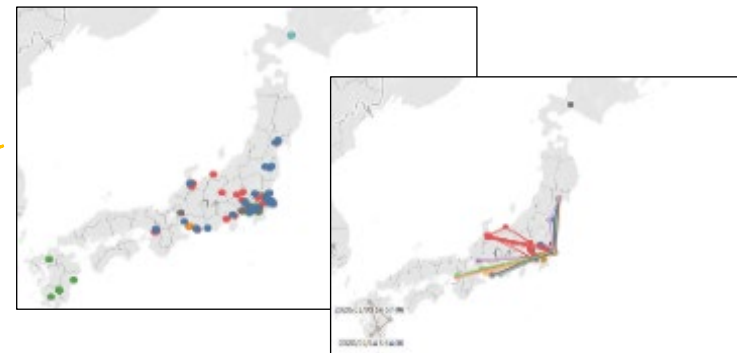
Scope 3	
Scope 3 total	11,952 thousand t-CO₂-e
● Transport	1,102 thousand t-CO ₂ -e
● Disposal	2,581 thousand t-CO ₂ -e
● Purchased products/services	3,921 thousand t-CO ₂ -e
● Others	4,348 thousand t-CO ₂ -e

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 CO₂ emitted during product transport by about 5%



Installed a logistics tracker
in 1,400 large pallets

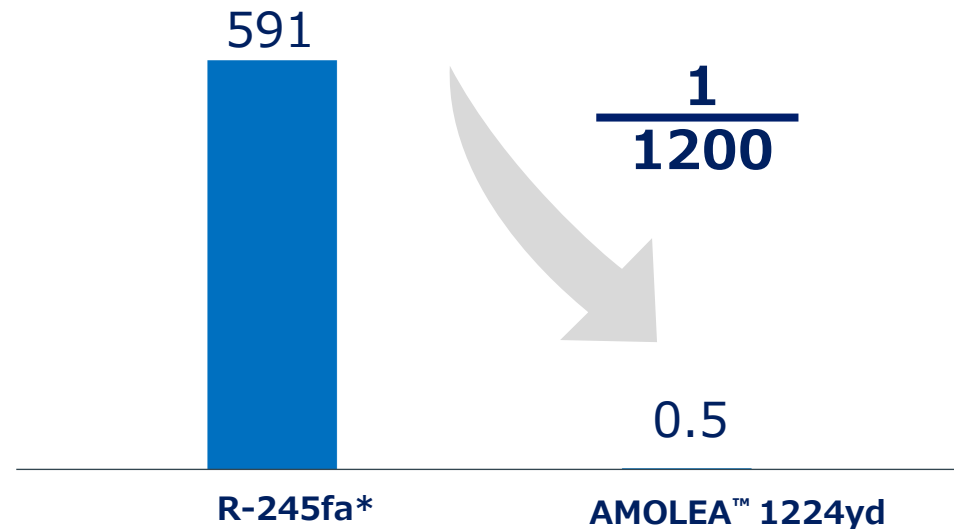


Visualized location information, movement histories,
and retention information

New environment-friendly Refrigerant AMOLEA™ series

- Environmental regulations led to the dissemination of refrigerants with low global warming potential
- The CO₂ emissions of AMOLEA™ at the time of product disposal are extremely small
- Shift to AMOLEA™ contributed to a significant reduction in CO₂ emissions at the time of disposal

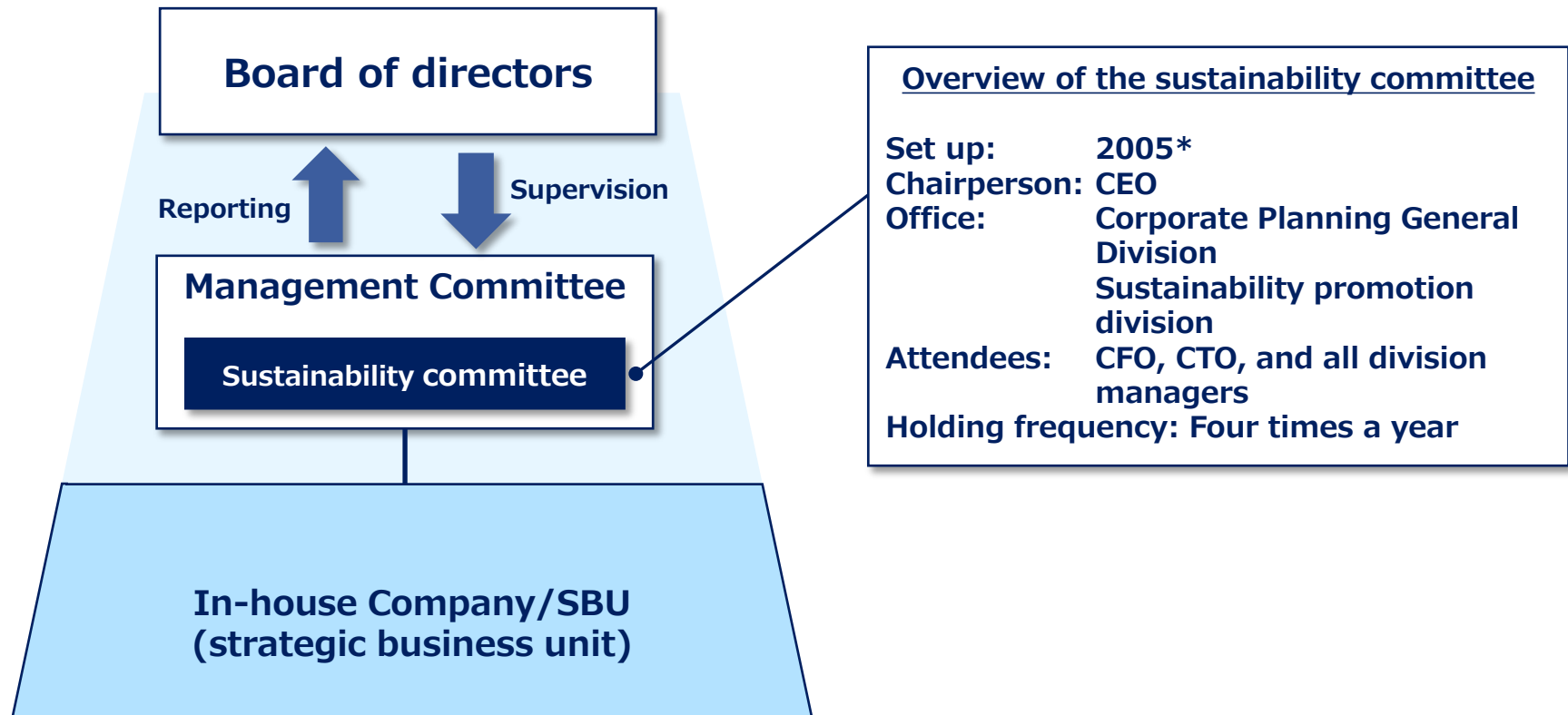
GHG emissions at the time of disposal (t-CO₂/ton)



4. Closing

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



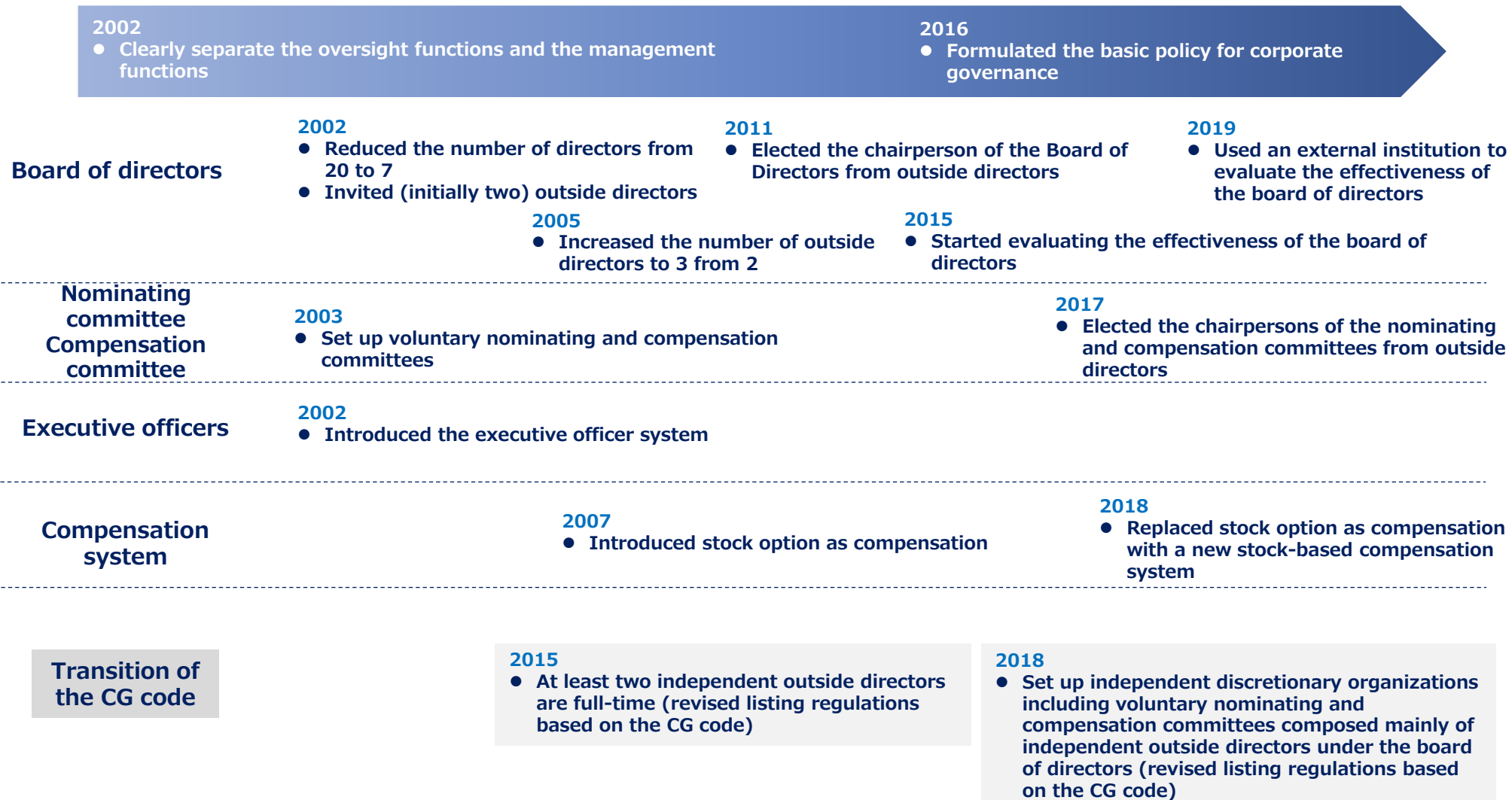
**By providing differentiated materials and solutions,
AGC strives to help realize a sustainable society
and become an excellent company that grows and
evolves continuously.**

5. Appendix

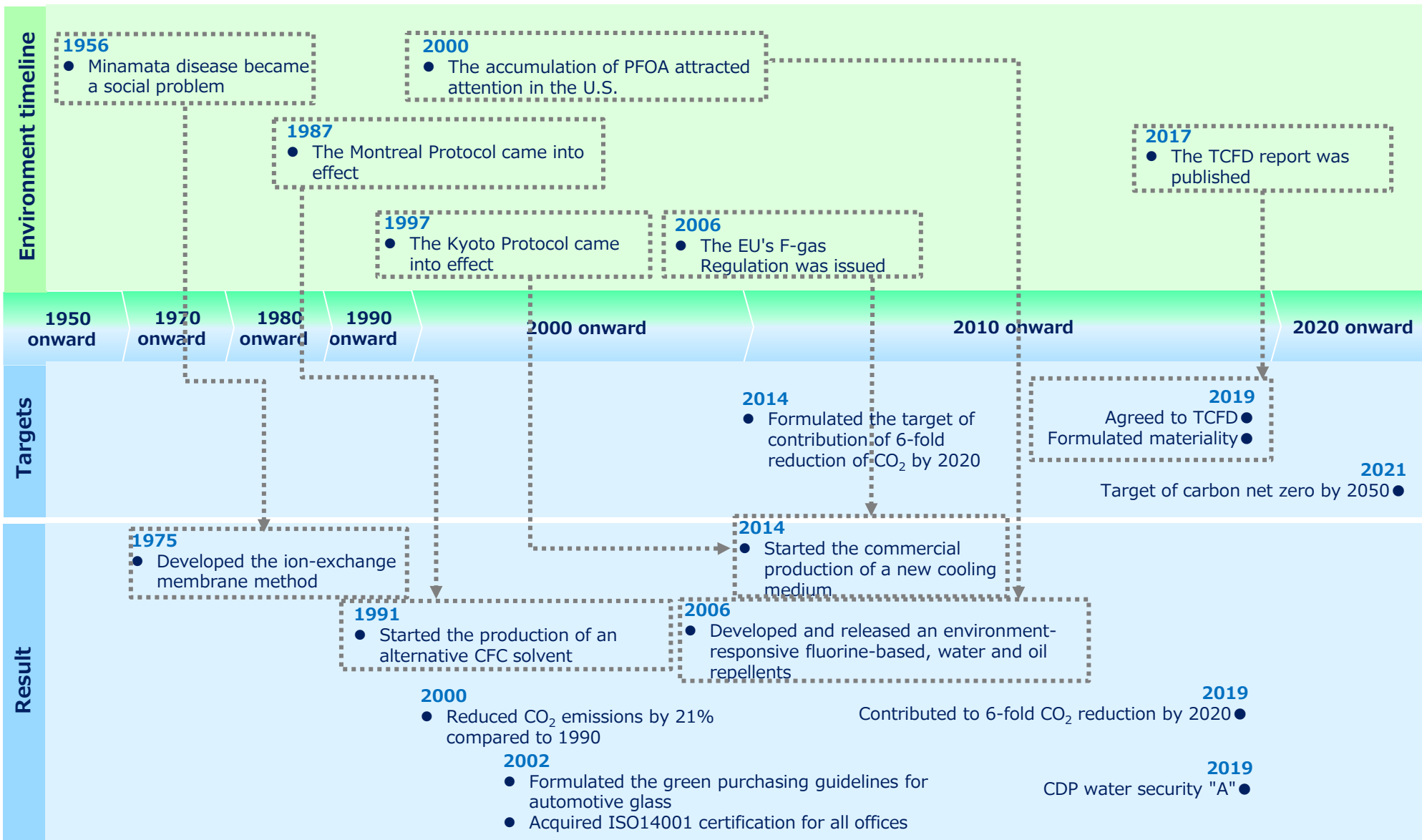


History of AGC's corporate governance

■ We have been developing a corporate governance system



History of the AGC Group's environment protection initiatives



Sustainability: Products and technologies to create social value

Material opportunities

AGC Group's materials and solutions

Social value

Related SDGs

Addressing climate change

Architectural glass, Green refrigerant, automotive infrared cut glass, refractories for biomass boiler, etc.

Contributing to the realization of a sustainable global environment



Effective use of resources

Fuel cell materials, products for recycled raw materials (glass, refractories, etc.)

Developing social infrastructure

Architectural glass, caustic soda, sodium hypochlorite, sodium bicarbonate, PVC, etc.

Contributing to the realization of safe and comfortable urban infrastructure



Achieving a safe and comfortable mobility

Automotive glass antennae, components for automotive sensing radar, HuD components, etc.

Building an info-intensive and IoT society

Antenna for buiding windows, materials for semiconductor production, Display glass, high-speed communication parts, etc.

Contributing to the realization of safe and healthy lifestyles



Addressing food crises

Agrochemical active ingredients/intermediates, film for agricultural green houses

Facilitating better health and longevity

Pharmaceuticals active ingredients/intermediates, high-speed communication parts, high-performance membrane for water treatment

Sustainability: create social value through healthy corporate activities

Material risks

AGC Group corporate activities

Addressing climate change

Continuous energy-saving, development of production technology/facilities to reduce GHG emissions, etc.

Effective use of resources

Use of recycled raw materials/materials, Reduction of land, etc.

Creating a socially and environmental-conscious supply chain

Supplier selection based on respect for human rights/environmental protection

Ensuring fair and equal employment and workplace safety

Reduce water usage, protect biodiversity, prevent environment accidents, supporter-making, etc.

Considering relationships with local communities and the environment

Increase employee engagement, prevention of serious disaster/ accidents requiring a leave, etc.

Social value

Related SDGs

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



FTSE4Good Index Series



FTSE4Good

FTSE Blossom Japan Index



FTSE Blossom
Japan

Nadeshiko Brand

as a company that excels in promoting the advancement of women



NIKKEI Smart Work Awards 2021 Special Jury Prize



“White 500” Company

in recognition of initiatives to promote strategic health management for its employees



EcoVadis Supplier Evaluations

PLATINUM rated for the Kashima plant

GOLD rated for the Chiba plant and AGC Pharma Chemicals



Derwent Top 100 Global Innovator 2021

Noteworthy DX Company for 2021

in recognition of digital transformation efforts



Your Dreams, Our Challenge

END

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