Welcome to your CDP Climate Change Questionnaire 2023

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Founded in 1907, AGC Inc. manufactures and sells mainly glass for building materials and automotive applications, as well as electronic components and other chemical-related materials. AGC and its subsidiaries (hereafter referred to as the "AGC Group") consists of AGC Inc., 222 subsidiaries and 30 affiliated companies, and is one of the world's largest materials manufacturers with net sales of 2,035.9 billion yen and 57,609 employees (as of December 31, 2022). In addition to those products, we also handle ceramics products, logistics and financial services. Our main products in the glass segment includes float glass, textured glass, wired pattered glass, Low-E (low emissivity) glass, decorative glass, architectural processed glass (insulating & heat-shielding doubled glazing glass, disaster prevention & crime prevention glass, fireproof & fire-resistant glass), automotive glass, and cover glass for in-vehicle displays. Major products in the electronics segment include glass substrates for LCDs, glass substrates for OLEDs, specialty glass for displays, peripheral components for displays, solar glass, processed glass for industrial applications, semiconductor process components, optoelectronics components, printed circuit board materials, lighting products, and scientific products. Major products in the chemicals segment include vinyl chloride, raw materials for vinyl chloride, caustic soda, urethane raw materials, fluoropolymers, water and oil repellents, gases, solvents, pharmaceutical and agrochemical intermediates and ingredients, biotechnology-related products, and iodine products. Geographically, we have established a global business base in Japan, Asia, Europe, and the Americas.

AGC Group Vison

The AGC Group has established the group vision "***Look Beyond***" as its corporate philosophy, which guides all the Group's business and social activities.

Our Mission

"AGC, an Everyday Essential part of the World - Supporting People's Lifestyles Everywhere with Differentiated Materials and Solutions"

Our Shared Values

Innovation & Operational Excellence, Diversity, Environment, Integrity.

Our Spirit

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

Long-Term Management Strategy - Vision 2030

In February 2021, AGC Group established a new long-term management strategy, "Vision 2030." The new strategy states, "By providing differentiated materials and solutions, AGC strives to help realize a sustainable society and become an excellent company that grows and evolves continuously". To realize this "Vision 2030," AGC will promote sustainability management and optimize its business portfolio to continuously create economic and social value.

Our Responsibility for Climate Change

AGC Group emits approximately 21 million t-CO2eq of GHG including Scope 1, 2 and 3 emissions. Approximately 55% of Scope 1 and 2 emissions come from our glass, electronics and other businesses, and 45% from our chemical operations. The main sources of GHG emissions are the energy use in the glass production process in our glass business, and the electricity use and direct energy use in the salt electrolysis process in our chemical business. We have set milestone targets for reducing Scope 1 and 2 GHG emissions by 30% and GHG emissions intensity per unit of sales by 50% by fiscal 2030, compared with fiscal 2019 levels. We have set a target of reducing Scope 3 GHG emissions by 30% from 2019 levels by 2030. The AGC Group not only aims to reduce its own GHG emissions but also to provide products and technologies that help society realize net-zero carbon emissions. As an industry leader, AGC Group develops and introduces world-class construction glass manufacturing techniques to reduce GHG emissions from the manufacturing process. In addition to the ongoing introduction of current technologies such as oxygen combustion systems and electrical boosters, we are also working on the development of innovative technologies that will have a significant impact in the future. We will also further expand our contribution to the prevention of global warming through our products and technologies. Our strategic policy is to develop technologies and expand our business in the environmental and energy fields through both our core business and strategic business.

Forward-looking statements

This response in the report may contain forward-looking statements that are based on current assumptions and projections made by our group management. A variety of known and unknown risks, uncertainties and other factors could cause actual future performances, financial condition, developments, and results to differ materially from those anticipated in this response report. We assume no responsibility to update these forward-looking statements or to align them with future events or developments.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data and indicate whether you will be providing emissions data for past reporting years.

Reporting year

Start date

January 1, 2022

End date

December 31, 2022

Indicate if you are providing emissions data for past reporting years

No

C0.3

(C0.3) Select the countries/areas in which you operate.

Austria
Belarus
Belgium
Brazil
Bulgaria
Canada
China
Croatia
Czechia
Denmark
Estonia
Finland
France
Germany
Greece
Hong Kong SAR, China
Hungary
India
Indonesia
Italy
Japan
Kazakhstan
Luxembourg
Malaysia
Mexico
Morocco
Netherlands
Philippines
Poland
Portugal
Republic of Korea
Romania
Russian Federation
Saudi Arabia
Singapore
Slovakia
Spain
Sweden
Switzerland
Taiwan, China
Thailand

Turkey
Ukraine
United Arab Emirates
United Kingdom of Great Britain and Northern Ireland
United States of America
Viet Nam

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

JPY

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.

Operational control

C-CH0.7

(C-CH0.7) Which part of the chemicals value chain does your organization operate in?

Row 1

Bulk organic chemicals

Bulk inorganic chemicals

Other chemicals

C0.8

(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
Yes, an ISIN code	JP3112000009
Yes, a CUSIP number	00109C103
Yes, a Ticker symbol	ASGLF

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual or committee	Responsibilities for climate-related issues
Chief Executive Officer (CEO)	RESPONSIBILITIES FOR CLIMATE-RELATED ISSUES The Chair, CEO, CFO and also CCO, CTO, and outside directors deliberate at a Board of Directors meeting to determine the appropriateness of governance, including management objectives and responses to risks and opportunities related to climate change issues, for the entire AGC Group. At the meetings of the Board of Directors, the CEO, as the representative director, is responsible for the Board's resolutions related to our climate change response. The Board of Directors is responsible for the following roles. These roles include responding to climate change: ・Approval of AGC Group's basic management policies ・Oversight of management execution of the AGC Group and AGC Inc. ・Appointment and dismissal of executive officers of AGC Inc. and determination of their remuneration ・Approval of important matters of the AGC Group and AGC Inc. As a preliminary step to the Board of Directors meeting, the Sustainability Committee, which is an advisory body to the CEO and is positioned at the same level as the Management Committee, deliberates over AGC Group's strategy for sustainability management, including climate change-related issues, and determines matters related to climate change-related issues to be brought up for discussion and reporting at the Board of Directors meeting. Based on decisions made by the Sustainability Committee, the CEO reports to the Board of Directors on AGC Group's climate change strategy as appropriate. The Sustainability Committee has established standards for the implementation of their role, the 'Sustainability Committee Agenda Items and Reporting Criteria for the Board of Directors'. The role of the Sustainability Committee is defined as follows, all of which include responding to climate change. - Sustainability-related policy decisions - Determination of sustainability targets, management of progress, and decision-

	making on measures to achieve them - Information sharing related to sustainability - Submission and reporting of important deliberations, decisions, and reports by the Sustainability Committee to the Board of Directors EXAMPLES OF CLIMATE-RELATED DECISIONS The CEO decided on the following in 2022. - Introduction of internal carbon pricing system - AGC Group's Scope 3 targets and SBT application - Introduction of GHG emissions forecasting and management - Expansion of the scope of climate change scenario analysis and its use within the AGC Group

C1.1b

(C1.1b) Provide further details on the board's oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Please explain
Scheduled – all meetings	Reviewing and guiding annual budgets Overseeing major capital expenditures Overseeing acquisitions, mergers, and divestitures Reviewing innovation/R&D priorities Overseeing and guiding employee incentives Reviewing and guiding strategy Overseeing and guiding the development of a transition plan Monitoring the implementation of a transition plan	Recognizing that climate change is a key issue affecting corporate sustainability in society and the economy, the directors of AGC Group are required to fulfil their obligations to address risks and opportunities related to climate change, as well as facilitate climate change adaptation and mitigation. Under the duty of loyalty to the company, as defined in the Companies Act in Japan where AGC's headquarters is located, directors are obligated to report any fact likely to cause substantial detriment to the company and are responsible for establishing a risk management system to fulfil their responsibility to monitor and control such issues. Recognizing that climate change may be one of these issues, the Board of Directors receives reports, monitors, and deliberates on the AGC Group's governance of climate change in accordance with decisions made by the Management Committee and the Sustainability Committee regarding the major risks and opportunities associated with climate change- The role of the Management Committee is defined as follows, which encompasses a perspective on the risks and opportunities associated with climate change:

	Overseeing and guiding scenario analysis Overseeing the setting of corporate targets Monitoring progress towards corporate targets Overseeing and guiding public policy engagement Overseeing value chain engagement Reviewing and guiding the risk management process	- Develop basic management policies for the AGC Group and determine management execution policies, strategies, and plans based on the basic policies approved by the Board of Directors - Oversee the business management of the internal companies and the Strategic Business Units (hereafter referred to as SBUs) - Approval of important matters in the business management of the internal companies and SBUs - Determination of important matters of the AGC Group and AGC Inc. The Management Committee discusses and decides on the following items related to our climate change response: - Annual budget review and guidance - Oversight of major capital expenditures - Oversight of acquisitions, mergers and divestments - Review of innovation/R&D priorities - Supervision and guidance of employee incentives - Review and guidance of strategy - Oversight and guidance of the development of transition plans - Monitoring the implementation of transition plans

C1.1d

(C1.1d) Does your organization have at least one board member with competence on climate-related issues?

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues
Row 1	Yes	AGC uses a skills matrix to visualize whether directors and corporate auditors have a good balance of knowledge, ability, and experience, and to confirm that they are appropriately selected. A total of eight skill items were selected from the three perspectives of governance, strategic alignment, and business characteristics, including sustainability with climate change within scope. We consider whether a review is necessary when the governance structure is changed or when a mid-term management plan is developed. The skills related to sustainability are defined as the knowledge of sustainability necessary for both the realization of a sustainable society and the sustainable growth of a company. Skills related to the environment, with climate change response as a central issue, are defined as the knowledge necessary for the realization of both a sustainable global environment

		and the sustainable growth of a company. Of the 11 directors and corporate auditors, 10 have these sustainability skills. Additionally, one of the directors has co-authored a book on ESG investing and has detailed knowledge on the subject.

C1.2

(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.

Position or committee

Chief Executive Officer (CEO)

Climate-related responsibilities of this position

Managing annual budgets for climate mitigation activities
Managing major capital and/or operational expenditures related to low-carbon products or services (including R&D)
Managing climate-related acquisitions, mergers, and divestitures
Providing climate-related employee incentives
Developing a climate transition plan
Implementing a climate transition plan
Integrating climate-related issues into the strategy
Conducting climate-related scenario analysis
Setting climate-related corporate targets
Monitoring progress against climate-related corporate targets
Managing public policy engagement that may impact the climate
Managing value chain engagement on climate-related issues
Assessing climate-related risks and opportunities
Managing climate-related risks and opportunities

Coverage of responsibilities

Reporting line

Reports to the board directly

Frequency of reporting to the board on climate-related issues via this reporting line

More frequently than quarterly

Please explain

POSITION IN THE COMPANY
Under the in-house company system, the roles and functions of Group Corporate and business units (in-house companies and SBUs) are separated in the execution of management, and the scope of responsibility and authority is clearly defined. Group Corporate aims to maximize corporate value for the entire AGC Group by formulating AGC Group vision and strategy, business portfolio policy, AGC Group policy on basic

management elements, and providing a management platform. In this way, the roles and functions of Group Corporate and the business units (in-house companies and SBUs) are separated and the scope of responsibility and authority is clarified in order to accelerate management decision-making and improve management efficiency. The president of each in-house companies and SBU is responsible for formulating management issues, business strategies, management resource allocation policies, performance plans and investment plans, and identifying major management issues and risks, based on a medium- to long-term view of changes and trends in the business environment. Transition plans are also formulated for each in-house company/SBU to respond to climate change. In-house company and SBU presidents present their division's transition plan to the CEO, CFO and CTO at the Strategy Business Meeting, where the plan is discussed and approved.

RESPONSIBILITIES FOR CLIMATE CHANGE
Overall responsibility for the climate change process itself and its success or failure within the company.

RATIONALE FOR THE ASSIGNMENT
Climate change has been identified through scenario analysis as a significant risk and opportunity for each of AGC's businesses and is at the heart of the AGC Group's overall sustainability activities. The risks and opportunities are specific to each business, and the in-house company and SBU presidents are responsible for the climate change plans, actions and results of their businesses, as well as the success or failure in securing revenues from the production and sale of products and services.

Position or committee

Chief Financial Officer (CFO)

Climate-related responsibilities of this position

Managing annual budgets for climate mitigation activities
Managing major capital and/or operational expenditures related to low-carbon products or services (including R&D)
Managing climate-related acquisitions, mergers, and divestitures
Providing climate-related employee incentives
Developing a climate transition plan
Implementing a climate transition plan
Integrating climate-related issues into the strategy
Conducting climate-related scenario analysis
Setting climate-related corporate targets
Monitoring progress against climate-related corporate targets
Managing public policy engagement that may impact the climate
Managing value chain engagement on climate-related issues
Assessing climate-related risks and opportunities
Managing climate-related risks and opportunities

Coverage of responsibilities

Reporting line

CEO reporting line

Frequency of reporting to the board on climate-related issues via this reporting line

More frequently than quarterly

Please explain

POSITION IN THE COMPANY
The CFO who is the representative director and executive vice president is in charge of the Corporate Planning Division, which houses the Sustainability Promotion Department, the department responsible for planning and promoting the AGC Group's sustainability initiatives. The Sustainability Promotion Department serves as the secretariat of the Sustainability Committee, the executive decision-making body for sustainability, and the Sustainability Promotion Department reports to the Board of Directors under the responsibility of the CFO on matters such as responses to climate change issues as decided and reported on by the Sustainability Committee.

RESPONSIBILITIES REGARDING CLIMATE CHANGE ISSUES
The Sustainability Promotion Department, under the supervision of the CFO, organizes the "Climate Change Response Strategy Meeting" to discuss and decide on the AGC Group's and divisions' response to climate change. The Climate Change Response Strategy Council was established in 2021 and meets four times a year for the following two purposes;
1. To discuss a wide range of issues and concerns that may arise in the future in order to continuously implement the Climate Change Response Roadmap from a variety of perspectives and to develop a common understanding of the actions to be taken.
2. To deepen discussions among relevant departments on draft major policies and measures related to climate change prior to submission of proposals and reports to the Sustainability Committee.

RATIONALE FOR THE ASSIGNMENT
The AGC Group's response to climate change is not limited to reducing GHG emissions, but also includes adaptation and other mitigation measures, risks and opportunities, and processes and products. With respect to adaptation, it is closely linked to business and financial strategies in light of future regulations and climate change, and the Financial Officers are assigned responsibility for this perspective.

Position or committee

Chief Technology Officer (CTO)

Climate-related responsibilities of this position

Managing annual budgets for climate mitigation activities
Managing major capital and/or operational expenditures related to low-carbon products or services (including R&D)

Managing climate-related acquisitions, mergers, and divestitures
Providing climate-related employee incentives
Developing a climate transition plan
Implementing a climate transition plan
Integrating climate-related issues into the strategy
Conducting climate-related scenario analysis
Setting climate-related corporate targets
Monitoring progress against climate-related corporate targets
Managing public policy engagement that may impact the climate
Managing value chain engagement on climate-related issues
Assessing climate-related risks and opportunities
Managing climate-related risks and opportunities

Coverage of responsibilities

Reporting line

CEO reporting line

Frequency of reporting to the board on climate-related issues via this reporting line

More frequently than quarterly

Please explain

POSITION IN THE COMPANY
The CTO is responsible to the Directors and Executive Officers. The CTO also oversees the Technology, Environmental, Safety & Quality, and Intellectual Property departments, which provide leadership in the technical aspects of GHG reduction activities.

RESPONSIBILITIES RELATED TO CLIMATE CHANGE
AGC Group's Technology Division promotes technological development and innovation with the aim of creating value through materials and solutions to realize our long-term management strategy "Where We Want to Be by 2030". In addition, to realize a sustainable society, which is the second major theme of the "AGC Plus-2023" medium-term management plan, we are developing technologies to reduce GHG emissions in the manufacturing process and developing products that contribute to net-zero carbon emissions, as well as developing recycling and energy-saving technologies to realize a sustainable society. In addition, we aim to realize a sustainable society by developing recycling and energy-saving technologies.

In addition, the general manager of the Environment, Safety & Quality Division, under the supervision of the CTO, is the owner of the "AGC Group GHG Emissions Reduction Promotion System," which is a cross-divisional initiative to reduce GHG emissions, and the CTO receives reports from its operational members and provides feedback about four times a year.

RATIONAL OF ASSIGNMENT
The CTO is in charge of the Technology Division, which is responsible for promoting

and overseeing the implementation of GHG emission reduction measures. The CTO is in charge of the Technology Division, which is responsible for promoting and overseeing these initiatives, and the technical leadership to enable the reduction of GHG emissions is assigned to the CTO.

Position or committee

Sustainability committee

Climate-related responsibilities of this position

Providing climate-related employee incentives
Developing a climate transition plan
Implementing a climate transition plan
Integrating climate-related issues into the strategy
Conducting climate-related scenario analysis
Setting climate-related corporate targets
Monitoring progress against climate-related corporate targets
Managing public policy engagement that may impact the climate
Managing value chain engagement on climate-related issues
Assessing climate-related risks and opportunities
Managing climate-related risks and opportunities

Coverage of responsibilities

Reporting line

Finance - CFO reporting line

Frequency of reporting to the board on climate-related issues via this reporting line

More frequently than quarterly

Please explain

POSITION IN THE COMPANY
Progress on sustainability activities, including climate change initiatives, is reported to the Board as appropriate. Based on discussions at Board meetings, policies, plans and progress on each topic are reviewed, approved and monitored. The Sustainability Committee, which is chaired by the CEO and includes the CTO, the CFO and the heads of each division, has been established as the decision-making body for sustainability-related initiatives and meets four times a year.

RESPONSIBILITIES FOR CLIMATE-RELATED ISSUES
The Sustainability Committee, which sits at the same level as the Executive Committee, is responsible for making decisions and overseeing the implementation of sustainability-related matters, including environmental activities, under the supervision of the Board of Directors. The Sustainability Committee deliberates on policies based on the opportunities and risks associated with the environmental activities of the entire Group, the results of environmental monitoring and issues arising from such monitoring.

RATIONAL OF ASSIGNMENT
The Sustainability Committee meets four times a year in the presence of the CEO, the CFO, the CTO, the Corporate Auditors and all Division Heads, and reports to the Board of Directors twice a year. The Sustainability Promotion Department, established within the Corporate Planning Division, serves as the Committee's secretariat and leads the formulation and implementation of the Group's overall sustainability management strategy.

Position or committee

Other committee, please specify

Greenhouse gas reduction program of the AGC Group

Climate-related responsibilities of this position

Implementing a climate transition plan
Monitoring progress against climate-related corporate targets
Managing public policy engagement that may impact the climate
Managing value chain engagement on climate-related issues

Coverage of responsibilities

Reporting line

Other, please specify

Reporting to CFO and CTO

Frequency of reporting to the board on climate-related issues via this reporting line

As important matters arise

Please explain

POSITION IN COMPANY
Under "GHG reduction program of the AGC Group", which is sponsored by the General Manager of the Environmental Safety and Quality Division, specialized divisions work together in data management, technical innovation, energy management, and supply chain management to reduce GHG emissions globally and across businesses.

REPONSIBILITIES REGARDING CLIMATE-RELATED ISSUES
The following are the missions of GHG reduction program of the AGC Group.
- Visualization and refinement of Scope1, 2, 3 GHG emissions
- Collection of data on social trends related to GHG emissions and reduces
- Consideration of measures to reduce GHG emissions and cross-group expansion
- Support and promotion of renewable energy procurement and creation
- Implementation of supply chain management activities
- PDCA management related to reducing GHG emissions

RATIONAL OF ASSIGNMENT

GHG reduction program of the AGC Group is an internal organizational and cross-divisional activity grouping focused on mitigation in corporate processes in response to climate change. It is also a forum for discussing the direction of GHG emissions reductions for the entire AGC Group. It is also an entity that conducts CFO and CTO about four times a year to report on the current status and present issues.

Position or committee

Business unit manager

Climate-related responsibilities of this position

Managing major capital and/or operational expenditures related to low-carbon products or services (including R&D)
Providing climate-related employee incentives
Developing a climate transition plan
Integrating climate-related issues into the strategy
Setting climate-related corporate targets
Monitoring progress against climate-related corporate targets
Assessing climate-related risks and opportunities

Coverage of responsibilities

Reporting line

CEO reporting line

Frequency of reporting to the board on climate-related issues via this reporting line

Half-yearly

Please explain

POSITION IN THE COMPANY
Under the corporate system, the roles and functions of Group Corporate and the in-house companies and SBUs are separated in the execution of management, and the scope of responsibility and authority is clearly defined. Group Corporate aims to maximize corporate value for the entire Group by formulating Group vision and strategy, business portfolio policy, Group policy on basic management elements, and providing a management platform. In this way, the roles and functions of Group Corporate and the in-house companies and SBUs are separated and the scope of responsibility and authority is clarified in order to accelerate management decision-making and improve management efficiency. In-house company and SBU presidents are responsible for formulating management issues, business strategies, management resource allocation policies, performance plans and investment plans, and identifying key management issues and risks based on their understanding of changes and trends in the business environment over the medium to long term. Transition plans are also formulated for each in-house company and SBU with respect to climate change response. In-house company and SBU presidents present their division's transition plan to the CEO, CFO and CTO at the Strategy Business Meeting, where it is discussed and approved.

RESPONSIBILITIES RELATED TO CLIMATE CHANGE
Overall responsibility for the in-house company's and SBU climate change process and its success or failure.

RATIONALE FOR ASSIGNMENT
Climate change has been identified through scenario analysis as a significant risk and opportunity for each of in-house company's and SBU and is at the heart of the AGC Group's overall sustainability activities. The risks and opportunities are specific to each in-house company's and SBU, and the in-house company's and SBU presidents are responsible for the climate change plans, actions and results of their businesses, as well as the success or failure in securing revenues from the production and sale of products and services.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Entitled to incentive
Board/Executive board

Type of incentive
Monetary reward

Incentive(s)
Bonus - % of salary

Performance indicator(s)
Board approval of climate transition plan
Shareholder approval of climate transition plan
Achievement of climate transition plan KPI
Progress towards a climate-related target
Achievement of a climate-related target
Implementation of an emissions reduction initiative
Reduction in absolute emissions
Reduction in emissions intensity
Energy efficiency improvement
Increased share of low-carbon energy in total energy consumption

Increased share of renewable energy in total energy consumption
Reduction in total energy consumption
Increased investment in low-carbon R&D
Increased share of revenue from low-carbon products or services in product or service portfolio
Increased engagement with suppliers on climate-related issues
Increased engagement with customers on climate-related issues
Increased supplier compliance with a climate-related requirement
Increased value chain visibility (traceability, mapping, transparency)
Company performance against a climate-related sustainability index (e.g., DJSI, CDP Climate Change score etc.)
Implementation of employee awareness campaign or training program on climate-related issues

Incentive plan(s) this incentive is linked to

Long-Term Incentive Plan

Further details of incentive(s)

As a provider of materials and solutions developed from a long-term perspective, the AGC Group's competitiveness is based not only on business strategies for a single fiscal year, but also on medium- to long-term technological development and investment in human resources and facilities. Therefore, an incentive system has been implemented to further motivate AGC's executives to take a balanced view of the short, medium and long term and to achieve their respective periodic goals. As variable compensation, in addition to bonuses linked to the company's performance in a single fiscal year, we have introduced a share-based compensation system in which the number of shares granted is linked to performance and other factors during the medium-term management plan period, including the strengthening of non-financial capital, such as addressing climate change issues. The share-based compensation system requires that the shares granted be held continuously during the term of office, with the aim of motivating employees to contribute to the increase in the company's value over the medium to long term and to further share the interests with shareholders.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

Based on the achievement of the AGC Group's overall GHG emission reduction targets, each in-house company and SBU has set its own GHG emission reduction targets and is implementing Scope 1, 2 and 3 GHG emission reduction activities. It is clear that the achievement of GHG emission reduction targets by each in-house company and SBU leads to the reduction of the AGC Group's overall GHG emissions and directly contributes to the implementation of the Climate Transition Plan.

Entitled to incentive

All employees

Type of incentive

Monetary reward

Incentive(s)

Bonus – set figure

Performance indicator(s)

Implementation of an emissions reduction initiative
Reduction in absolute emissions
Reduction in emissions intensity
Energy efficiency improvement
Increased share of low-carbon energy in total energy consumption
Increased share of renewable energy in total energy consumption
Reduction in total energy consumption
Increased investment in low-carbon R&D
Increased share of revenue from low-carbon products or services in product or service portfolio
Increased engagement with suppliers on climate-related issues
Increased engagement with customers on climate-related issues
Increased supplier compliance with a climate-related requirement
Increased value chain visibility (traceability, mapping, transparency)
Company performance against a climate-related sustainability index (e.g., DJSI, CDP Climate Change score etc.)
Implementation of employee awareness campaign or training program on climate-related issues

Incentive plan(s) this incentive is linked to

Both Short-Term and Long-Term Incentive Plan

Further details of incentive(s)

AGC Group strives to create an organizational culture in which our employees, who diligently engage in their daily work, respect one another and praise each other's achievements and efforts. To this end we have implemented the ‘CEO Award’ system. By sharing excellent practices throughout the group, we aim to create further growth for employees and the company. The ‘Look Beyond Award’, named after the Group's vision, is the highest award that recognizes the most outstanding initiatives among the projects that received the ‘CEO Award’. The top project in each category is nominated as a ‘Look Beyond Award’ candidate, and the CEO selects the winner after the presentation to the AGC Group CEO, CFO, and CTO. A one-time monetary reward is given for the winning project.

Explain how this incentive contributes to the implementation of your organization’s climate commitments and/or climate transition plan

The projects that have been entered as candidates into this reward system and have received monetary rewards include the results of activities that contribute to short to long-term climate change response strategies, such as addressing procurement risks in response to raw material shortages due to natural disasters, environmental issues, and environmental regulations, and establishing collection chains for cullet, a raw material that can be used in the production of glass. In short, this internal award program contributes directly to the implementation of our Climate Transition Plan.

Entitled to incentive

Other, please specify

Researchers

Type of incentive

Monetary reward

Incentive(s)

Bonus – set figure

Performance indicator(s)

Increased investment in low-carbon R&D

Incentive plan(s) this incentive is linked to

Both Short-Term and Long-Term Incentive Plan

Further details of incentive(s)

AGC has adopted an incentive-based incentive system to encourage researchers to engage in inventions that affect other companies and to acquire patents. When a patent application is filed, an incentive remuneration will be paid to the inventor at the time of filing and registration. The reward at the time of registration is determined based on AGC's own assessment that considers the innovativeness and originality of the invention and the degree of impact on other companies as patent rights. The current system was introduced in 2018. Compared to the previous system, which was biased toward technologies related to high-interest products, the scope of awards was wider, and the proportion of inventors receiving incentives increased. This system is characterized by the shorter period of time between the birth of an invention and the receipt of an incentive fee.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

AGC Group was selected by Clarivate (UK), a global information-service company, for the seventh consecutive fifth year, as Clarivate Top 100 Global Innovator 2022, which analyzes intellectual property trends based on patent data held by the company and selects 100 companies from the world's most innovative corporate ／ research institute.
In addition, AGC was selected as a Innovation Momentum 2023:The world Top 100 by LexisNexis Intellectual Property Solutions (U.S.), a provider of global patent-search and value-analysis solutions.
Through such honorable foreign awards, researchers are able to more actively research climate change issues, which are business issues general by in-house companies and SBU, and thereby become the driving force behind the Group-wide decarbonisation program.

Entitled to incentive

All employees

Type of incentive

Monetary reward

Incentive(s)

Bonus – set figure

Performance indicator(s)

Progress towards a climate-related target
Achievement of a climate-related target
Implementation of an emissions reduction initiative
Reduction in absolute emissions
Reduction in emissions intensity
Energy efficiency improvement
Increased share of low-carbon energy in total energy consumption
Increased share of renewable energy in total energy consumption
Reduction in total energy consumption
Increased share of revenue from low-carbon products or services in product or service portfolio
Increased engagement with suppliers on climate-related issues
Increased engagement with customers on climate-related issues
Increased value chain visibility (traceability, mapping, transparency)
Implementation of employee awareness campaign or training program on climate-related issues

Incentive plan(s) this incentive is linked to

Not part of an existing incentive plan

Further details of incentive(s)

The Automotive Company, one of AGC's internal companies, has established an award system for operations that are good for the purpose of improving the motivation of employees belonging to the Asian Business Division. The award system is applicable to departments belonging to the Asia Business Division of the Automotive Company and consolidated subsidiaries. The award-winning projects are appropriate for commendation by the General Manager of the Asian Business Division. For example, the award-winning projects were highly awarded by the General Manager of the Plant, and the award-winning projects significantly contributed to the Business Division.
The award methods are prize money and commemorative gifts, and prize money is determined by grade between 50,000 yen and 600,000 yen.

Explain how this incentive contributes to the implementation of your organization’s climate commitments and/or climate transition plan

The number of activities and entries for awards that contribute to solving problems related to climate change has increased each year, and we see this as a sign that the entire Group is promoting awareness of climate change and a sense of responsibility for solving climate change problems. There is no doubt that the accumulation of such activities will contribute to the achievement of GHG emission reduction targets and the realization of the AGC Group's overall transition plan.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	1	Normally, business plans are formulated over a span of three to five years, and business plans for a single fiscal year are reviewed annually based on the results of the previous fiscal year and the medium-term management plan.
Medium-term	1	3	Normally, business plans are formulated over a three-to five-year span. Currently, under the "AGC plus-2023" medium-term management plan, which covers the three-year period from 2021 to 2023, the main measures are to accelerate business growth in strategic business areas, pursue "management with ambidexterity" to explore new business areas (energy-related areas, etc.), promote sustainability management to accelerate the resolution of social issues through material innovation, and strengthen competitiveness by accelerating DX.
Long-term	3	30	Currently, we are implementing the long-term business strategy "Vision for 2030" formulated in 2021. To address climate change issues, we are committed to contributing to a sustainable global environment through our business activities. We have also declared that we will aim for our own CARBON NET ZERO by 2050 and have set 2030 as the milestone.

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

DEFINITION OF SUBSTANTIVE IMPACTS

The AGC Group defines substantial impact as items that may have a significant effect on investors' judgment, and determines net assets, ordinary income, and net income as threshold indicators. Then, the threshold of the amount of loss is determined based on the smaller of 3% of net assets or 30% of ordinary income or net income. In 2022 the threshold our substantive impact was anything over 30% of net income, or 17.4 billion JPY.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered

Direct operations
Upstream
Downstream

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

Annually

Time horizon(s) covered

Short-term
Medium-term
Long-term

Description of process

RISK IDENTIFICATON
The AGC Group defines risks that are expected to have a significant impact on the Group's supply chain and value chain, as well as on the Group's management in the short to long term, as "critical risk factors," and has established a system to monitor the management situation throughout the Group. In order to develop and operate a risk management system for the company and its subsidiaries, the AGC Group Integrated Risk Management Basic Policy, which includes risks related to climate change, defines basic policies, roles, responsibilities, etc., in accordance with Article 100, Paragraph 2, Item 4 "Regulations and other systems related to loss risk management" of the Enforcement Regulations of the Japanese Companies Act. The development and operation of a risk management system refers to (1) the development and operation of procedures/systems to prevent the manifestation of risks after identifying the risks, and (2) the development and operation of methods/systems to respond to the occurrence of the risks after identifying the risks.

The AGC Group has established the following basic approach to integrated risk management, including climate change risk:
a. Participation of management
The AGC Group regards integrated risk management as an everyday task, and management itself is actively involved. Specifically, the AGC Group has established a basic policy for integrated risk management from the perspective of overall Group optimization, and is implements a PDCA cycle as a Group.
b. Group-wide Integrated Risk Management Initiatives
Based on the basic policy formulated by the management, each in-hosue company,

SBU and corporate division, including affiliated companies under their jurisdiction, shall promote their respective integrated risk management efforts. At the same time, the Corporate Planning Department is responsible for comprehensively and centrally grasping the status of risk management, including responses to the occurrence of risks, with regard to the important risks that should be managed by the Group as a whole.
c. Ensuring the Effectiveness and Efficiency of Integrated Risk Management
The AGC Group is committed to integrated risk management with the aim of achieving both effectiveness and efficiency in integrated risk management. Specifically, we share the AGC Group's policies and priority areas for integrated risk management, and work together as one to ensure "effective" integrated risk management. In addition, we promote integrated risk management as a highly "efficient" approach without duplication or oversensitivity, taking into consideration the degree of impact of risks on management, probability of occurrence, business scale, and other factors.

Short- and medium-term
For short- and medium-term risks, we have established the "AGC Group Integrated Risk Management Basic Policy," which is the basic policy for the Group's risk management system, based on the "Risk Management System" described in the Annual Report, and have built a risk management and/or crisis response system.

Long term
In the management plan, we have positioned important opportunities and significant risks that may affect the long-term direction of corporate management and corporate value as the Group's Sustainability Materiality, taking into consideration future trends in global social issues and risks, and social issues that our customers are working to resolve.

RISK ASSESSMENT
Critical risks are determined and reviewed annually, taking into consideration the degree of impact on the AGC Group's management and the likelihood of occurrence of the risk event. Each in-house company and SBU among the major risks is subject to risk analysis and countermeasures for each business/project, and is monitored by management as necessary.

As for risks related to the environment, disasters, and quality, such as compliance and climate change, each in-house company and SBU takes various measures to improve its own risk management, while the Corporate Division in charge of downside risks provides advice and support for these efforts by formulating and sharing guidelines and training programs. As for downside risks, each in-house company and SBU periodically self-inspects its risk management level, and the results are monitored by the management. Specific arrangements for the development and operation of the risk management system are stipulated in the "AGC Group Risk Management Implementation Regulations" and are implemented accordingly. Every year, we conduct a "downside risk self-assessment" to identify the risk of interruption of directly managed, upstream and downstream operations due to sudden events such as typhoons, hurricanes, and cyclones caused by climate change, and identify high-risk business locations. For directly managed facilities that are determined to be at high-risk, we have

implemented risk reduction measures and formulated a business continuity plan that defines important operations that should be continued in the event of an unexpected event.

REPONSE TO RISK
Based on our internal rules, the AGC Group's important risk factors are defined, and the status of risk management is regularly discussed/monitored by the Management Committee and the Board of Directors. In addition, the AGC Group's corporate divisions, companies and SBUs analyze risks and consider countermeasures for each business or project, and the Management Committee and the Board of Directors deliberate on the risks as necessary.

In addition to the processes described above, we have established sustainability goals aimed at taking advantage of opportunities and addressing risks associated with climate change. As a decision-making body for sustainability initiatives, we have established a "Sustainability Committee" chaired by the CEO and consisting of the CTO, CFO, and the heads of each division. With regard to important risks, the committee determines policies to deal with them under the supervision of the board of directors, and discusses future countermeasures based on the progress of the goals. As for the AGC Group's risks related to compliance, environment, disaster, quality, etc., each department is in charge of establishing and sharing guidelines, training, audits, etc., as necessary. Significant risk factors are reviewed on a regular basis, taking into consideration the degree of impact on the Group's management and the possibility of risk occurrence. In preparation for unforeseen events that could have a significant impact on the AGC Group's business performance and financial position, a contingency reporting line has been established under the concept of "Bad News First" in accordance with internal rules to enable prompt and reliable reporting and information sharing with the CEO.

Value chain stage(s) covered

Direct operations
Upstream
Downstream

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

More than once a year

Time horizon(s) covered

Short-term
Medium-term
Long-term

Description of process

IDENTIFICATION/ASSESSMENT OF RISKS AND OPPORTUNITIES
The AGC Group is working to address climate change as a key element of "contributing

to a sustainable global environment," a social value that the Group hopes to create through sustainability management. In addition to identifying and evaluating and addressing the risks associated with climate change, we also see the solution of global climate change issues as an important opportunity, and are working to expand sales of products with energy-saving and energy-creating effects throughout the product life cycle and to build business models that will contribute to the spread of renewable energy. Management and executives of the in-house company and SBU share strategies to expand business without missing opportunities. In addition to the Corporate Strategy Meeting, the AGC Group as a whole holds a Long-Term Strategy Meeting every year in spring when the new medium-term management plan is formulated. In our long-term management strategy "Vision for 2030," which is currently being implemented, we have set the goal of "becoming an excellent company that grows and evolves continuously while contributing to the realization of a sustainable society through the provision of unique materials and solutions.

Levels of the value chain covered
In addition to Scope 1 and 2 GHG emission reduction target set in 2021, the AGC Group has also set a Scope 3 GHG emission reduction target for the entire AGC Group for 2022 and attained a certified SBT. Each the in-house company and SBU has also set its own Scope 3 GHG emissions reduction target and is addressing risks and opportunities in direct operations/upstream/downstream.

Short- and medium-term
The "Business Strategy Meeting" is held twice a year, at which the Group CEO and other top management and executives of each in-house company and SBU discuss short- to medium-term overall business growth strategies and investment plans. At this meeting, the business potential of each business unit is evaluated from various angles. In addition to the perspectives of market growth potential, profitability, and technological superiority, we also assess from non-financial perspectives such as sustainability.

Long term
In the "Business Strategy Meeting," not only short- and medium-term strategies but also strategies to achieve our own CARBON NET ZERO by 2050 are included in the perspective of short- to medium-term strategies. Businesses with high GHG emissions at the manufacturing stage are evaluated as having high product carbon footprints and high risks in the long term, while businesses that contribute significantly to the reduction of GHG emissions upstream and downstream through the AGC Group's products and services are evaluated as leading to business opportunities in the long term. From these various perspectives, the AGC Group makes decisions on the long-term and comprehensive allocation of management resources.

Response to Risks and Opportunities
Currently, we are promoting business portfolio management for long-term sustainable growth. In evaluating the business, we have established a set of metrics that reflect high growth rates, asset efficiency, and excellent carbon efficiency (low greenhouse gas emissions per unit of sales), while being resilient to market fluctuations. By adopting these metrics, we aim to improve sustainable profitability and implement business

strategies that take into account both the opportunities and risks of climate change. In addition, the AGC Group has been utilizing carbon pricing, which has been in operation since 2021, for its business investment and capital investment decision-making. The objective is to quantitatively assess the risks associated with climate change and to strategically promote decision-making and implementation of business investment/capital investment that recognizes climate change's opportunities.

You can see the current medium-term management plan from here:
https://www.agc.com/en/ir/library/briefing/pdf/2023_0208e_2.pdf

Vision 2030, our long-term strategy, can be found here:
https://www.agc.com/company/2030/index.html

Value chain stage(s) covered

Direct operations
Upstream
Downstream

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

Annually

Time horizon(s) covered

Short-term
Medium-term
Long-term

Description of process

This case study describes the process of identifying, assessing and responding to risks at one of AGC Group's in-house companies, the Architectural Glass Asia Pacific Company

IDENTIFICATION OF RISKS AND OPPOTUNITIES
Based on the 10 sustainability materiality common to the entire AGC Group identified in 2020 and the needs and expectations of stakeholders, we have identified sustainability materiality related to risks and opportunities that are specific to Architectural Glass Asia Pacific Company. The expectations and requirements of our customers to reduce Scope 1 and 2 GHG emissions and the expectations and requirements of our products to reduce their own environmental impact, such as the product carbon footprint, are part of the materiality and their achievement represents both a risk and an opportunity for the Architectural Glass Asia Pacific Company in the short to long term. Success or failure in achieving these targets is both a risk and an opportunity for Architectural Glass Asia Pacific Company in the short to long term. The internal and external environmental challenges of the business units, both in terms of products and processes, are identified and reviewed annually using the ISO 140001 system as a basis for understanding the

organization and its situation, with reference to the identified sustainability materiality of Architectural Glass Asia Pacific Company.

ASSESSMENT OF RISKS AND OPPOTUNITIES
Of the risks identified in this process, those with the potential to significantly impact the business in the short term are also identified in the "Integrated Risk Management" (the risk management process described in C2.2 above) implemented throughout the AGC Group and reported to the CEO, who is responsible for Integrated Risk Management. The information is reported to the CEO, who is responsible for integrated risk management. Opportunities identified through this process that are considered to have a significant potential impact on earnings and business portfolio decisions are discussed and decided upon by the CEO, CFO and CTO as a strategy developed within the Architectural Glass Asia Pacific Company at the annual Business Strategy Meeting. The CEO, CFO and CTO discuss and decide on the strategy developed within the Architectural Glass Asia Pacific Company at the annual Business Strategy Meeting. In addition, EMS management reviews within the Architectural Glass Asia Pacific Company identify changes in EMS issues, needs/expectations, environmental aspects and risks/opportunities through internal audits and report to the President of the Architectural Glass Asia Pacific Company.

RESPONSE TO RISKS AND OPPOTUNITIES
The risks and opportunities identified through the above process are evaluated for progress and achievement through the Environmental Management System, in which targets, KPIs and actions are set by the department responsible for each item within the Architectural Glass Asia Pacific Company, with the Environment and Safety Department acting as the secretariat. Significant results achieved in 2022 include: no significant nonconformities in the environmental management system, reduction of CO2 emissions per unit of production in the glass melting furnace, reduction of GHG emissions, and an increase in the amount of glass cullet used, which contributes to the reduction of new resource inputs.

C2.2a

(C2.2a) Which risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	EVALUATED RISKS - Risks associated with existing carbon prices and increased operating costs - Risks associated with national NDC and their policies, organizational requirements for achieving objectives, and increased operating costs to meet those requirements - Risks of increase in business expenses due to the exploitation and non-use of fossil fuel subsidies - Risks of increase in business expenses due to the exploitation and

		non-use of grants for renewable energy, etc. RATIONAL FOR RELEVANCE The Architectural Glass Asia Pacific Company and the Architectural Glass Europe & Americas Company, which have a total of 31 furnaces (including two accounted for by the equity method) that manufacture flat glass, account for a large percentage of GHG emissions of AGC Group due to the use of raw materials and energy. They assess the risks associated with regulations and policies in each country, including carbon-pricing.
Emerging regulation	Relevant, always included	EVALUATED RISKS - Risks associated with increased operating costs in countries where AGC's manufacturing sites are located due to future increases in carbon-based prices - Risks associated with increased operating costs to reduce greenhouse gas emissions due to policies for achieving greenhouse gas emission reduction targets in each country - Risk that companies that use fossil fuels will bear the expense of paying fuel or purchasing emission credits - Risks associated with increased operating expenses due to the exploitation and non-use of fossil fuel subsidies; - Risks of increase in business expenses due to the exploitation and non-adoption of grants for renewable energy, etc. - Rating risk for a company's greenhouse gas emissions RATIONAL FOR RELEVANCE For the Architectural Glass Asia Pacific Company, which has a total of 6 glass melting furnaces, we are evaluating the risk because the carbon tax, which is a direct charge for GHG emissions, is expected to increase in the future and because operational cost is expected to increase due to the regulations concerning electricity and fuel use in each country and the increase in their prices.
Technology	Relevant, always included	EVALUATED RISKS ・Increase in direct costs associated with fossil-based energy substitution ・Risk of increased investment costs for developing next-generation low-carbon technologies ・Risk of increased investment costs associated with the spread of renewable energy and energy-saving technologies RATIONAL FOR RELEVANCE Reducing GHG emissions from on-site power generation facilities: Because there is an increasing demand for abolishing coal-fired power generation, which has a higher greenhouse-gas emission factor, some businesses evaluate risks as they may bear the expenses for

		responding to fuel-conversion and early abolishment of coal-fired power generation. Product taxonomies: European investors and companies are expected to need to disclose EU taxonomic conformance rates. On the other hand, active information disclosure may attract growth funds in Europe and increase market competitiveness. In addition, it may become a global standard by reflecting other principles and standards (ICMA, ISOs, etc.). There are risks that are subject to public disclosure or related information disclosure based on standards such as having a base in Europe, and pressure from investors and NGO if related information is not disclosed. We also assess the risk, as the Brown Taxonomies, if developed, may also serve as an investment regulation for investors. Next-Generation Products: Demand for low-carbon glass is forecast to increase in line with trends in the construction industry, which aims to reduce lifecycle GHG emissions from buildings. For example, we have determined that increased authentications, such as LEED certifications in buildings, represent a growing demand for ZEB and ZEH. Appropriate product specifications are required to respond to such market trends, and the expenses associated with technological development may affect financials. If we fail to respond to these market changes, we will lose orders and our revenues will decline. To prevent such circumstances, we incur R&D costs for Low-carbon glass. Renewable Energy Implementation: Groups assess risks because of the risk of AGC's failure to acquire renewable energy due to the failure to achieve its GHG emissions reduction target, increased investment costs associated with policies such as mandating renewable energy introduction ratios in each country, and the possibility of additional costs arising from the imbalance between supply and demand due to an increase in energy users.
Legal	Relevant, always included	EVALUATED RISKS ・Stakeholder complaints and response risks associated with differences in interpretations of climate change response-related information disclosed through various media ・Litigation risk from investors and other stakeholders due to AGC's failure to respond to climate change RATIONAL FOR RELEVANCE When the risks related to climate change are included in the Annual Securities Report, the Company evaluates risks because information such as the impact on its finances and business activities may be subject to litigation as misstatements.

Market	Relevant, always included	EVALUATED RISKS ・Increased spending to meet customers' demands for reduced GHG emissions ・Increase in investment costs to meet greenhouse gas reduction requirements for suppliers of raw materials ・Risk of sales decline due to failure to meet customer requirements RATIONAL FOR RELEVANCE In the automotive glass business, one of our main businesses, there are increasing demands for reductions in greenhouse gas emissions at the product manufacturing stage, particularly in Europe. We are evaluating risks because of the potential curtailment of our business due to such failure to meet demand and the potential for lost business opportunities.
Reputation	Relevant, always included	EVALUATED RISKS ・Risk that changes in customers' attitudes and preferences will reduce AGC's reputation for ESG efforts ・ Changes in investor awareness could lead to lower estimate among customers for AGC's ESG efforts. ・There is a risk that changes in investor awareness will lead to a decline in customers' estimate for our ESG efforts. RATIONAL FOR RELEVANCE In ESG estimate, AGC has received a relatively high reputation among industries, but the importance of assessments on climate-change responses has increased year by year. We place particular emphasis on evaluating us, which has relatively high greenhouse gas emissions. When CDP and other ESG assessments related to climate-change are low, corporate value may decline without being selected by investors. Therefore, we assess the risk.
Acute physical	Relevant, always included	EVALUATED RISKS ・Risk from unstable operations caused by extreme weather ・Risks associated with the impact on sales of shutdowns due to facility damage and disrupted supply chains, as well as additional costs for dealing with damage ・Increase in capital investment costs due to increased frequency of extreme weather events such as heavy rains, heavy snowfall, heat wave, typhoons, etc. RATIONAL FOR RELEVANCE Silica sand and soda ash, which are raw materials for glass production in Japan, are mainly imported from overseas. When the operation of raw material suppliers and transportation of raw materials are interrupted due to wind and water damage associated with extreme weather or unusual weather, they may have a large impact on the glass

		production of AGC Group. Therefore, we are evaluating the risk. In fact, given the fact that North American suppliers' production activities were stopped in 2022 due to an outage caused by extreme weather events, we are assessing the risk of urgency as the physical risks could disrupt our raw material procurement and manufacturing activities. In addition, AGC Group's plants that produce basic chemicals are located along the coast, so they are susceptible to typhoons. If we become unable to operate due to the impact of typhoons, this could result in a decline in net sales. In addition, if we are unable to adequately implement risk mitigation measures, we assess risks because of the risk of losing customers.
Chronic physical	Relevant, always included	EVALUATED RISKS ・Increase in heat shielding measures and occupational safety and health maintenance costs due to increase in average temperature ・Increase in operation expenses due to changes in rainfall and weather patterns, and increase in business expenses due to the impact of rising sea levels ・Increase in operating expenses due to the impact of rising sea levels RATIONAL FOR RELEVANCE We assess the risk of an increase in the world average temperature, which could have an impact on sales, as business activities could be curtailed due to the shutdown of operations to combat heat diseases among employees and the request for power savings associated with tight power supply and demand. In addition, AGC Group has high-temperature workplaces, such as glass-melting furnaces, and employees are susceptible to heat-related diseases. In addition, there is a risk that the expense of countermeasures (air conditioners, etc.) for heat-related diseases will increase as temperatures rise. If the amount of water resources at an operating site declines locally, we assess the risk because there is a necessity to suspend production or reduce production at a site with a large water intake, which could impact sales. Factories that handle basic chemicals are in coastal areas and may be affected by storm surges and sea-level rise. Inability to operate leads to a decline in sales. In addition, if we are unable to adequately implement risk mitigation measures, there is a risk of losing customers.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier
Risk 1

Where in the value chain does the risk driver occur?
Direct operations

Risk type & Primary climate-related risk driver
Current regulation
Carbon pricing mechanisms

Primary potential financial impact
Increased direct costs

Company-specific description
As the GX League becomes fully operational and the emissions trading system moves forward, it is possible that a carbon price similar to that in other countries will be implemented in Japan. Therefore, if both Scope 1 and Scope 2 are subject to emissions trading, this would have a significant impact on the AGC Group. In addition, Japan will continue to be an important market for the Glass and Chemicals businesses, which have relatively high GHG emissions within the AGC Group, and the impact associated with GHG emissions cannot be ignored.

Time horizon
Medium-term

Likelihood
Unlikely

Magnitude of impact
Medium-high

Are you able to provide a potential financial impact figure?
Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)
700,000,000

Potential financial impact figure – maximum (currency)
4,550,000,000

Explanation of financial impact figure

The carbon price forecast for 2030 published by the IEA is USD 120/t-CO2 in the APS (Announced Pledge Scenario) and USD 130/t-CO2 in the NZE scenario (Net Zero Emissions by 2050). Based on these projections, if Japan were to implement a carbon price similar to that of other countries, the range would be from USD 20/t-CO2 to USD 130/t-CO2. Assuming that about 250,000 t-CO2, 10% of Scope 1 and 2 GHG emissions in 2022 from AGC Group's Japanese sites are covered by emissions trading, the financial impact is expected to range from USD 20 * 250,000t-CO2 to USD 130 * 250,000t-CO2. USD/JPY exchange rate converted at JPY 140/ USD 1.

Minimum: 250,000 t-CO 2 * USD 20 * 140 (USD/JPY) = 700,000,000 JPY
Maximum: 250,000 t-CO 2 * USD 130 * 140 (USD/JPY) = 4,550,000,000 JPY

Cost of response to risk

8,000,000,000

Description of response and explanation of cost calculation

SITUATION

Scope 1 and 2 GHG emissions from sites in Japan account for about 2.45 million tons-CO2, or about 22.3% of the AGC Group's total Scope 1 and 2 GHG emissions in 2022. In Japan, in February 2022, the Ministry of Economy, Trade and Industry of the Japanese government announced the "GX League Initiative". The "GX League Initiative" is a framework for voluntary emissions trading in which companies with ambitious carbon reduction targets aim to achieve their goals while investing in reductions. Full-scale operation is planned from 2023.

TASK

AGC's domestic sites are taxed when they purchase fossil fuels for their business activities. In particular, complete decarbonization/electrification of glass melting furnaces and chemical manufacturing processes, which are major sources of GHG emissions, is difficult to change drastically in a short period of time in terms of equipment life. Therefore, the financial impact of an increase in the tax rate for the "global warming taxation system" is expected to be significant. In addition, the GX League plans to start voluntary emissions trading after FY2023. The price is tentatively set at USD 20/t-CO2, the level of J-credits, and since the target emissions under the scheme can be voluntarily determined.

ACTION

As a milestone for the AGC Group's overall goal for Scope 1 and Scope 2 GHG emissions, the AGC Group has set a target of achieving -30% CO2 emissions by 2030 compared to 2019. To achieve this goal, emissions from sites in Japan must also be reduced by 30% by 2030. We are striving to reduce absolute GHG emissions by further improving the efficiency of the energy we use, and are building a business structure that minimises the effect of a carbon tax. In order to achieve the group's goal, it is necessary to reduce Scope 1 emissions through further measures such as cold repair of glass melting furnaces, fuel conversion, and the use of BAT, and to reduce Scope 2 emissions through active introduction of renewable energy. In 2022, measures were implemented such as cold repair of glass melting furnaces, introduction of high-efficiency equipment

and process improvement at the time of renewal of aging facilities. Typical investment for cold repair of glass melting furnaces is more than JPY 4 billion, and if cold repair of two melting furnaces per year is carried out, it will cost at least JPY 8 billion.

RESULT
The sum of absolute Scope 1 and Scope 2 GHG emissions in 2022 was approximately 5.1% lower than in 2019.

Comment

Identifier
Risk 2

Where in the value chain does the risk driver occur?
Direct operations

Risk type & Primary climate-related risk driver
Acute physical
Flood (coastal, fluvial, pluvial, groundwater)

Primary potential financial impact
Increased indirect (operating) costs

Company-specific description
The AGC Group's core site in Japan is home to 13 manufacturing facilities and activities closely related to the manufacturing process. Some of them operate near coastal areas. Therefore, they are exposed to physical risks such as flood/storm surges, which may increase their overhead costs.

Time horizon
Long-term

Likelihood
Very unlikely

Magnitude of impact
Low

Are you able to provide a potential financial impact figure?
Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)
0

Potential financial impact figure – maximum (currency)

134,780,510

Explanation of financial impact figure

Potential flood and storm surge damages are identified in terms of inundation depth (m) and rainfall (mm/h) based on the planned rainfall in the hazard map above and the expected maximum rainfall announced by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). The current frequency of occurrence in RCP 8.5 and RCP 2.6 for the present, 2030, 2040, and 2050 was taken into account and calculated based on AGC's assets and sales.
Using AQUEDUCT, the minimum, maximum, and average damage estimates for the years 2030, 2050, and 2080 are calculated from assets and sales, respectively, assuming the recurrence period to be 100 years and 1000 years.

The depth ranges and probabilities of flood and storm surge events expected to occur in 2050 for 9 of the 13 sites evaluated are as follows: In the other four sites, neither flood nor storm surge risks were identified by either hazard maps or AQUEDUCT. However, a depth of inundation below 0.04m is assumed to be 0, and no financial impact calculations are made.

Range of inundation depths for flood events expected in 2050:
(1)
Assessment tool: Hazard map estimated maximum size
Inundation depth :0.04m～1.96m
Annual frequency: 0.0008 to 0.0358 times/year

(2)
Assessment tool: Hazard map plan scale
Inundation depth :0.02m～1.64 m
Annual frequency: 0.0034 to 0.1232 times/year

(3)
Assessment tool: AQUEDUCT
Inundation depth :0.01～2.82 m
Probability of occurrence: Once in 100 years

Range of inundation depths for storm surge events expected in 2050:
Assessment tool: AQUEDUCT
Inundation depth :0.05～0.97 m
Probability of occurrence: Once in 100 years

The annual impact in 2050 under PCP 8.5 based on the above damage assumptions is as follows. Since the annual impact in 2030 is equal to or lower than that in 2050, the year 2050 is adopted as the assumed maximum value. In the evaluation using AQUEDUCT, 100 years was adopted as a more realistic time frame for reproduction compared to 1000 years.
Tool: Hazard Map
Rainfall: Planned-scale rainfall

Climate-simulation: RCP8.5
Assumed damage: Flooding
Annual impact range: 0 to JPY 100,214,000

Tool: AQUEDUCT
Climate-model difference: average
Climate-simulation: RCP8.5
Assumed damage: flooding and storm surge
Annual impact range: 0 to JPY 134,780,510

Cost of response to risk

13,000,000

Description of response and explanation of cost calculation

SITUATION
There are 13 sites in Japan with activities closely related to the manufacturing process. Manufacturing sites are the core of AGC Corporation, which produces glass and chemicals, some of which operate near the coast.

TASK
The stakeholders of the AGC Group may be concerned about whether there is a serious physical risk such as flooding or storm surge, it was judged necessary to conduct a damage estimate associated with urgent physical risks such as flooding/storm surges.

The following publicly available information was used to make flood damage risk assumptions.
・Inundation Depth: This data is obtained from the Japanese Ministry of Land, Infrastructure, Transport and Tourism site-specific inundation simulation/search system.
・Rainfall standard values: Obtained from hazard maps of rivers leading to inundation depths from the Japanese Ministry of Land, Infrastructure, Transport and Tourism Flooding Simulation and Retrieval System by Location.

The following publicly available information was used for the storm surge damage risk assumption
・Inundation depth: Acquired from AQUEDUCT.

The following were used to calculate the estimated amount of damage
・Consortium for Disaster Reduction Economy, Cabinet Office, Government of Japan, "Reference Indicator Tool for the Impact of Natural Disasters on Firms (Flood Damage)."
・Flood hazard maps, etc., published by the Ministry of Land, Infrastructure, Transport and Tourism and the prefectures of Japan
・AQUEDUCT (WRI)

The climate simulations we used: RCP 2.6 and RCP8.5
We used the downscaling method created by a private weather company contracted by us; d4pdf, part of the Japan region model of CMIP5, SI-CAT

ACTION
The results of the damage calculations show that the maximum flood depth reaches 282cm in the case of a flood in the river near the site in the PCP8.5 simulation in 2050, but the probability of such a flood occurring is very low. It was also found that storm surges leading to inundation and their impact on properties when they occur is relatively small. Based on the results of the damage calculations, the risk of inundation was determined to be about 10cm. Sandbags are installed to protect facilities and buildings in case of flooding.

RESULT
As a result of these measures, the AGC Group's sites are not affected by wind and flood damage in 2022.

CALCULATION OF COST
We calculated the maintenance cost of sandbags to be JPY 1 million times JPY 13 million for maintenance of 13 sites.

Comment

Identifier
Risk 3

Where in the value chain does the risk driver occur?
Direct operations

Risk type & Primary climate-related risk driver
Current regulation
Carbon pricing mechanisms

Primary potential financial impact
Increased direct costs

Company-specific description
The Company is subject to the EU ETS for six glass manufacturing sites in Europe (France, Czech Republic, Belgium and Germany). Direct costs may increase due to the increase in the reduction rate from 1.74% to 2.2% in the fourth plan period. 100% of benchmark-based allowances will be allocated free of charge from 2021, but if the glass sector is subject to CBAM, free allocation may be phased out over the next few years. Free allocation could be phased out.

Time horizon
Long-term

Likelihood
About as likely as not

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

1,395,000,000

Potential financial impact figure – maximum (currency)

1,751,500,000

Explanation of financial impact figure

The actual Scope 1 GHG emissions of Architectural Glass Europe & Americas Company in 2022 is about 2,000,000 t-CO2, assuming that 5% of the total emissions are eligible to purchase credits under the EU-ETS scheme. The price of EU-ETS is assumed to be USD 90/tCO2 in 2030 and USD 113/tCO2 in 2050. The conversion from EURO to JPY is made at the rate of JPY 155/EUR.
2,000,000*0.05*90*155 = JPY 1,395,000,000
2,000,000*0.05*113*155 = JPY 1,751,500,000

Cost of response to risk

8,000,000,000

Description of response and explanation of cost calculation

SITUATION
The reduction rate for the fourth plan period (2021-2030) will be increased from 1.74% in the third plan period to 2.2%, which will reduce the number of credits to be allocated, which is expected to affect the increase in the credit price. IEA World Energy Outlook 2022 expects EU-ETS prices to be USD 90/tCO2 in 2030: USD 113/tCO2 in 2050. In addition, there is a move by the European Green Deal to expand the reduction contribution by EU ETS. Specifically, it is being considered to increase the reduction rate from 2.2% to 4.2% during the 4th Plan period.

TASK
Six glass manufacturing sites in Europe are identified as targets. As the glass sector is a leakage industry, 100% of the emission credits based on the benchmark are allocated free of charge as of 2021. The benchmark is the value of the top 10% most efficient in the production of the product in question, so that the purchase of credits is required for those operating at a lower efficiency than the benchmark. The price of the credits is set to be passed on to the power generation companies in the electricity price. Since the free quota for power producers is 0%, it is actually a factor in price increases. The EU has decided to introduce the Border Carbon Adjustment Mechanism (CBAM) in 2023, which may cover all sectors in the EU ETS by 2030. Since CBAM replaces free allocation in the EU ETS, if the glass sector is covered by CBAM, free allocation may be phased out over the next few years.

ACTION
- Glass recycling: AGC Glass Europe recycles about 1 million tons of cullet per year, saving about 1.15 million tons of raw materials and 700,000 tons of CO2 emissions.
- Recycling of DeSOx waste for use as a raw material: 4,600 tons of sulphate will be recycled as raw material in 2022, totalling about 59,500 tons since the start in 1999.
- The total output of green power by recovery and private power generation reached 28,927 MWh in 2022. This resulted in a reduction of nearly 2,100 tons of CO2.

RESULT
700,000t-CO2+2,100t-CO2=702,000t-CO2 was reduced.

CALCULATION OF COST
The AGC Group as a whole has a plan to invest more than JPY 100 billion between 2021 and 2025 to reduce GHG emissions by 2025. Assuming that half of the investment is for the reduction of Scope 1 and 2 GHG emissions from the company's own processes and that 16% of the AGC Group's total sales are in Building Glass Europe and American segments, the following calculations are made.
10,000,000,000*0.5*0.16=8,000,000,000

Comment

C2.4

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.4a

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Opp1

Where in the value chain does the opportunity occur?

Downstream

Opportunity type

Products and services

Primary climate-related opportunity driver

Development and/or expansion of low emission goods and services

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

Refrigerants currently in use have an extremely high GWP (Global Warming Potential), and the industry as a whole urgently needs to reduce this GWP. The refrigerant gas market is currently worth about JPY 800 billion worldwide, and the refrigerant used in car air-conditioners is rapidly switching to 1234yf, and is expected to complete the switch to 1234yf in the near future. AGC was the first company in the world to succeed in commercial production of 1234yf, and is making a significant contribution to global warming mitigation. AMOLEA® is a next-generation environmental fluorinated solvent developed by AGC. It is not only environmentally friendly, but also non-flammable and has high cleaning power.

Time horizon

Medium-term

Likelihood

More likely than not

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

49,200,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

The Chemicals business is expected to generate sales of JPY 650 billion in 2023. This sales forecast includes gas business including green refrigerant AMOLEA® and solvents, chlor-alkali business, fluorochemicals business, and urethane business.

Cost to realize opportunity

10,202,000,000

Strategy to realize opportunity and explanation of cost calculation

SITUATION

The tightening of regulations on refrigerants as an impact on global warming is an opportunity for us to expand our business. This is because of the refrigerant (hydrochloro-olefin (HFO) with low GWP) that we have been researching and developing for many years. On the other hand, in order to expand the market for new refrigerants, it is necessary to make the developed refrigerant the de facto standard in the market.

TASK

HFCs have been used as refrigerants (gases) to cool and heat the air, but their impact on global warming has been very large. Therefore, it was internationally agreed to gradually reduce the use of HFCs and to switch to "green refrigerants" (natural refrigerants such as HFO and CO2), which have a much lower impact on global warming. In addition to low GWP, the new refrigerants are required to have physical properties comparable to those of conventional refrigerants. In addition, to become the de facto standard, it is necessary to cooperate with industry associations and government agencies around the world to raise awareness of the new refrigerants.

ACTION
In order to respond to this new challenge, AGC has successfully developed green refrigerants (structured/unique manufacturing method) by making full use of the molecular design technology and organic synthesis technology cultivated in our chemical business.

RESULT
AGC is one of the world's leading refrigerant companies holding two of the seven green refrigerants (1234yf 1224yd) currently available in the world, and is the only company in Japan that manufactures/sells green refrigerants. In addition to this market position, we promote our products through trade shows and lobby the market through industry associations to increase sales.

COST CALUCULATION TO REALIZE THE OPPOTUNITY
The R&D Department of our Chemicals segment is developing new products and technologies by utilizing fundamental technologies such as fluorochemistry, polymer chemistry, inorganic chemistry, and electrochemistry in order to provide materials and solutions that "add safety, security, and comfort" to the world, as stated in AGC plus 2.0. In particular, we are focusing on the development of environmentally friendly products and processes, as well as intermediates/agrochemicals for pharmaceuticals and agrochemicals and development in the biotechnology field. Research and development expenses for the Chemicals segment in 2022 were JPY 10,202 million.

Comment

Identifier
Opp2

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Products and services

Primary climate-related opportunity driver
Development and/or expansion of low emission goods and services

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

In Europe, demand is expected to continue to replace high insulation glass to reduce energy consumption in buildings, and in Japan and Asia, demand for high insulation and heat shielding glass is expected to expand. The AGC Group also expects that the carbon footprint of its automotive products will continue to be reduced in the future, and aims to increase sales of cover glass for automotive displays and new mobility components (including 5G communications) as strategic businesses by taking timely advantage of these market trends. The AGC Group also anticipates these market trends.

Time horizon

Medium-term

Likelihood

About as likely as not

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

85,700,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

In 2023, sales of our glass business are expected to increase by approximately 12% over 2021. Therefore, sales of the glass business, including 99% all-around UV-cut glass, frosted glass, and dimming glass, are expected to increase from JPY 734.3 billion (2021) to JPY 820.0 billion (2023).

Cost to realize opportunity

9,697,000,000

Strategy to realize opportunity and explanation of cost calculation

SITUATION

The shift to EVs is underway because gasoline vehicles, which use fossil fuels and emit CO2 when running, cause global warming, but EV air conditioners also consume large amounts of electricity, creating a new problem.

TASK

Air conditioners for EVs consume a large amount of electricity, and it is important to improve the heat shielding/insulation effect of automotive glass. It is necessary to improve the heat shielding/insulating performance of automotive window glass to reduce the air-conditioning load. In addition, EVs use panoramic roof glass to let in light and create an open interior space. However, they are susceptible to solar heat and outside air, requiring the use of air conditioners and sun shades to keep the interior comfortable, leading to an increase in vehicle weight.
Windshields have the largest area of any automotive window glass. At first we started to improve the thermal barrier performance of windshields and developed a laminated glass "Coolveil" using a highly thermal barrier interlayer and two sheets of glass, but we were left with the problem of reducing the weight of the glass, which leads to improved fuel efficiency of automobiles.

ACTION
By making full use of the glass material technology, organic/inorganic material technology, and glass coating technology cultivated in the glass business, the company succeeded in developing technology to improve the heat shielding/insulation performance of window glass. Following the development of the world's first coating technology for tempered glass with UV and infrared ray absorbing functions, and the development of "UV Veil Premium Coolon" door tempered glass with heat shielding performance that could only be achieved with laminated glass, we have developed "UV Veil Premium Privashield" that offers high UV cutting performance and heat shielding for all automobile windows. Subsequently, we developed "UV Veil Premium Privashield" and succeeded in providing all car windows with high UV-cut and heat-shielding performance by improving the absorption performance of ultraviolet and infrared rays compared to conventional privacy glass.

RESULT
Development of special Low-E coating technology for automobiles, panoramic sunroofs, have achieved unprecedented heat shielding/insulation performance that can significantly reduce heat in summer and cold in winter.

COST CALUCULATION TO REALIZE THE OPPOTUNITY
Research and development expenses for the Glass segment in 2022 were JPY 9,697 million.

Comment

Identifier
Opp3

Where in the value chain does the opportunity occur?
Downstream

Opportunity type

Products and services

Primary climate-related opportunity driver

Development and/or expansion of low emission goods and services

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

Opportunities for Architectural Glass Asia Pacific Company
The insulation performance of existing homes in Japan is based on outdated standards, and approximately 90% of windows will need to be retrofitted to meet new insulation performance standards to meet ZEH in the future. AGC has a nationwide sales and manufacturing network and is well positioned to meet the required deadlines. AGC has a nationwide sales and manufacturing network in Japan and has established a system that can respond appropriately to delivery deadlines. Its manufacturing capacity accounts for approximately half of the total capacity in Japan. In addition, its manufacturing capacity for low-e glass, which is essential for high-performance double glazing, is about 70% of the total. In terms of marketing, the company is also actively promoting energy-saving glass. As a result, the company is able to capture this large retrofit market at a high rate. This is in addition to the demand for new housing starts each year. There are currently more than 800,000 new housing starts per year, which limits the supply and assembly capacity of downstream window materials outside of AGC.

Time horizon

Medium-term

Likelihood

More likely than not

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

5,500,000,000

Potential financial impact figure – maximum (currency)

11,000,000,000

Explanation of financial impact figure

High performance insulating double glazing uses low-e glass on one side of ordinary double glazing, and the unit price ranges from 5,000 yen to 10,000 yen per square meter. Although the window area varies depending on the type of housing, such as

single-family homes and condominiums, if an average of 10 square meters per unit is retrofitted, the cost would be 50 to 100 thousand yen per unit. The estimated number of units is 220,000, and AGC's share is half of that, so 110,000 units will be acquired, and the incremental sales will be 5 to 11 billion yen. (5,000 - 10,000 x 10 x (220,000 x 0.5) = 5,500,000,000 - 11,000,000,000) Note that this calculation does not include sales of low-e glass to other companies as a component of double glazing, since it is impossible to determine whether they are used for renovation.

Cost to realize opportunity

0

Strategy to realize opportunity and explanation of cost calculation

SITUATION
Although there is a national policy towards carbon neutrality, it is important to first raise awareness of the need to retrofit windows among individual consumers. In addition, window retrofitting involves construction work that requires the hiring of installer. Therefore, it is essential to meet the promised delivery date with the window frame assembly company downstream in the value chain.

TASK
In addition to traditional sales channels, it is also necessary to stimulate demand directly at the end user. Consumer behavior is becoming increasingly digital, and online marketing through websites is effective. Once an order is received, it is essential to provide an accurate response regarding the delivery date.

ACTION
A digital marketing platform was already in place and content that was easy for consumers to understand, such as how to take advantage of subsidies, was added to encourage order taking. An order-taking system was also in place, and adjustments were made to ensure that production capacity was not exceeded and deadlines were met.

RESULT
In addition to sales promotion to distributors, who are AGC's direct customers, online marketing to end users through websites, and outreach to the entire glass industry through the Flat Glass Association, of which AGC is an active member, consumer awareness of window renovation was increased and demand increased significantly. The company was able to manage orders within its production capacity by successfully matching production with demand for new homes, resulting in on-time deliveries and smooth shipments.

COST CALUCULATION TO REALIZE THE OPPOTUNITY
No new development costs were incurred because the company already manufactures and sells products that meet energy conservation standards. There is no investment in system design or equipment because the existing marketing and manufacturing platforms are being leveraged.

Comment

C3. Business Strategy

C3.1

(C3.1) Does your organization's strategy include a climate transition plan that aligns with a 1.5°C world?

Row 1

Climate transition plan

No, but our strategy has been influenced by climate-related risks and opportunities, and we are developing a climate transition plan within two years

Explain why your organization does not have a climate transition plan that aligns with a 1.5°C world and any plans to develop one in the future

The AGC Group is well aware of the need to limit the global temperature increase to 1.5 degrees Celsius.

The AGC Group has a glass business and a chemicals business. In light of the ACT's transition plan evaluation methodology and the SBTi's trend toward setting sectoral targets, the AGC Group is examining whether presenting ourselves as having just one transition plan will really help limit the global temperature rise to 1.5 degrees Celsius.

C3.2

(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?

	Use of climate-related scenario analysis to inform strategy
Row 1	Yes, qualitative and quantitative

C3.2a

(C3.2a) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices
Physical climate scenarios RCP 8.5	Company-wide		This is one of the typical concentration pathway (RCP) scenarios shown in the Intergovernmental Panel on Climate Change (IPCC) report. CO2 emissions from 2012 to 2100 are set at 5.19 to 7.00 (trillion tons CO2), with the aim of keeping the gap in radio forcing below 8.5W/m2 from before the industrial revolution to the end of the 21st century. OBJECTIVE

			To analyse in detail AGC's acutely physical risks in high-probability-of-flood and storm surge scenarios. METHODOLOGY A simplified assessment was conducted at seven major manufacturing sites of AGC on the impact of a sudden catastrophe such as flooding and storm surge caused by climate-change on the operations of manufacturing sites. By calculating the average annual impact amount, taking into account the frequency of the total impact amount in the occurrence of a single disaster, we identify the locations with the greatest risk and the degree of risk, and utilize this information in the implementation of measures to prevent flooding at the site level. COVERAGE AND TIME HORIZONS All in-house companies and SBUs Until 2050 RESULTS Physical: • Sudden disaster The frequency of extreme weather conditions such as heavy rains, heavy snowfall, heat waves, and typhoons increases locally. Any facility damage or supply chain disruption in all of our businesses could result in an impact on sales due to shutdowns and additional costs for dealing with damage. • Water stress The amount of water resources at operation sites decreases locally. In all businesses, there is a possibility that there will be a necessity to suspend production or reduce production at sites with large water intake, which could affect sales. • Temperature rises The world average temperature rises. In all businesses, the company's business activities may be curtailed due to the suspension of operations to combat heat-related diseases among employees and the request for power savings stemming from tight electricity supply and demand, which could affect sales.

Transition scenarios IEA APS	Company-wide		Demand for fossil fuels is expected to peak by 2025 and global CO2 emissions are expected to decline by 40% by 2050. CO2 emissions in all sectors, particularly the electricity sector, are projected to decline, with global mean temperature increases of 2.1 degrees per year in 2100 relative to pre-industrial levels. OBJECTIVE This scenario cannot be ignored because the momentum to achieve targets well below 2°C is increasing worldwide. METHODOLOGY This model determines the future energy demand and supply as an output, using inputs such as macroeconomic, fuel prices, user prices, energy technology costs, and carbon prices. COVERAGE AND TIME HORIZONS AGC Group wide Until 2050 RESULTS Risks: • Rising carbon prices Pricing policies for corporate GHG emissions (carbon tax, emissions trading, etc.) will be accelerated. All businesses that use fossil fuels may bear the expense of paying fuel/purchasing emission credits. • Demand from customers to reduce GHG emissions GHG reduction requirements from suppliers of raw materials accelerate. In some businesses, sales may be affected depending on how the company responds to customer requirements. • To reduce GHG emissions from in-house power generation facilities Demand for abolition of coal-fired thermal power generation with a high greenhouse gas emission factor will increase. There is a possibility that companies will bear the expense of responding to fuel conversion and early abolition with respect to private coal power generation. Opportunities:

			• Building renovation market Renovations to improve the energy efficiency of buildings accelerate. Market expansion is expected for insulation glass and PVC sashes and urethane insulation products. • SOLAR PV MARKETS Market expansion is expected for ceramics refractories and fluoropolymer films for melting furnaces used in manufacturing cover glass for solar panels. • Hydrogen-related market The implementation of electric decomposition-relationship facilities will accelerate along with the expansion of production of hydrogen derived from renewable energy power. Market expansion of ion exchange membranes for electrodegradation is expected. • EV・FCV market Market expansion is expected for products used in electric vehicles and fuel cell vehicles, such as electrolytes for all-solid cells and electrolyte polymer solutions for fuel cells.

C3.2b

(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.

Row 1

Focal questions

Focus

Transition scenario:

- How will different climate scenarios affect the demand for AGC Group products? Where are the risks and where are the opportunities?

- What are the levels of fossil fuel, energy, electricity, and CO2 prices under different climate scenarios? What is the relative role of regulation and price in emission reductions?

Physical scenario:

- How much risk is there of business interruption to AGC due to climate change?

Results of the climate-related scenario analysis with respect to the focal questions

RATIONALE FOR SCENARIO SELECTION
Since the AGC Group operates globally and has many country and regional specific characteristics, the transition scenarios applied include the Announced Pledges Scenario, STEPS, NZE as transition scenarios, and RCP8.5.

Transition:
RESULTS
Under the 2°C scenario, we have identified increased costs associated with the implementation of policies related to the transition such as carbon pricing, carbon taxes, and emissions trading schemes in Japan, Indonesia, and the EU. This cost increase is assumed to be up to USD 770 million for the AGC Group in 2030, assuming that emissions remain the same as Scope 1 and 2 emissions in 2021. In terms of opportunities, for example, the market for building renovation in developed countries is expected to expand over the long term, the market for components for the ZEV market is expected to grow at an accelerated pace. In addition products that meet new market needs include insulating window glass for buildings with excellent durability and recyclability that also takes resource recycling into consideration, and green refrigerants and solvents with extremely low GWP.

HOW RESULTS INFORMED DECISION MAKING
We reaffirmed the need to reduce Scope 1 emissions by further measures using BAT and fuel conversion at the timing of the cold repair of glass melting furnaces that will be implemented in the future, and to thoroughly reduce Scope 2 emissions by actively introducing renewable energy from a short- to long-term perspective. We also reviewed the direction and expected reduction amount of GHG emission reduction measures currently being implemented and planned in the future, and confirmed that we would continue to maintain this as it is. Cold repair of glass melting furnaces is performed in the short to long term, depending on the lifetime of the furnace owned by the AGC Group.

Physical:
RESULTS
Under the 4°C scenario, the AGC Group found that identifying and addressing the potential impacts on its manufacturing sites and suppliers in the event of intensified physical impacts from climate change, such as flooding, storm surges, and sea level rise, was a challenge for us.

HOW RESULTS INFORMED DECISION MAKING
As a result of the damage calculation, it was found that the maximum inundation depth would reach 282cm if a flood occurred in a river near the business site in the PCP8.5 simulation in 2050. At the same time, however, the annual frequency of occurrence was found to be very low, ranging from 0.0008 to 0.0358 times/year. The range of the annual impact of flooding in 2050 under the same RCP8.5 simulation is from JPY 0 to 100,214,000, and the impact on assets is also found to be in the range outside the "significant impact" category. Based on the results of the damage calculations, the risk of inundation was determined to be about 10cm at this point. Sandbags will be installed

in case of flooding, and the company will continue to protect facilities, buildings, and other assets.

C3.3

(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	INFLUENCE ON STRATEGY We believe that the globally accelerating trend toward decarbonisation and low carbon will increase demand for products that help mitigate and adapt to climate change. For glass, it is forecast that the durability of glass will need to be improved due to the growing demand for high durability of buildings and automobiles. Based on this recognition, in addition to Eco-glass, the Chemicals Segment is working to develop and expand sales of such products as CFC substitutes, which have a low global warming potential, and ion-exchange membranes for salt electrolytes. In the glass business, we made a strategic decision to promote the use of renewable energy in the construction materials field through alliances with other materials. As an example of our strategy, in 2022 we developed the Aslo Rail Fastener Solar Panel Installation Method (tentative name) in collaboration with a wall material manufacturer Nozawa, which enables power generation on the walls of buildings (patent pending). As the shortage of solar panels is a problem, the promotion of the same installation method will contribute to improving the energy self-sufficiency of buildings. In the future, we will conduct test sales to commercialize buildings such as offices and warehouses, and aim to start sales in 2023. TIME HORIZON CONSIDERED Analysis and steering considers the short, medium, and long-term impact on business objectives.
Supply chain and/or value chain	Yes	INFLUENCE ON STRATEGY Recognizing that climate-change has a significant impact on raw material procurement and product logistics in AGC Group's value chain, we recognize the importance of raising awareness of sustainability and improving response

		throughout the supply chain. Through the Basic Purchasing Policy, we sought the efforts of suppliers involved in the environment and social, such as the prevention of global warming. In the future, based on this policy, we will enhance the items for responding to climate change in the questionnaire survey of suppliers and grasp the current status of our initiatives. In addition, through cooperation with suppliers, we are promoting more effective measures with less environmental impact, such as improving transportation lots and modal shifts in transportation methods. Consideration of purchasing from multiple countries and suppliers was also initiated in light of climate change risks. In the event that we are unable to procure raw materials from existing suppliers due to unforeseen circumstances, we are making efforts to search for and develop sources that can be used in a quality manner even if prices are high. As a specific example of our activities, we constructed a pallet collection system using RFID tags and a cloud-based individual management system. We received the Sustainable Activities Award, the 24th Logistics Environmental Award, sponsored by the Japan Federation of Freight Industries, together with our business partners. In 2022, we decided on Scope3GHG emissions reduction targets and supplier engagement targets, and were certified as SBT during the year. TIME HORIZON CONSIDERED Analysis and steering considers the short-and medium-term impact on supplier engagement.
Investment in R&D	Yes	INFLUENCE ON STRATEGY In product development, we are advancing the development of new refrigerants for air conditioners that significantly reduce the impact on global warming, and are further strengthening our research activities on highly energy-efficient car light control glass and other products. We are also actively developing technologies related to environmentally friendly glass melting processes to reduce greenhouse gases emitted from manufacturing processes. In 2023, we succeeded in a demonstration test of glass production using ammonia as fuel in the first commercial reactor in the world to develop fuel ammonia use and production technology for industrial furnaces. This project was developed by the National Energy and Industrial Technology Development Organization (NEDO), an

		independent administrative agency consigned in 2021. TIME HORIZON CONSIDERED Analysis and steering consider the short, medium, and long-term effects on R&D.
Operations	Yes	INFLUENCE ON STRATEGY Climate-change issues have had a major impact on efforts to reduce GHG emissions at individual sites. Our strategic objective is to establish a milestone of reducing GHG emissions (scope 1 and 2) by 30% in 2030 compared to 2019. Each production base is promoting a shift to low-carbon fuels and energy, the implementation of the latest high-efficiency equipment, and the rationalization of production processes. For example, we have improved efficiency by maintaining and upgrading electro-deposition facilities at domestic and overseas chemical plants, increased LNG of fuel for combustion at domestic and overseas glass plants, and expanded use of surplus renewable energy at electro-deposition plants at domestic chemical plants (Chiba). TIME HORIZON CONSIDERED Analysis and steering consider the short, medium, and long-term effects on manufacturing technology.

C3.4

(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Direct costs Indirect costs Capital expenditures Capital allocation Acquisitions and divestments Access to capital Assets Liabilities	REVENUES The following was presented at the ESG briefing held in September 2022. In the glass business, our state-of-the-art Low-E double-glazing glass reduces heat transfer by about 90% compared to single-pane glass, and is attracting attention as a product that contributes to the fight against global warming due to its excellent heat insulation effect. We have been developing and marketing products with higher thermal insulation properties, and we will continue to work on further improvement to contribute to the reduction of CO2 emissions from buildings. DIRECT AN INDIRECT COST In the medium term, we believe that energy prices will inevitably rise due

		to the shift from coal/oil to low-carbon fuels such as LNG and the shift to renewable energy. The IEA APS scenario estimates the carbon price for developed countries at US$100/t-CO2 in 2030 and US$140/t-CO2 in 2040. Furthermore, carbon price-related measures are being introduced in China, Korea, and other countries in the world. The AGC Group's Scope 1+2 GHG emissions in 2022 were about 11 million tons. As for the long-term impact on direct and indirect costs, if a burden of JPY 10,000/t-CO2 is required, the total annual burden for the entire group would be approximately JPY 110 billion. Therefore, as a milestone for 2030, we have set a target to reduce greenhouse gas emissions by 30% from 2019 levels, and are working on the reduction. CAPITAL EXPENDITURE Our GHG emissions reduction goals will require increased capital expenditure to meet, and climate change will have a significant impact on our capital investment/allocation plans. We plan to invest more than JPY 100 billion over the five years from 2021 to 2025 to address climate change. Investment for the purpose of GHG emission reduction is about 60%, and investment for the purpose of GHG emission reduction in the float glass melting furnace and the conversion of electric power source to renewable energy is about 40%. CAPITAL ALLOCATION In addition, in order to reduce GHG emissions while maintaining medium- and long-term growth, it will be essential to develop new manufacturing methods. Therefore, in the mid- to long-term, the company plans to allocate management resources to the development of new construction methods on a priority basis. Over the long term we are shifting our business portfolio from existing businesses with high GHG emissions to strategic businesses with low GHG emissions and high market growth potential (such as life science and electronics-related businesses). The percentage investment in strategic businesses in the medium-term management plan (2021-2023) is 33% of our investment (total amount of JPY 600 billion), an increase from 25% (total investment amount of JPY 666 billion) in the previous medium-term management plan (2018-2020). ACQUISITIONS AND DIVESTITURES The period of the current medium-term management plan (2021-2023) may be affected. At this time, the company has not made any acquisitions or divestments for the purpose of reducing GHG emissions, but in order to reduce GHG emissions (Scope 1 and Scope 2) by 30% by 2030 and achieve our own CARBON NET ZERO by 2050, the company may consider future acquisitions to acquire technologies that can reduce GHG emissions, or divestments as it exits its low-carbon productivity business.

		ACCESS TO CAPITAL The period of the current medium-term management plan (2021-2023) may be affected. In the medium term, there is a possibility of a decrease in profits due to tighter carbon pricing-related measures by governments, and a decrease in equity capital due to an increase in R&D expenses. As a result, the capital adequacy ratio may decline and the financial rating may be lowered, which may ultimately affect our ability to raise funds. ASSETS The period of the current medium-term management plan (2021-2023) may be affected. In the medium term, the low-carbon productivity products and manufacturing facilities in our business portfolio may be negatively evaluated by external stakeholders, and we may incur losses. LIABILITIES The period of the current medium-term management plan (2021-2023) may be affected. In the medium term, the debt ratio may increase due to a decrease in equity capital and an increase in R&D expenses as a result of a decrease in revenues and an increase in R&D expenses due to the strengthening of carbon pricing-related measures by the government.

C3.5

(C3.5) In your organization's financial accounting, do you identify spending/revenue that is aligned with your organization's climate transition?

	Identification of spending/revenue that is aligned with your organization's climate transition
Row 1	No, but we plan to in the next two years

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?

Absolute target

C4.1a

(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

Target reference number

Abs 1

Is this a science-based target?

Yes, and this target has been approved by the Science Based Targets initiative

Target ambition

Well-below 2°C aligned

Year target was set

2021

Target coverage

Company-wide

Scope(s)

Scope 1
Scope 2
Scope 3

Scope 2 accounting method

Market-based

Scope 3 category(ies)

Category 1: Purchased goods and services
Category 10: Processing of sold products
Category 11: Use of sold products
Category 12: End-of-life treatment of sold products

Base year

2019

Base year Scope 1 emissions covered by target (metric tons CO2e)

6,081,000

Base year Scope 2 emissions covered by target (metric tons CO2e)

5,288,000

Base year Scope 3, Category 1: Purchased goods and services emissions covered by target (metric tons CO2e)

4,169,884

Base year Scope 3, Category 2: Capital goods emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 4: Upstream transportation and distribution emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 6: Business travel emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 7: Employee commuting emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 10: Processing of sold products emissions covered by target (metric tons CO2e)

244,699

Base year Scope 3, Category 11: Use of sold products emissions covered by target (metric tons CO2e)

2,302,473

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target (metric tons CO2e)

3,425,668

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 14: Franchises emissions covered by target (metric tons CO2e)

Base year Scope 3, Category 15: Investments emissions covered by target (metric tons CO2e)

Base year Scope 3, Other (upstream) emissions covered by target (metric tons CO2e)

Base year Scope 3, Other (downstream) emissions covered by target (metric tons CO2e)

Base year total Scope 3 emissions covered by target (metric tons CO2e)

10,142,724

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

21,746,724

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1

100

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2

100

Base year Scope 3, Category 1: Purchased goods and services emissions covered by target as % of total base year emissions in Scope 3, Category 1: Purchased goods and services (metric tons CO2e)

100

Base year Scope 3, Category 2: Capital goods emissions covered by target as % of total base year emissions in Scope 3, Category 2: Capital goods (metric tons CO2e)

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target as % of total base year emissions in Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

Base year Scope 3, Category 4: Upstream transportation and distribution covered by target as % of total base year emissions in Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e)

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target as % of total base year emissions in Scope 3, Category 5: Waste generated in operations (metric tons CO2e)

Base year Scope 3, Category 6: Business travel emissions covered by target as % of total base year emissions in Scope 3, Category 6: Business travel (metric tons CO2e)

Base year Scope 3, Category 7: Employee commuting covered by target as % of total base year emissions in Scope 3, Category 7: Employee commuting (metric tons CO2e)

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 8: Upstream leased assets (metric tons CO2e)

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target as % of total base year emissions in Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e)

Base year Scope 3, Category 10: Processing of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 10: Processing of sold products (metric tons CO2e)

100

Base year Scope 3, Category 11: Use of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 11: Use of sold products (metric tons CO2e)

100

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e)

100

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 13: Downstream leased assets (metric tons CO2e)

Base year Scope 3, Category 14: Franchises emissions covered by target as % of total base year emissions in Scope 3, Category 14: Franchises (metric tons CO2e)

Base year Scope 3, Category 15: Investments emissions covered by target as % of total base year emissions in Scope 3, Category 15: Investments (metric tons CO2e)

Base year Scope 3, Other (upstream) emissions covered by target as % of total base year emissions in Scope 3, Other (upstream) (metric tons CO2e)

Base year Scope 3, Other (downstream) emissions covered by target as % of total base year emissions in Scope 3, Other (downstream) (metric tons CO2e)

Base year total Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)

76.4

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

87.3

Target year

2030

Targeted reduction from base year (%)

30

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

15,222,706.8

Scope 1 emissions in reporting year covered by target (metric tons CO2e)

6,308,306

Scope 2 emissions in reporting year covered by target (metric tons CO2e)

4,705,025

Scope 3, Category 1: Purchased goods and services emissions in reporting year covered by target (metric tons CO2e)

4,003,665

Scope 3, Category 2: Capital goods emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 4: Upstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 5: Waste generated in operations emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 6: Business travel emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 7: Employee commuting emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 8: Upstream leased assets emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 9: Downstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 10: Processing of sold products emissions in reporting year covered by target (metric tons CO2e)

344,099

Scope 3, Category 11: Use of sold products emissions in reporting year covered by target (metric tons CO2e)

1,482,930

Scope 3, Category 12: End-of-life treatment of sold products emissions in reporting year covered by target (metric tons CO2e)

1,259,119

Scope 3, Category 13: Downstream leased assets emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 14: Franchises emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Category 15: Investments emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Other (upstream) emissions in reporting year covered by target (metric tons CO2e)

Scope 3, Other (downstream) emissions in reporting year covered by target (metric tons CO2e)

Total Scope 3 emissions in reporting year covered by target (metric tons CO2e)

7,089,813

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

18,103,144

Does this target cover any land-related emissions?

No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

% of target achieved relative to base year [auto-calculated]

55.8487184859

Target status in reporting year

Underway

Please explain target coverage and identify any exclusions

The scope and conditions of the environmental performance data for each site, which is the data that forms the basis of GHG emission calculations, are defined in the "AGC Group Environmental Performance Data Guidance," which is a set of rules common to the whole AGC Group. The sites that are to report environmental performance data are defined in the "AGC Group Environmental Activity Regulations". Small sites with significantly low impact assessed by the environmental impact assessment are excluded from the environmental performance data scope. The overall impact of GHG emissions from activities at such sites is less than 1%. Under these conditions, Scope 1 and Scope 2 emissions have been set as the target scope without any exclusions, and Scope 3 emissions have been included in the target scope for categories 1, 10, 11, and 12, which are categories that AGC groups are likely to influence and be influenced by at the same time. In categories 1, 10, 11, and 12, emissions outside of AGC group are not included.

Plan for achieving target, and progress made to the end of the reporting year

We are further reducing energy consumption through energy-saving measures and shifting from fossil-derived energy to non-fossil-derived energy. For the glass melting process, which already has high carbon emission efficiency, we are working on the introduction of oxygen combustion methods with higher energy efficiency, the introduction of electric boosters for melting to reduce fuel consumption, acceleration of electrification of the melting heat source, demonstration of ammonia combustion, and others.

Scope 3 GHG emission reduction targets will be achieved by focusing on the use of next-generation refrigerants and solvents with extremely low global warming potential and by strengthening supplier engagement activities.

List the emissions reduction initiatives which contributed most to achieving this target

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?

Net-zero target(s)
Other climate-related target(s)

C4.2b

(C4.2b) Provide details of any other climate-related targets, including methane reduction targets.

Target reference number
Oth 1

Year target was set
2021

Target coverage
Company-wide

Target type: absolute or intensity
Absolute

Target type: category & Metric (target numerator if reporting an intensity target)
Engagement with suppliers
Percentage of suppliers (by emissions) with a science-based target

Target denominator (intensity targets only)

Base year
2019

Figure or percentage in base year
0

Target year
2030

Figure or percentage in target year
50

Figure or percentage in reporting year

24

% of target achieved relative to base year [auto-calculated]

48

Target status in reporting year

Underway

Is this target part of an emissions target?

This target is not included in the emissions reduction target because it is a supplier participation target.

Is this target part of an overarching initiative?

Science Based Targets initiative – approved supplier engagement target

Please explain target coverage and identify any exclusions

Our goal is to encourage suppliers of raw materials/energy with 50% of Scope 3 Category 1 and 3 emissions to set GHG reduction targets in line with SBT standards.

Plan for achieving target, and progress made to the end of the reporting year

Through participation in the CDP Supply Chain Program and communication with suppliers through surveys that we ask them to fill out every year, we encourage them to set targets based on scientific evidence, especially among targeted suppliers. The results of the 2022 supplier survey showed that 35 suppliers have set GHG reduction targets, 56% of the total number of suppliers surveyed. Of these, 10 companies are SBT certified and 5 companies are considering SBT certification, which is 24% of the total number of companies surveyed.

List the actions which contributed most to achieving this target

C4.2c

(C4.2c) Provide details of your net-zero target(s).

Target reference number

NZ1

Target coverage

Company-wide

Absolute/intensity emission target(s) linked to this net-zero target

Abs1

Target year for achieving net zero

2050

Is this a science-based target?

No, but we anticipate setting one in the next two years

Please explain target coverage and identify any exclusions

We aim to achieve our own CARBON NET ZERO by 2050 for Scope 1 and 2 emissions. For both Scope 1 and Scope 2, no emission sources are excluded from this target, and the goal is to reduce emissions for the entire group.

Do you intend to neutralize any unabated emissions with permanent carbon removals at the target year?

Unsure

Planned milestones and/or near-term investments for neutralization at target year

Planned actions to mitigate emissions beyond your value chain (optional)

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.

Yes

C4.3a

(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	0	0
To be implemented*	0	0
Implementation commenced*	0	0
Implemented*	50	15,702,100
Not to be implemented	0	0

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Initiative category & Initiative type

Low-carbon energy consumption

Low-carbon electricity mix

Estimated annual CO2e savings (metric tonnes CO2e)
15,000,000

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
5,589,000,000

Investment required (unit currency – as specified in C0.4)
5,735,000,000

Payback period
4-10 years

Estimated lifetime of the initiative
11-15 years

Comment
After 2030, if carbon costs ($90/t CO2) are generated as in the IEA NZE scenario, the cost reduction would be about 5,589 (million yen/year).

Initiative category & Initiative type
Waste reduction and material circularity
Product/component/material recycling

Estimated annual CO2e savings (metric tonnes CO2e)
700,000

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
9,656,500,000

Investment required (unit currency – as specified in C0.4)
0

Payback period
No payback

Estimated lifetime of the initiative
3-5 years

Comment

Glass recycling: AGC Glass Europe recycles around 1,000,000 tonnes of cullet per year, saving about 1,150,000 tonnes of raw material and 700,000 tonnes of CO2 emissions. The average cullet ratio in our raw materials is close to 30% today, but this will be increased significantly. Recycling DeSOx waste as raw material: 4,600 tonnes of sulphates were recycled as raw material in 2022, bringing the total to around 59,500 tonnes since the start in 1999.

Local sourcing of sand. “Just good enough” sands allowed to reduce the transport needed, decrease the processing actions, reduce waste and our use of natural resources.

CALCULATION OF ANNUAL COST SAVINGS
The assumed cost savings is the cost of not reducing 700,000 t-CO2 without recycling the cullet and trading that amount.
Current carbon price under EU ETS = 89EUR/t-CO2e
1EUR = 155 yen
700,000*89*155=9,656,500,000

Initiative category & Initiative type

Low-carbon energy generation
Solar PV

Estimated annual CO2e savings (metric tonnes CO2e)

2,100

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

28,969,500

Investment required (unit currency – as specified in C0.4)

0

Payback period

<1 year

Estimated lifetime of the initiative

16-20 years

Comment

In 2022, the total green electricity production reached 28,927 MWh of recovered and self-generated energy. As a result, close to 2,100 tonnes of CO2 were saved in 2022.

CALCULATION OF ANNUAL COST SAVINGS
The assumed cost reduction was the cost of not using green electricity and not reducing 2,100 t-CO2, which would have to be traded for emission credits.
Current carbon price under EU ETS = 89EUR/t-CO2e
1EUR = 155 yen
2100*89*155=28,969,500

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Compliance with regulatory requirements/standards	As for regulations and standards related to climate change, the basic policy is to comply with climate change responses and other environmental laws and regulations applicable at each site. We have also established an environmental management system to identify the laws and regulations applicable to each site and evaluate their compliance. Should a nonconformity occur, management will report it and promptly take corrective action.
Dedicated budget for energy efficiency	The Law on the Rational Use of Energy (commonly referred to as the "Energy Conservation Act") applies to many manufacturing sites in Japan and requires that unit energy consumption be reduced by at least 1% annually. To meet these criteria, we formulate energy conservation measures every year. The Energy Conservation Law also applies grants according to the outcomes of reduction. In the architectural glass and chemicals segments, energy conservation is practiced by the entire division in order to actively utilize this system. In 2021, we established a survey system for capital investment and corresponding subsidies. In addition to initiatives in the in-house companies and SBUs, in 2022 we established and began operating AGC Group GHG Emissions Reduction System, a system for sharing grant information throughout the Group as a cross-divisional mechanism for reducing greenhouse gases. We are currently designing this system so that it can be deployed globally. For the Ministry of Economy, Trade and Industry, which oversees the subsidy system, a person in charge was assigned to the Sustainability Promotion Department. We have also decided to assign a person in charge of GHG emissions surveys to AGC China, our regional headquarters, and have begun to create a system for surveying grants in the Chugoku region.

Internal price on carbon	In our Group's European Glass business, we introduced Internal Carbon Pricing in 2005, and have been making investment decisions on large-scale capital investment projects by evaluating their profitability based on future carbon-cost. With regard to carbon pricing, which is expected to be introduced in various countries in the future, in order to reflect carbon costs in investment decisions, we designed a ICP system to be introduced throughout AGC Group in 2021. As a consequence, we have set up two types of ICP: The first is ICP for business investment, including plant construction, M&A, and capital investment to reduce greenhouse gases. Prices are 6500 (yen /t-CO2). In addition, ICP for R&D spending to reduce greenhouse gases is set higher than the above prices because it is a relatively long-term approach. In the 2021 ICP plan design phase, ICP was applied on a pilot basis in several investments. In the Chinese manufacturing capital expenditure project, we judged that we could secure profitability in the long term mainly by applying ICP for stress testing purposes. In the Taiwanese renewable energy in-house power plant investment project, NPV turned positive after examining ICP, so the investment execution was decided after considering other factors.
Partnering with governments on technology development	In the Fuel Ammonia Use and Production Technology Development project, which was commissioned by the New Energy and Industrial Technology Development Organization (NEDO), researches have succeeded in the world's first demonstration test of glass production using ammonia as fuel in an actual production furnace. This project is engaged in technology development in collaboration with Taiyo Nippon Sanso Co., Ltd., National Research Institute of Advanced Industrial Science and Technology, and Tohoku University. This time, we conducted an actual test of the ammonia combustion technology using an ammonia-oxygen burner equipped with a low NOx combustion technology developed by Taiyo Nippon Acid in a glass melting furnace for manufacturing building glass at AGC Yokohama Technical Center, and verified the effects of glass quality and on furnace materials, flame temperature, furnace temperature, and NOx emission control. In the future, this project will conduct demonstration tests under various conditions, as well as more scaled-up burner tests and demonstration tests at other sites in AGC. Through these efforts, we aim to identify the extent of the exploitation of ammonia combustion technology and fully introduce it to glass melting furnaces. In the future, we will contribute to the reduction of greenhouse gas emissions in manufacturing processes in a wide range of materials industries by considering the application of this technology not only to glass, but also to other materials such as steel and aluminum.

Internal incentives/recognition programs	AGC operates an internal award program that covers all employees and does not restrict the types of activities to a narrow scope. The award system has several layers, including offices, in-house companies, the Environmental Safety & Quality Department, and CEO, and many entries are made for operations that contribute to reducing GHG emissions in all phases of the value chain. Financial rewards are given to operations subject to the award.
Dedicated budget for low-carbon product R&D	AGC is actively developing low-carbon products. For example, in June 2023 we will begin sales of a new type of ion-exchange membrane FORBLUE™FLEMION™, which we have manufactured and sold for salt electrolytic plants that had been conducting R&D since the previous fiscal year. The newly launched FORBLUE™ and FLEMION™ F-9060 can reduce electrolysis voltage by about 40mV in salt electrolysis plants that produce caustic soda, etc., and contributes to lower electricity consumption and GHG emissions.
Employee engagement	The AGC Group conducts climate change awareness training at the corporate, business unit and site levels to increase employee knowledge and interest in climate change.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.

Level of aggregation

Group of products or services

Taxonomy used to classify product(s) or service(s) as low-carbon

Low-Carbon Investment (LCI) Registry Taxonomy

Type of product(s) or service(s)

Other

Other, please specify

Environmentally friendly next-generation low-GWP refrigerant

Description of product(s) or service(s)

AMOLEA® refrigerant series are environmentally friendly next-generation low-GWP refrigerants. It is a hydrofluoro-olefin (HFO) refrigerant with an ozone depletion potential (ODP) of zero or virtually zero and a global warming potential (GWP) of less than one,

which means it has a very low impact on the global environment. AMOLEA®1224yd is a safe (non-flammable, low toxicity) refrigerant that has been approved by the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)

Yes

Methodology used to calculate avoided emissions

Guidelines for Assessing the Contribution of Products to Avoided Greenhouse Gas Emissions (ILCA)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)

End-of-life stage

Functional unit used

GHG emissions per ton of refrigerant at disposal

Reference product/service or baseline scenario used

HFC refrigerant R-245fa

Life cycle stage(s) covered for the reference product/service or baseline scenario

End-of-life stage

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario

590.5

Explain your calculation of avoided emissions, including any assumptions

Refrigerant is used in refrigeration and air-conditioning equipment, and leaks occur when the equipment is filled with refrigerant and when the equipment is used. The amount of refrigerant remaining at the time of equipment disposal was obtained by subtracting the amount of refrigerant leaked. The amount of refrigerant recovered at the time of equipment disposal was subtracted from the amount of refrigerant remaining to be disposed of. The GHG emissions at the time of each refrigerant disposal were calculated by multiplying each GWP value by the amount of refrigerant disposed of, and the difference between the two was used to calculate the amount of reduction contribution.

The leakage rates of R-245fa and AMOLEA®1224yd were used for the refrigerants used in commercial refrigeration and air-conditioning equipment. The refrigerant recovery rate published by the Ministry of Economy, Trade and Industry*3 was used to calculate the amount of recovered refrigerant.

*1 List of Calculation Methods and Emission Factors for Greenhouse Gas Emissions Calculation, Reporting, and Publication System (Ministry of the Environment 2020.)

*2Review of Emission Factors for Refrigeration and Air-Conditioning Equipment in Use (Ministry of Economy, Trade and Industry, March 2009)

*3 Recovery rate of CFCs at the time of disposal of commercial refrigeration and air-conditioning equipment (Ministry of Economy, Trade and Industry 2020. 12.)

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year

1

C5. Emissions methodology

C5.1

(C5.1) Is this your first year of reporting emissions data to CDP?

No

C5.1a

(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

Row 1

Has there been a structural change?

No

C5.1b

(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?
Row 1	No

C5.2

(C5.2) Provide your base year and base year emissions.

Scope 1

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

6,081,000

Comment

Scope 1 emissions are calculated in accordance with the GHG Protocol.

Scope 2 (location-based)

Base year start
January 1, 2019

Base year end
December 31, 2019

Base year emissions (metric tons CO2e)
5,130,109

Comment
Location-based Scope 2 emissions calculations are consistent with the GHG Protocol. Emission factors are based on IEA published values for each country and region.

Scope 2 (market-based)

Base year start
January 1, 2019

Base year end
December 31, 2019

Base year emissions (metric tons CO2e)
5,288,000

Comment
Market-based Scope 2 emissions calculations are based on the GHG Protocol. If a specific emission factor is provided by each energy supplier, that factor is used. If an energy supplier does not provide a specific emission factor, the calculation is based on published values from IPCC, IEA, etc.

Scope 3 category 1: Purchased goods and services

Base year start
January 1, 2019

Base year end
December 31, 2019

Base year emissions (metric tons CO2e)
4,169,884

Comment
Scope 3 Category 1 calculations follow the calculation method specified by the GHG Protocol.

Scope 3 category 2: Capital goods

Base year start
January 1, 2019

Base year end
December 31, 2019

Base year emissions (metric tons CO2e)

389,455

Comment

Scope 3 Category 2 calculations follow the calculation method specified by the GHG Protocol.

Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

1,394,338

Comment

Scope 3 Category 3 calculations follow the calculation method specified by the GHG Protocol.

Scope 3 category 4: Upstream transportation and distribution

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

1,020,466

Comment

Scope 3 Category 4 calculations follow the calculation method specified by the GHG Protocol.

Scope 3 category 5: Waste generated in operations

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

56,482

Comment

Scope 3 Category 5 calculations follow the calculation method specified by the GHG Protocol.

Scope 3 category 6: Business travel

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

18,769

Comment

Scope 3 Category 6 calculations follow the calculation method specified by the GHG Protocol.

Scope 3 category 7: Employee commuting

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

21,406

Comment

Scope 3 Category 7 calculations follow the calculation method specified by the GHG Protocol.

Scope 3 category 8: Upstream leased assets

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Not Applicable

Scope 3 category 9: Downstream transportation and distribution

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Not Applicable

Scope 3 category 10: Processing of sold products

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

244,699

Comment

Scope 3 Category 10 calculations follow the calculation method specified by the GHG Protocol.

Scope 3 category 11: Use of sold products

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

2,302,473

Comment

Scope 3 Category 11 calculations follow the calculation method specified by the GHG Protocol.

Scope 3 category 12: End of life treatment of sold products

Base year start

January 1, 2019

Base year end

December 31, 2019

Base year emissions (metric tons CO2e)

3,425,668

Comment

Scope 3 Category 12 calculations follow the calculation method specified by the GHG Protocol.

Scope 3 category 13: Downstream leased assets

Base year start
January 1, 2019

Base year end
December 31, 2019

Base year emissions (metric tons CO2e)
167,009

Comment
Scope 3 Category 1 3calculations follow the calculation method specified by the GHG Protocol.

Scope 3 category 14: Franchises

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment
Not Applicable

Scope 3 category 15: Investments

Base year start
January 1, 2019

Base year end
December 31, 2019

Base year emissions (metric tons CO2e)
59,466

Comment
Scope 3 Category 15 calculations follow the calculation method specified by the GHG Protocol.

Scope 3: Other (upstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3: Other (downstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

C5.3

(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.

Act on the Rational Use of Energy
China Corporate Energy Conservation and GHG Management Programme
IEA CO2 Emissions from Fuel Combustion
IPCC Guidelines for National Greenhouse Gas Inventories, 2006
ISO 14064-1
Japan Ministry of the Environment, Law Concerning the Promotion of the Measures to Cope with Global Warming, Superseded by Revision of the Act on Promotion of Global Warming Countermeasures (2005 Amendment)
The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)
The Greenhouse Gas Protocol: Scope 2 Guidance

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)

6,308,306

Comment

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based

We are reporting a Scope 2, location-based figure

Scope 2, market-based

We are reporting a Scope 2, market-based figure

Comment

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Reporting year

Scope 2, location-based

4,830,553

Scope 2, market-based (if applicable)

4,705,025

Comment

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1, Scope 2 or Scope 3 emissions that are within your selected reporting boundary which are not included in your disclosure?

Yes

C6.4a

(C6.4a) Provide details of the sources of Scope 1, Scope 2, or Scope 3 emissions that are within your selected reporting boundary which are not included in your disclosure.

Source of excluded emissions

AGC Group Environmental Activity Rules, which are common rules for AGC Group, stipulate that the scope and conditions for reporting environmental performance data for each site, which is the basis data for calculating GHG emissions and other environment-

related performance values, also follow the definition of AGC Group Environmental Performance Data Guidance, which is a common rule for the Group. The company's internal standards include three-level assessments: the nature of the company's operations, the number of employees, and the presence or absence of substantive environmental impacts. Small sites that meet all three criteria, such as those that do not work even light tasks such as assembly or finish, are used as simple offices, have fewer than 50 employees, and are identified as having no environmental impacts. They are not included in our Scope1,2 emissions nor Category 1, Category 3, or Category 5 of Scope 3 emissions, which are based on environmental performance data and voluntarily report environmental performance data.

Scope(s) or Scope 3 category(ies)

Scope 1
Scope 2 (location-based)
Scope 2 (market-based)
Scope 3: Purchased goods and services
Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2)
Scope 3: Waste generated in operations

Relevance of Scope 1 emissions from this source

Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source

Emissions are not relevant

Relevance of market-based Scope 2 emissions from this source

Emissions are not relevant

Relevance of Scope 3 emissions from this source

Emissions are not relevant

Date of completion of acquisition or merger

Estimated percentage of total Scope 1+2 emissions this excluded source represents

0

Estimated percentage of total Scope 3 emissions this excluded source represents

0

Explain why this source is excluded

The sum of Scope1,2, and 3 emissions at small sites that do not report environmental performance data as defined above is estimated to be less than 1% of the total emissions, that means, less than 21,521t-CO2, and thus is considered to be an impact outside the materiality thresholds responded to by C5.1c.

Explain how you estimated the percentage of emissions this excluded source represents

We estimated the emissions of comparatively larger small-size sites for which reporting of environmental performance data is optional, and their Scope 1and 2 emissions were less than 50t-CO2 per year per site. Even if these all small sites emit 50t-CO2 per year, the sum would be less than 1% of our total emissions (11,013,331t-CO2 in 2022). Therefore, we determined that the emissions of these small-scale sites are not material for us.

C6.5

(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

4,003,665

Emissions calculation methodology

Average data method
Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

We gather Scope1, 2 and 3 emission data from the value chain partners associated with the production of products for AGC Group through CDP Supply Chain Program. However, we don't use these data to calculate Category 1 emissions because the quality of these data is not appropriate for third party assurance.

Capital goods

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

778,335

Emissions calculation methodology

Average data method
Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

We gather Scope1, 2 and 3 emission data from the value chain partners associated with the production of products for AGC Group through CDP Supply Chain Program. However, we don't use these data to calculate Category 2 emissions because the quality of these data is not appropriate for third party assurance.

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

1,333,735

Emissions calculation methodology

Average data method
Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

We gather Scope1, 2 and 3 emission data from the value chain partners associated with the energy generation for AGC Group through CDP Supply Chain Program. However, we don't use these data to calculate Category 3 emissions because the quality of these data is not appropriate for third party assurance.

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

953,846

Emissions calculation methodology

Average data method
Distance-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

We gather Scope1, 2 and 3 emission data from the value chain partners associated with the transportation for AGC Group through CDP Supply Chain Program. However, we don't use these data to calculate Category 4 emissions because the quality of these data is not appropriate for third party assurance.

Waste generated in operations

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

49,442

Emissions calculation methodology

Average data method
Spend-based method
Waste-type-specific method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

We gather Scope1, 2 and 3 emission data from the value chain partners associated with the waste treatment for AGC Group through CDP Supply Chain Program. However, we don't use these data to calculate Category 5 emissions because the quality of these data is not appropriate for third party assurance.

Business travel

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

53,266

Emissions calculation methodology

Average data method
Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

Transportation companies disclose emission factors by means of transportation, but we don't request these data to our value chain partners to calculate Category 6 emissions because the quality of these data is not appropriate for third party assurance.

Employee commuting

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

30,510

Emissions calculation methodology

Average data method
Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

Transportation companies disclose emission factors by means of transportation, but we don't request these data to our value chain partners to calculate Category 7 emissions because the quality of these data is not appropriate for third party assurance.

Upstream leased assets

Evaluation status

Not relevant, explanation provided

Please explain

Although the Company owns leased assets, AGC Group controls their operations and is responsible for the emissions of leased assets, and all of them are included in Scope 1 and 2 emissions. Accordingly, we have determined that this category is not relevant.

Downstream transportation and distribution

Evaluation status

Not relevant, explanation provided

Please explain

As we produce intermediate products (parts and materials), transportation of our products (by other companies) from our factories to the customers' processing plants is subject to Category 9 calculation. However, since all shipments from AGC Group are handled by the Company as specified shippers by the Japanese law, they are included in the calculation scope of Category 4 emissions under GHG Protocol. Accordingly, the Company has determined that this category is not relevant.

Processing of sold products

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

344,099

Emissions calculation methodology

Average data method
Average product method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

We do not use customer data because it is difficult to ask every customer for emissions data related to the processing of our products, and the quality of the data is not suitable for third-party verification.

Use of sold products

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

1,482,930

Emissions calculation methodology

Average data method
Average product method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

We do not use customer data because it is difficult to ask every customer for emissions data related to the processing of our products, and the quality of the data is not suitable for third-party verification.

End of life treatment of sold products

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

1,259,119

Emissions calculation methodology

Average data method
Average product method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

We do not use customer data because it is difficult to ask every customer for emissions data related to the processing of our products, and the quality of the data is not suitable for third-party verification.

Downstream leased assets

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

161,513

Emissions calculation methodology

Average data method
Lessor-specific method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

We don’t request value chain partners involved in downstream leased assets to calculate emissions for each property because the quality of these data is not appropriate for third party assurance.

Franchises

Evaluation status

Not relevant, explanation provided

Please explain

AGC has determined that this category is not relevant because it doesn’t operate franchises.

Investments

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

57,938

Emissions calculation methodology

Average data method
Site-specific method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

Based on the practicability of third-party assurance, we did not request that our affiliates report environmental performance data.

Other (upstream)

Evaluation status

Please explain

Other (downstream)

Evaluation status

Please explain

C6.7

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?

Yes

C6.7a

(C6.7a) Provide the emissions from biogenic carbon relevant to your organization in metric tons CO2.

	CO2 emissions from biogenic carbon (metric tons CO2)	Comment
Row 1	56,525	

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure

0.0000054095

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

11,013,331

Metric denominator

unit total revenue

Metric denominator: Unit total

2,035,900,000,000

Scope 2 figure used

Market-based

% change from previous year

15

Direction of change

Decreased

Reason(s) for change

Change in renewable energy consumption

Please explain

Because the consumption of fossil fuels was reduced in conjunction with the purchase of renewable energy power certificates.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	5,842,891	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	21,241	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	1,281	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	391,590	IPCC Fourth Assessment Report (AR4 - 100 year)
SF6	33,456	IPCC Fourth Assessment Report (AR4 - 100 year)
PFCs	17,847	IPCC Fourth Assessment Report (AR4 - 100 year)

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/area/region.

Country/area/region	Scope 1 emissions (metric tons CO2e)
Japan	1,304,791
China	387,364

Indonesia	1,822,213
Singapore	2,308
Republic of Korea	85,255
Taiwan, China	105,947
Thailand	326,487
Viet Nam	31,094
Belgium	515,416
Czechia	319,189
France	262,283
Germany	129,653
Hungary	1,070
Italy	120,938
Netherlands	183
Poland	436
Russian Federation	414,028
Slovakia	129
Spain	112,855
United Kingdom of Great Britain and Northern Ireland	47,435
Brazil	224,782
Canada	184
Mexico	65
United States of America	92,915
Denmark	1,029
Turkey	49
Philippines	44
Portugal	58
Austria	106

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By business division

By activity

C7.3a

(C7.3a) Break down your total gross global Scope 1 emissions by business division.

Business division	Scope 1 emissions (metric ton CO2e)
Architectural Glass Asia Pacific	656,297
Architectural Glass Europe & Americas	2,093,029
Automotive	610,448
Electronics	607,019
Chemicals including Life Science	2,315,266
Others	26,247

C7.3c

(C7.3c) Break down your total gross global Scope 1 emissions by business activity.

Activity	Scope 1 emissions (metric tons CO2e)
CO2 emissions originated from fuel combustion	4,777,467
CO2 emissions originated from processing raw materials	1,019,923
GHG generation associated with emission of methane and fluorine-based gases into the air other than CO2	465,415
Process emissions of CO2 other than above	45,501

C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4

(C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4) Break down your organization's total gross global Scope 1 emissions by sector production activity in metric tons CO2e.

	Gross Scope 1 emissions, metric tons CO2e	Comment
Chemicals production activities		

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/area/region.

Country/area/region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Japan	1,267,871	1,147,169
China	506,749	569,528
Indonesia	982,755	1,015,451
Singapore	2,540	2,540
Republic of Korea	157,202	157,122
Taiwan, China	301,070	279,592

Thailand	1,121,770	1,048,611
Viet Nam	17,775	22,633
Belgium	53,856	53,856
Czechia	118,991	116,123
France	5,634	5,634
Germany	15,630	15,630
Hungary	17,068	17,068
Italy	14,042	14,042
Morocco	28,837	28,837
Netherlands	408	408
Poland	29,270	29,270
Russian Federation	63,089	63,089
Slovakia	219	219
Spain	5,929	4,112
United Kingdom of Great Britain and Northern Ireland	5,442	5,471
Brazil	4,878	17
Canada	119	119
Mexico	5,806	6,157
United States of America	101,174	101,174
Denmark	507	507
Turkey	28	28
Philippines	90	90
Portugal	3	3
Kazakhstan	46	46
Malaysia	479	479
Austria	1,276	0

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By business division

By activity

C7.6a

(C7.6a) Break down your total gross global Scope 2 emissions by business division.

Business division	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Architectural Glass Asia Pacific	137,586	140,176
Architectural Glass Europe & Americas	204,894	200,745
Automotive Glass	747,273	752,192
Electronics	990,913	974,491
Chemicals and Life Science	2,668,688	2,548,301
Others	81,199	89,120

C7.6c

(C7.6c) Break down your total gross global Scope 2 emissions by business activity.

Activity	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Grid power consumption	4,599,498	4,473,970
Purchased steam	230,810	230,810
Hot water / Cold water	245	245

C7.7

(C7.7) Is your organization able to break down your emissions data for any of the subsidiaries included in your CDP response?

No

C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7

(C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7) Break down your organization's total gross global Scope 2 emissions by sector production activity in metric tons CO2e.

	Scope 2, location-based, metric tons CO2e	Scope 2, market-based (if applicable), metric tons CO2e	Comment
Chemicals production activities			

C-CH7.8

(C-CH7.8) Disclose the percentage of your organization's Scope 3, Category 1 emissions by purchased chemical feedstock.

Purchased feedstock	Percentage of Scope 3, Category 1 tCO2e from purchased feedstock	Explain calculation methodology

C-CH7.8a

(C-CH7.8a) Disclose sales of products that are greenhouse gases.

	Sales, metric tons	Comment
Carbon dioxide (CO2)		
Methane (CH4)		
Nitrous oxide (N2O)		
Hydrofluorocarbons (HFC)		
Perfluorocarbons (PFC)		
Sulphur hexafluoride (SF6)		
Nitrogen trifluoride (NF3)		

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Decreased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change in emissions	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	175,000	Decreased	1.5	Reduced 75,000t-CO2 consumption by switching from fossil-fuel-derived in-house power generation to system power with renewable energy certificates at operation sites in Southeast Asia. Approximately 11,400,000t-CO2 in Scope 1and 2 emissions in 2021 due to the implementation of renewable energy and

				the purchasing of renewable energy certificates. (75,000+100,000)/11,400,000=1.5%
Other emissions reduction activities	120,000	Decreased	1.1	Reduce 90,000t-CO2 by reducing fluorocarbons emissions, and reduce 30,000t-CO2 by reducing glass raw materials. Approximately 11,400,000t-CO2 in Scope 1 and 2 emissions. (90,000+30,000)/11,400,000=1.1%
Divestment	0	No change		
Acquisitions	0	No change		
Mergers	0	No change		
Change in output	0	No change		
Change in methodology	0	No change		
Change in boundary	0	No change		
Change in physical operating conditions	0	No change		
Unidentified	0	No change		
Other	31,000	Increased	0.28	31,000t-CO2 increased due to increased direct energy consumption. Approximately 11,400,000t-CO2 in Scope 1 and 2 emissions. 31,000/11,400,000=0.28%

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Market-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 20% but less than or equal to 25%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	Yes
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	Yes
Generation of electricity, heat, steam, or cooling	Yes

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	167,448	23,368,813	23,536,262
Consumption of purchased or acquired electricity		201,235	9,175,056	9,376,290
Consumption of purchased or acquired heat		0	28.4	28.4
Consumption of purchased or acquired steam		0	880,816	880,816
Consumption of purchased or acquired cooling		0	1,165	1,165

Consumption of self-generated non-fuel renewable energy		19,135		19,135
Total energy consumption		387,818	32,665,328	33,053,146

C-CH8.2a

(C-CH8.2a) Report your organization's energy consumption totals (excluding feedstocks) for chemical production activities in MWh.

Consumption of fuel (excluding feedstocks)

Heating value

MWh consumed from renewable sources inside chemical sector boundary

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

Consumption of purchased or acquired electricity

MWh consumed from renewable sources inside chemical sector boundary

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

Consumption of purchased or acquired heat

MWh consumed from renewable sources inside chemical sector boundary

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

Consumption of purchased or acquired steam

MWh consumed from renewable sources inside chemical sector boundary

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

Consumption of purchased or acquired cooling

MWh consumed from renewable sources inside chemical sector boundary

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

Consumption of self-generated non-fuel renewable energy

MWh consumed from renewable sources inside chemical sector boundary

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

Total energy consumption

MWh consumed from renewable sources inside chemical sector boundary

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	Yes
Consumption of fuel for co-generation or tri-generation	Yes

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Sustainable biomass

Heating value

HHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

Other biomass

Heating value

HHV

Total fuel MWh consumed by the organization

155,972

MWh fuel consumed for self-generation of electricity

155,972

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

Other renewable fuels (e.g. renewable hydrogen)

Heating value

HHV

Total fuel MWh consumed by the organization

11,476

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

Coal

Heating value

HHV

Total fuel MWh consumed by the organization

3,730,010

MWh fuel consumed for self-generation of electricity

3,635,555

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

Oil

Heating value

HHV

Total fuel MWh consumed by the organization

1,636,788

MWh fuel consumed for self-generation of electricity

4,621

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

Gas

Heating value

HHV

Total fuel MWh consumed by the organization

14,418,460

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

The volume of natural gas consumption.

Other non-renewable fuels (e.g. non-renewable hydrogen)

Heating value

HHV

Total fuel MWh consumed by the organization

3,583,555

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

Total fuel

Heating value

HHV

Total fuel MWh consumed by the organization

23,536,262

MWh fuel consumed for self-generation of electricity

3,796,148

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

C8.2d

(C8.2d) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	6,652,574	1,234,163	5,475,849	57,438
Heat	0	0	0	0
Steam	16,195	0	0	0
Cooling	0	0	0	0

C-CH8.2d

(C-CH8.2d) Provide details on electricity, heat, steam, and cooling your organization has generated and consumed for chemical production activities.

Electricity

Total gross generation inside chemicals sector boundary (MWh)

Generation that is consumed inside chemicals sector boundary (MWh)

Generation from renewable sources inside chemical sector boundary (MWh)

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)

Heat

Total gross generation inside chemicals sector boundary (MWh)

Generation that is consumed inside chemicals sector boundary (MWh)

Generation from renewable sources inside chemical sector boundary (MWh)

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)

Steam

Total gross generation inside chemicals sector boundary (MWh)

Generation that is consumed inside chemicals sector boundary (MWh)

Generation from renewable sources inside chemical sector boundary (MWh)

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)

Cooling

Total gross generation inside chemicals sector boundary (MWh)

Generation that is consumed inside chemicals sector boundary (MWh)

Generation from renewable sources inside chemical sector boundary (MWh)

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)

C8.2e

(C8.2e) Provide details on the electricity, heat, steam, and/or cooling amounts that were accounted for at a zero or near-zero emission factor in the market-based Scope 2 figure reported in C6.3.

Country/area of low-carbon energy consumption

Japan

Sourcing method

Retail supply contract with an electricity supplier (retail green electricity)

Energy carrier

Electricity

Low-carbon technology type

Hydropower (capacity unknown)

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

1,405

Tracking instrument used

NFC – Renewable

Country/area of origin (generation) of the low-carbon energy or energy attribute

Japan

Are you able to report the commissioning or re-powering year of the energy generation facility?

No

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

Country/area of low-carbon energy consumption

Japan

Sourcing method

Retail supply contract with an electricity supplier (retail green electricity)

Energy carrier

Electricity

Low-carbon technology type

Renewable energy mix, please specify

Not disclosed by the contracting power supplier

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

745

Tracking instrument used

NFC – Renewable

Country/area of origin (generation) of the low-carbon energy or energy attribute

Japan

Are you able to report the commissioning or re-powering year of the energy generation facility?

No

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

Country/area of low-carbon energy consumption

Spain

Sourcing method

Retail supply contract with an electricity supplier (retail green electricity)

Energy carrier

Electricity

Low-carbon technology type

Renewable energy mix, please specify

hydropower, wind

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

12,095

Tracking instrument used

NFC – Renewable

Country/area of origin (generation) of the low-carbon energy or energy attribute

Spain

Are you able to report the commissioning or re-powering year of the energy generation facility?

No

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

Country/area of low-carbon energy consumption

Brazil

Sourcing method

Retail supply contract with an electricity supplier (retail green electricity)

Energy carrier
Electricity

Low-carbon technology type
Hydropower (capacity unknown)

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
52,045

Tracking instrument used
NFC – Renewable

Country/area of origin (generation) of the low-carbon energy or energy attribute
Brazil

Are you able to report the commissioning or re-powering year of the energy generation facility?
No

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

Country/area of low-carbon energy consumption
Austria

Sourcing method
Retail supply contract with an electricity supplier (retail green electricity)

Energy carrier
Electricity

Low-carbon technology type
Renewable energy mix, please specify
hydropower, wind, Solar

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
7,345

Tracking instrument used
NFC – Renewable

Country/area of origin (generation) of the low-carbon energy or energy attribute

Austria

Are you able to report the commissioning or re-powering year of the energy generation facility?

No

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

Country/area of low-carbon energy consumption

Indonesia

Sourcing method

Unbundled procurement of energy attribute certificates (EACs)

Energy carrier

Electricity

Low-carbon technology type

Renewable energy mix, please specify

Geothermal electric power generation

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

100,000

Tracking instrument used

TIGR

Country/area of origin (generation) of the low-carbon energy or energy attribute

Indonesia

Are you able to report the commissioning or re-powering year of the energy generation facility?

No

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

Country/area of low-carbon energy consumption

Japan

Sourcing method

Retail supply contract with an electricity supplier (retail green electricity)

Energy carrier

Electricity

Low-carbon technology type

Renewable energy mix, please specify

Not disclosed by the contracting power supplier

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

27,600

Tracking instrument used

NFC – Renewable

Country/area of origin (generation) of the low-carbon energy or energy attribute

Japan

Are you able to report the commissioning or re-powering year of the energy generation facility?

No

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

Comment

C8.2g

(C8.2g) Provide a breakdown by country/area of your non-fuel energy consumption in the reporting year.

Country/area

Japan

Consumption of purchased electricity (MWh)

29,750

Consumption of self-generated electricity (MWh)

234

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

29,984

Country/area

Italy

Consumption of purchased electricity (MWh)

0

Consumption of self-generated electricity (MWh)

1,238

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

1,238

Country/area

Germany

Consumption of purchased electricity (MWh)

0

Consumption of self-generated electricity (MWh)

9,207

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

9,207

Country/area
Belgium

Consumption of purchased electricity (MWh)
0

Consumption of self-generated electricity (MWh)
7,432

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

7,432

Country/area
China

Consumption of purchased electricity (MWh)
0

Consumption of self-generated electricity (MWh)
1,024

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

1,024

Country/area
Indonesia

Consumption of purchased electricity (MWh)
100,000

Consumption of self-generated electricity (MWh)

0

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

100,000

Country/area

Austria

Consumption of purchased electricity (MWh)

7,345

Consumption of self-generated electricity (MWh)

0

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

7,345

Country/area

Spain

Consumption of purchased electricity (MWh)

12,095

Consumption of self-generated electricity (MWh)

0

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

12,095

Country/area

Brazil

Consumption of purchased electricity (MWh)

52,045

Consumption of self-generated electricity (MWh)

0

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

52,045

C-CH8.3

(C-CH8.3) Does your organization consume fuels as feedstocks for chemical production activities?

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

Description

Waste

Metric value

518,212

Metric numerator

Waste that does not include valuable resources

Metric denominator (intensity metric only)

% change from previous year

16

Direction of change

Increased

Please explain

AGC Group has set up one goal to improve the accuracy of environmental performance data reported by individual sites, and is implementing initiatives focusing on actual data other than environmental performance data, which is the basis for GHG emissions. In some cases, the data was not reported in accordance with the Environmental Performance Data, which is a common rule for AGC Group. However, the scope is aligned year by year. Accordingly, there are cases where the amount of waste generated may appear to be increasing. On the other hand, 2022 saw an increase in sales compared to 2021, that leads to an increase in production and an increase in waste.

C-CH9.3a

(C-CH9.3a) Provide details on your organization's chemical products.

C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6

(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

	Investment in low-carbon R&D	Comment
Row 1		

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement

2.独立した第三者保証報告書（英語版）.pdf

Page/ section reference
P1-4

Relevant standard
ISAE3000

Proportion of reported emissions verified (%)
100

C10.1b

(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 2 emissions and attach the relevant statements.

Scope 2 approach
Scope 2 market-based

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement

2.独立した第三者保証報告書（英語版）.pdf

Page/ section reference

P1-4

Relevant standard

ISAE3000

Proportion of reported emissions verified (%)

100

C10.1c

(C10.1c) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Scope 3 category

Scope 3: Purchased goods and services
Scope 3: Capital goods
Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2)
Scope 3: Upstream transportation and distribution
Scope 3: Waste generated in operations
Scope 3: Business travel
Scope 3: Employee commuting
Scope 3: Downstream transportation and distribution
Scope 3: Processing of sold products
Scope 3: Use of sold products
Scope 3: End-of-life treatment of sold products
Scope 3: Downstream leased assets

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

2.独立した第三者保証報告書（英語版）.pdf

Page/section reference

P1-4

Relevant standard

ISAE3000

Proportion of reported emissions verified (%)

100

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?

Yes

C10.2a

(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C6. Emissions data	Energy consumption	ISAE3000	In the process of verifying Scope 1, 2, and 3 emissions, on-site inspections are conducted at several sites to verify energy-consumption figures that serve as the basis for GHG emissions.
C6. Emissions data	Year on year change in emissions (Scope 1)	ISAE3000	In the process of verifying Scope 1, 2, and 3 emissions, on-site inspections are conducted at several sites to verify year-on-year change in Scope 1 emissions, which serve as GHG emissions base figures.
C6. Emissions data	Year on year change in emissions (Scope 2)	ISAE3000	In the process of verifying Scope 1, 2, and 3 emissions, on-site inspections are conducted at several sites to verify year-on-year changs in Scope 2 emissions, which serve as GHG emissions base figures.
C6. Emissions data	Year on year change in emissions (Scope 3)	ISAE3000	In the process of verifying Scope 1, 2, and 3 emissions, the year-on-year change in Scope 3 emissions is verified.

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

Yes

C11.1a

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.

EU ETS
France carbon tax
Japan carbon tax
Shenzhen pilot ETS

C11.1b

(C11.1b) Complete the following table for each of the emissions trading schemes you are regulated by.

EU ETS

% of Scope 1 emissions covered by the ETS

21.5

% of Scope 2 emissions covered by the ETS

0

Period start date

January 1, 2022

Period end date

December 31, 2022

Allowances allocated

1,045,261

Allowances purchased

148,000

Verified Scope 1 emissions in metric tons CO2e

1,360,002

Verified Scope 2 emissions in metric tons CO2e

0

Details of ownership

Facilities we own and operate

Comment

Electricity production is part of ETS but not in our ownership and operation boundaries (reason for which answer to "Scope 2 emissions covered by the ETS" = 0%).

Shenzhen pilot ETS

% of Scope 1 emissions covered by the ETS

0

% of Scope 2 emissions covered by the ETS
3.2

Period start date
January 1, 2021

Period end date
December 31, 2021

Allowances allocated
201,756

Allowances purchased
9,000

Verified Scope 1 emissions in metric tons CO2e
183

Verified Scope 2 emissions in metric tons CO2e
146,776

Details of ownership
Facilities we own and operate

Comment
Three of AGC Group's sites in China fall under the Shenzhen local pilot market. The requirements for companies to meet their obligations in Shenzhen are lower than in other regions, and companies with an annual emissions equivalent of 3,000 tons or more are eligible. The 2022 liquidation quotas are approximately 200,000 tons for the three sites combined, and 9,000 tons of CO2 allowances have been purchased.

C11.1c

(C11.1c) Complete the following table for each of the tax systems you are regulated by.

France carbon tax

Period start date
January 1, 2022

Period end date
December 31, 2022

% of total Scope 1 emissions covered by tax
3.1

Total cost of tax paid
208,922,700

Comment

The French carbon tax (Contribution Climat-of CCE) has been added to the domestic consumption tax on Énergie consumption (Tax intérieures sur la consommation des produits énergétiques, d'électricité é et de gaz) and has raised the total tax rate. These excise taxes are added to the final prices for gasoline, diesel, heating oil and natural gas, which will be paid by individuals and businesses. The carbon-tax system functions as a policy measure to complement EU-ETS. Carbon tax rate of 7€/tCO2

TAX CALCULATION
Emissions of Scope1GHG from energy-use in 2022 from AGC's French operations were 192,620t-CO2.
Multiply this by carbon tax rate of 7€/tCO2
1EUR=155JPY
192,620*7*155=208,922,700

Japan carbon tax

Period start date
January 1, 2022

Period end date
December 31, 2022

% of total Scope 1 emissions covered by tax
10.7

Total cost of tax paid
194,452,511

Comment
Japan has not yet introduced a carbon tax. The implementation of a carbon tax is considered to be a burden on the industrial sector in Japan, where thermal power generation is the mainstream, and was also postponed in the tax system revision in 2022. However, there is a global warming countermeasure tax (global warming tax) as an alternative to the carbon tax. This system imposes a tax burden on fossil fuels while increasing taxes in stages. The system is the same as the carbon tax, but currently the tax burden is 289 yen per tonne of CO2 emissions

TAX CALCULATION
289 Yen* 672,846t-CO2=194,452,511

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

To mitigate the impact of Japan's carbon tax and EU-ETS, we are working to reduce our Scope 1 GHG emissions. In order to reduce Scope 1 GHG emissions through production process innovation, the following reduction measures have been taken: introduction of energy-saving oxygen combustion in glass melting furnaces, introduction of electric boosters for melting to reduce fuel consumption, and acceleration of electrification of melting heat sources. Converting

the glass melting furnaces in accordance with the cold repair period is effective in terms of operation, and these technologies have been introduced to glass melting furnaces that have reached the cold repair period. The cold repair cycle for glass melting furnaces is 15 to 20 years, and this effort is being implemented over the long term, from 2019, when our own CARBON NET ZERO was set, to 2050, when the goal will be achieved.
GHG emission reduction programs implemented to date include:
We have been investigating and implementing fuel conversion from heavy oil to natural gas, introduction of oxygen combustion, and installation of electric boosters in small and medium-sized glass melting furnaces. By 2030, we plan to install electric boosters in large furnaces producing architectural and automotive glass , start demonstration tests of clean fuels such as ammonia and hydrogen, introduce/deploy those fuels, and introduce/deploy cutting-edge energy-saving technologies. In addition, towards 2050, we will introduce and deploy hybrid furnaces, expand the use of cullet, and combine multiple technologies with a focus on further electrification to achieve our GHG emission reduction targets and minimize the impact carbon pricing schemes in each country have on our business.

C11.2

(C11.2) Has your organization canceled any project-based carbon credits within the reporting year?

No

C11.3

(C11.3) Does your organization use an internal price on carbon?

Yes

C11.3a

(C11.3a) Provide details of how your organization uses an internal price on carbon.

Type of internal carbon price

Shadow price

How the price is determined

Social cost of carbon

Objective(s) for implementing this internal carbon price

Change internal behavior
Drive energy efficiency
Drive low-carbon investment
Identify and seize low-carbon opportunities
Navigate GHG regulations
Stakeholder expectations
Stress test investments
Reduce supply chain emissions

Set a carbon offset budget

Scope(s) covered

Scope 1
Scope 2

Pricing approach used – spatial variance

Uniform

Pricing approach used – temporal variance

Static

Indicate how you expect the price to change over time

Actual price(s) used – minimum (currency as specified in C0.4 per metric ton CO2e)

6,500

Actual price(s) used – maximum (currency as specified in C0.4 per metric ton CO2e)

10,000

Business decision-making processes this internal carbon price is applied to

Capital expenditure
Operations

Mandatory enforcement of this internal carbon price within these business decision-making processes

Yes, for all decision-making processes

Explain how this internal carbon price has contributed to the implementation of your organization's climate commitments and/or climate transition plan

This program has two objectives: first, to incentivize investment in capital technology and development that contributes to GHG emission reductions, and second, to manage the carbon risk of business investments.
The following items are covered by the system, and both the Management Committee and internal decisionmakers from each department are included in the scope of the system.
1. Capital investment to reduce GHG emissions: Solar power generation facilities, etc.
2. Business investment: new business locations, new production lines, M&A, etc.
3. Development of GHG reduction technology: Development of all-electric melting technology, etc.
As a result of this ICP system, AGC Group companies have decided to install solar power generation systems.

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?

Yes, our suppliers
Yes, our customers/clients
Yes, other partners in the value chain

C12.1a

(C12.1a) Provide details of your climate-related supplier engagement strategy.

Type of engagement

Information collection (understanding supplier behavior)

Details of engagement

Collect targets information at least annually from suppliers
Collect climate-related risk and opportunity information at least annually from suppliers
Collect climate transition plan information at least annually from suppliers
Collect other climate related information at least annually from suppliers

% of suppliers by number

20

% total procurement spend (direct and indirect)

80

% of supplier-related Scope 3 emissions as reported in C6.5

80

Rationale for the coverage of your engagement

Scope 3 GHG emissions of category 1 and 3, related to suppliers, account for 50.8% of the total Scope 3 emissions of the AGC Group in 2021. These emissions account for 24.8% of total GHG emissions including Scope 1 and 2. We recognize that engagement with our suppliers is essential to reducing these GHG emissions.
In response, AGC has been conducting a survey on GHG reduction measures among its suppliers since 2021. Among the suppliers associated with Scope 3 Category 1 and 3 GHG emissions in 2020, suppliers with a large proportion of GHG emissions are included in the survey. Suppliers accounting for about 55% of total Category 1 and 3 emissions and about 90% of total Category 1 emissions were included in the survey.

Impact of engagement, including measures of success

The content of the survey to which suppliers are asked to respond includes the following:
(1) As a company, do you feel the need to respond to climate change (reduce CO2 emissions)?

(2) Do you track your own CO2 emissions for SCOPE 1+2?
(3) Are there any structure to reduce CO2 emissions or related ongoing projects?
(4) Do you have a CO2 reduction target?
(5) Please provide specific examples (percentage reduction).
(6) Please provide specific examples (base year and target year)
(7) If you have measures to reduce CO2 emissions (excluding the introduction of renewable energy), please provide details.
(8) Do you track your Scope 3 emissions?
(9) Is there a calculation method of CO2 emissions for products/materials supplied to AGC?
(10) Do you have a certified SBT?
(11) If you plan to obtain a SBT certification in the future, please indicate the year in which you plan to obtain it.
(12) Have you introduced renewable energy?
(13) Do you set renewable energy targets?

We measure the success of this engagement by the rates of suppliers that have emission reduction targets, and by the rate of suppliers that have SBT targets. About 86% of the targeted suppliers responded to the survey conducted in 2022, and we found that about 71% of the responding suppliers have calculated their Scope 1 and 2 emissions (about 29% of responding suppliers have calculated Scope 3 emissions), and about 73% of them have set GHG reduction targets. In addition, approximately 16% of the responding suppliers have obtained a certified SBT.

We will continue to survey our suppliers and monitor how they are responding to climate change. As of 2020, approximately 24% of suppliers are aware of all Scope 1, 2, and 3 GHG emissions and have reduction targets, we plan to promote engagement and have this figure reach 40% by 2030. Similarly, the SBT certification rate for suppliers is currently approximately 16%, and we plan for this percentage to be increased to 30% by 2030. For this purpose, since the survey to suppliers in 2022, we have added a statement to encourage suppliers to pursue certified SBTs. Also In 2022, we conducted in-depth surveys of 27 major suppliers through the CDP supply chain program to further strengthen our engagement.

Comment

Type of engagement

Engagement & incentivization (changing supplier behavior)

Details of engagement

Run an engagement campaign to educate suppliers about climate change

% of suppliers by number

5

% total procurement spend (direct and indirect)

5

% of supplier-related Scope 3 emissions as reported in C6.5

5

Rationale for the coverage of your engagement

Our Architectural Glass Asia Pacific Company is hosting a regular briefing session on our Green Procurement Guidelines for suppliers located in Japan. In the briefing, suppliers are requested to comply with the AGC Group Basic Purchasing Policy, the AGC Group Integrated Green Procurement Guidelines, the establishment and operation of an environmental management system, supply chain management, and cooperation in second-party audits, and in regard to climate change, they are requested to actively engage in their own GHG emission control/reduction activities to prevent global warming. At the briefing, we mentioned that we may ask suppliers to conduct a LCA of their products and calculate the carbon footprint of their products as part of the life cycle and other environmental studies.

Impact of engagement, including measures of success

This supplier engagement did not include a request for mandatory LCA implementation of products, calculation of product carbon footprints, or reporting of actions taken at the supplier. However, after the Green Procurement Policy briefing for this supplier, one supplier provided LCA data, which is a relatively high level request because LCA implementation takes time and manpower, but the request for cooperation in the Green Procurement Policy briefing resulted in a higher than expected level of understanding from the supplier.

Comment

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement & Details of engagement

Collaboration & innovation

Run a campaign to encourage innovation to reduce climate change impacts

% of customers by number

100

% of customer - related Scope 3 emissions as reported in C6.5

100

Please explain the rationale for selecting this group of customers and scope of engagement

The AGC Group is committed to promoting sustainability management with the aim of continuously enhancing social and economic value. The AGC Group takes the

requirements of its customers regarding sustainability, the environment, and climate change very seriously, and is proactively working to meet these requirements, starting with activities that are feasible. The AGC Group will continue to contribute to the development of a circular economy in order to meet the diverse needs of society and customers toward the goal of “carbon neutrality through all products and corporate activities by 2050”. Specifically, the AGC Group aims to achieve our own CARBON NET ZERO in its own production processes and, by utilizing environmentally friendly products and technologies, is working together with its customers, the world's leading companies, to reduce GHG emissions in society as a whole in order to realize a sustainable society. For example, in the area of architectural glass, we are developing and supplying Low-E double-glazing glass with high heat insulation and heat shielding effects, and building component solar cell modules that incorporate solar cell functions into the glass, in order to save energy and create new energy at the same time. Refrigerants used in air conditioners are a product with a large environmental impact, but AMOLEA®, a next-generation green refrigerant developed by the AGC Group, has a global warming potential (GWP) of less than 1, which is 1/1000 of conventional products. It is attracting worldwide attention as an essential element in the prevention of global warming and is being applied to a wide range of fields from automobiles to housing.

Impact of engagement, including measures of success

In March 2022, we won the award in the "Sustainability Category" of the Excellent Appreciation Award given by Honda Motor to its business partners. The "Sustainability Category" is an award presented to suppliers that have made outstanding efforts in the area of ESG. The award was given in recognition of our past activities and medium- to long-term strategies, including the establishment of sustainability targets in all business units, the establishment of an actionable Sustainability Committee to achieve these targets, and the introduction of internal carbon pricing. Such success was beyond our initial expectations, and we feel we have exceeded our goals.

C12.1d

(C12.1d) Give details of your climate-related engagement strategy with other partners in the value chain.

AGC Asia Pacific Pte. Ltd., a subsidiary of AGC, has become a regional founding partner of the World Green Building Council's Asia Pacific Network, participating in and supporting green building-related activities in the region. The World Green Building Council (WorldGBC) catalyses the uptake of sustainable and decarbonised built environments for everyone, everywhere. We work with businesses, organisations and governments to deliver on the ambitions of the Paris Agreement and UN Global Goals for Sustainable Development. Through systems change approach, we challenge business as usual, stimulate market change and champion best practice to deliver on the 2030 decarbonisation and sustainability goals for our sector. Regional Partners support WorldGBC’s Regional Networks create activities and projects that help translate our three global programmes (Advancing Net Zero, Better Places for People, Circularity Accelerator) and global initiatives (Global Advocacy, Sustainable Finance) to a national and regional context.

C12.2

(C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?

Yes, suppliers have to meet climate-related requirements, but they are not included in our supplier contracts

C12.2a

(C12.2a) Provide details of the climate-related requirements that suppliers have to meet as part of your organization's purchasing process and the compliance mechanisms in place.

Climate-related requirement

Implementation of emissions reduction initiatives

Description of this climate related requirement

Our Architectural Glass Asia Pacific Company is hosting a regular briefing session on our Green Procurement Guidelines for our suppliers. In the briefing, suppliers are requested to comply with the AGC Group Basic Purchasing Policy, the AGC Group Integrated Green Procurement Guidelines, the establishment and operation of an environmental management system, supply chain management, and cooperation in second-party audits, and in regard to climate change, they are requested to actively engage in their own GHG emission control/reduction activities to prevent global warming. At the briefing, we mentioned that we may ask suppliers to conduct a LCA of their products and calculate the carbon footprint of their products as part of the life cycle and other environmental studies.

% suppliers by procurement spend that have to comply with this climate-related requirement

100

% suppliers by procurement spend in compliance with this climate-related requirement

100

Mechanisms for monitoring compliance with this climate-related requirement

Supplier self-assessment

Second-party verification

Response to supplier non-compliance with this climate-related requirement

Retain and engage

Climate-related requirement

Climate-related disclosure through a non-public platform

Description of this climate related requirement

The AGC Group's supplier-related Scope 3 emissions account for about 25% of our total emissions. The AGC Group recognizes that the cooperation with its suppliers is essential to the Group's GHG emissions reduction measures. To ensure smooth supplier engagement activities, the company has set the contract conditions of "accurate disclosure of information in response to surveys on environmentally hazardous substances specified by the AGC Group within a certain period of time" and "cooperation with the AGC Group's environmental activities". The supplier survey that has been conducted since FY2021 is based on these conditions, and about 86% of our suppliers that were asked to respond to the survey have done so.

% suppliers by procurement spend that have to comply with this climate-related requirement

100

% suppliers by procurement spend in compliance with this climate-related requirement

100

Mechanisms for monitoring compliance with this climate-related requirement

Certification
Supplier self-assessment
First-party verification
Second-party verification
Off-site third-party verification
On-site third-party verification
Grievance mechanism/Whistleblowing hotline
Supplier scorecard or rating
No mechanism for monitoring compliance
Other, please specify

Response to supplier non-compliance with this climate-related requirement

Suspend and engage

C12.3

(C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?

Row 1

External engagement activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

Yes, we engage directly with policy makers
Yes, our membership of/engagement with trade associations could influence policy, law, or regulation that may impact the climate
Yes, we fund organizations or individuals whose activities could influence policy, law, or regulation that may impact the climate

Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?

No, but we plan to have one in the next two years

Describe the process(es) your organization has in place to ensure that your external engagement activities are consistent with your climate commitments and/or climate transition plan

With the increase in the number of natural disasters caused by climate change, addressing climate change has become a major social issue that companies need to tackle. The AGC Group is no exception, and in 2021 it has committed itself to achieving our own CARBON NET ZERO by 2050. In addition, there is a growing need to reduce the environmental impact of our products throughout their life cycles, and we are working to make effective use of the planet's limited resources. We intend to achieve this goal and solve this problem by implementing initiatives at all phases of the value chain, and to this end, collaboration with external parties that may directly or indirectly influence policies, laws, and regulations that may affect the climate is very important. We consider it Licence to Operate to participate in and support external organizations that demonstrate a positive attitude toward climate change, and we have expressed our support for the TCFD, participated in the Japan Climate Initiative, and our emission reduction target obtained approval from SBT Initiative.

C12.3a

(C12.3a) On what policy, law, or regulation that may impact the climate has your organization been engaging directly with policy makers in the reporting year?

Specify the policy, law, or regulation on which your organization is engaging with policy makers

In the "Development of Fuel Ammonia Utilization and Production Technology" project commissioned by the New Energy and Industrial Technology Development Organization (NEDO), the world's first demonstration test of glass production using ammonia as fuel in an actual production furnace has been successfully carried out. This project is being undertaken in collaboration with TAIYO NIPPON SANSO CORPORATION, the National Institute of Advanced Industrial Science and Technology, and Tohoku University. In this study, equipment tests of ammonia combustion technology were conducted using an ammonia-oxygen burner with low NOx combustion technology developed by Taiyo Nippon Sanso at the glass melting furnace for manufacturing architectural glass at the AGC Yokohama Technical Center to verify the effects on glass quality and furnace materials, flame temperature, furnace internal temperature, and nitrogen oxide emissions. In the future, the project plans to conduct verification tests under various conditions, as well as to conduct burner tests on a larger scale and demonstration tests at other AGC sites. The aim of this project is to fully introduce ammonia combustion technology to glass melting furnaces after determining the scope of its application.

Category of policy, law, or regulation that may impact the climate

Climate change mitigation

Focus area of policy, law, or regulation that may impact the climate

Emissions – CO2

Policy, law, or regulation geographic coverage

Global

Country/area/region the policy, law, or regulation applies to

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

NEDO was established in 1980 to lead the development of new energy sources in the wake of the two oil shocks that hit the world in the '70s. Since then, as one of the largest public research and development management organizations in Japan that plays a role in economic and industrial administration, the Institute has been engaged in research, development, and demonstration activities by bringing together the knowledge of companies, universities, and public research institutions under the two missions of "solving energy and global environmental problems" and "strengthening industrial technological capabilities. NEDO's fifth medium- to long-term target period, which will begin in fiscal 2023, has three pillars: "innovation creation through R&D management," "growth support for R&D start-ups," and "enhancement/accumulation of technical intelligence that contributes to policy making and R&D management. We are working on these three pillars. Specifically, we are working on upgrading management functions through the project/manager system and further strengthening R&D management functions in order to "create innovation through R&D management". Through these efforts, we will maximize the results of our R&D activities and promote social implementation by companies and others through responding promptly to changes in circumstances caused by global innovation. In order to discover start-ups, which are new leaders of innovation and contribute to the creation of new industries, we have established an integrated support system from the seed stage to commercialization, and are implementing various support measures. In addition, we will contribute to the creation of a start-up/ecosystem through mutual collaboration with other public support organizations. In order to discover the potential seeds of innovation and introduce them to society, we are working to "strengthen/accumulate technical intelligence that contributes to policy making and R&D management". We will be the first in the world to grasp emerging innovation, and will formulate technological strategies that leverage Japan's strengths and competitive advantages, and provide policy evidence that leads to the implementation of projects through industry-academia-government collaboration. In addition, NEDO is implementing eight fund projects, including the Green Innovation Fund, to help realize policies such as stimulating industrial technology/innovation, achieving carbon neutrality, and ensuring economic security.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

Have you evaluated whether your organization's engagement on this policy, law, or regulation is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Specify the policy, law, or regulation on which your organization is engaging with policy makers

AGC Asia Pacific Pte. Ltd., a subsidiary of AGC, has become a regional founding partner of the World Green Building Council's Asia Pacific Network, participating in and supporting green building-related activities in the region.

Category of policy, law, or regulation that may impact the climate

Climate change adaptation

Focus area of policy, law, or regulation that may impact the climate

Construction and housing

Policy, law, or regulation geographic coverage

Global

Country/area/region the policy, law, or regulation applies to

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

The World Green Building Council (WorldGBC) catalyses the uptake of sustainable and decarbonised built environments for everyone, everywhere. We work with businesses, organisations and governments to deliver on the ambitions of the Paris Agreement and UN Global Goals for Sustainable Development. Through systems change approach, we challenge business as usual, stimulate market change and champion best practice to deliver on the 2030 decarbonisation and sustainability goals for our sector. Regional Partners support WorldGBC's Regional Networks create activities and projects that help translate our three global programmes (Advancing Net Zero, Better Places for People, Circularity Accelerator) and global initiatives (Global Advocacy, Sustainable Finance) to a national and regional context.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

Have you evaluated whether your organization's engagement on this policy, law, or regulation is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

C12.3b

(C12.3b) Provide details of the trade associations your organization is a member of, or engages with, which are likely to take a position on any policy, law or regulation that may impact the climate.

Trade association

Japan Business Federation (Keidanren)

Is your organization's position on climate change policy consistent with theirs?

Consistent

Has your organization attempted to influence their position in the reporting year?

Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position

In 2013, Keidanren (Japan Business Federation) formulated the "Keidanren Low Carbon Society Action Plan" (hereinafter referred to as the "Action Plan") under the four pillars the 62 participating industries have made steady efforts to reduce emissions. Pillar 1: Emission reductions from domestic business operations, Pillar 2: Strengthening cooperation with other interested groups, Pillar 3: Promoting contribution at the international level, and Pillar 4: Development of innovative technologies toward carbon neutrality by 2050. Based on these results, the Action Plan has been positioned as a pillar of industry's climate change countermeasures in the government's global warming countermeasures plan. The Japanese government set the goals of becoming carbon neutral (CN) by 2050 in October 2020 and reducing greenhouse gas emissions by 46% by FY2030 in April 2021. To realize these ambitious goals, it is essential to make concerted efforts by the public and private sectors, and it is important to link this to Japan's economic growth and create a virtuous cycle between the economy and the environment. The action plan has focused on CO2 reduction toward 2030 from the viewpoint of contributing to Japan's mid-term reduction target under the Paris Agreement. Amidst the growing interest and expectations for the realization of CN by 2050, Keidanren has newly positioned the realization of CN by 2050 as the most important goal to be achieved in the future, and has revised its action plan to "Keidanren Carbon Neutrality Action Plan", which will be strongly promoted by the organization. In addition, on May 17th 2022, the Japan Business Federation (Nippon Keidanren) made proposed the Green Transformation, and the AGC Group fully endorses its position. The report recommends that the Japanese government develop a "GX policy package" that will serve as a grand design for the GX. In particular, the report presents Nippon Keidanren's current thinking on various issues, including the active promotion of nuclear energy use including replacement/new nuclear power plants, the Green Deal, and

carbon pricing, on which current efforts are lagging behind, and press the government for prompt policy implementations. In addition, AGC endorses the "Declaration of Building Partnership" established by the "Council on Promoting Partnership Building for Cultivating the Future," whose members include the Chairman of Keidanren, the President of NISSHO, the President of RENGO, and related ministers.

Funding figure your organization provided to this trade association in the reporting year (currency as selected in C0.4)

15,000,000

Describe the aim of your organization's funding

Annual membership fee

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

Other, please specify

Sheet Glass Association

Is your organization's position on climate change policy consistent with theirs?

Consistent

Has your organization attempted to influence their position in the reporting year?

Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position

The Flat Glass Manufacturers Association of Japan is currently composed of the member companies of AGC, Nippon Sheet Glass and Central Glass Products, and its chairman is the chairman of AGC. The Flat Glass Manufacturers Association of Japan is actively promoting the dissemination and expansion of "eco-glass," which meets society's needs for energy conservation and carbon neutrality in buildings such as homes and buildings. In the future, there are great expectations for new needs for flat glass such as space development, electronics, and solar power generation. In the area of flat glass production, we are also actively addressing environmental issues while striving for fundamental energy conservation.

The Flat Glass Manufacturers Association of Japan believes that the promotion of high-performance double glazing, which the association has branded as eco-glass to promote its diffusion, in existing homes is necessary for the realization of a low-carbon society. According to the results of the LCA study, the promotion of high-performance double glazing in existing houses can be expected to reduce emissions in society by far

more than the emissions caused by the production of flat glass. The AGC Group fully supports the position of the Flat Glass Manufacturers Association and is actively promoting the spread and expansion of high-performance glass such as "Low-E double-glazing glass", which contributes to energy conservation in buildings such as residences, offices, and commercial buildings and meets social needs. In addition, we share the same position in that we are actively addressing environmental issues, such as reducing emissions in the raw fuel melting process of flat glass production. The "Flat Glass Industry Vision 2022 for Carbon Neutrality by 2050" issued by the Flat Glass Manufacturers Association of Japan in 2022 states that the industry will continue its efforts through innovation and technology establishment to achieve the goal. During 2021, we played a prominent role in the development of this vision by leading the discussion. In addition, AGC played a leading role in establishing a special committee in 2022 and driving the study to develop a standard industry response to the increasing number of inquiries from the market regarding embodied carbon in architectural glass after the government's announcement of a carbon neutrality target.

Funding figure your organization provided to this trade association in the reporting year (currency as selected in C0.4)

29,000,000

Describe the aim of your organization's funding

Annual membership fee

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

C12.3c

(C12.3c) Provide details of the funding you provided to other organizations or individuals in the reporting year whose activities could influence policy, law, or regulation that may impact the climate.

Type of organization or individual

Non-Governmental Organization (NGO) or charitable organization

State the organization or individual to which you provided funding

WWF Japan

Funding figure your organization provided to this organization or individual in the reporting year (currency as selected in C0.4)

1,000,000

Describe the aim of this funding and how it could influence policy, law or regulation that may impact the climate

WWF is currently engaged in activities aimed at reducing emissions of carbon dioxide and other substances that cause global warming and keeping the rise in global mean temperature at 1.5 degrees compared to pre-industrial levels.

Have you evaluated whether this funding is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

C12.4

(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication

In voluntary communications

Status

Complete

Attach the document

agc_report_en_2023.pdf

Page/Section reference

P34、P85-90

Content elements

Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets
Other metrics

Comment

Publication

In voluntary sustainability report

Status

Underway – previous year attached

Attach the document

agc_sus_en_2022.pdf

Page/Section reference

P28-39

Content elements

Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets
Other metrics

Comment

Publication

In mainstream reports

Status

Complete

Attach the document

rep2022_4.pdf

Page/Section reference

P17, 19, 20, 21

Content elements

Governance
Risks & opportunities

Comment

C12.5

(C12.5) Indicate the collaborative frameworks, initiatives and/or commitments related to environmental issues for which you are a signatory/member.

	Environmental collaborative framework, initiative and/or commitment	Describe your organization's role within each framework, initiative and/or commitment
Row 1	Task Force on Climate-related Financial Disclosures (TCFD) Other, please specify	・By disclosing information in line with TCFD's recommendations, we express our support for TCFD.

	Keidanren Nature Conservation Council of JCI, JBIB,	・JCI: Express our needs of renewable energy in Japan ・JBIB: Express our attitude through natural capital conservation ・Keidanren Committee on Nature Conservation

C15. Biodiversity

C15.1

(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity
Row 1	Yes, executive management-level responsibility	With the recognition by society and the economy that issues related to natural capital, including biodiversity-related issues, are important issues affecting corporate sustainability, the AGC Group recognizes that its directors have a duty to identify risks and opportunities related to natural capital and to work to mitigate and restore the damage to natural capital. The AGC Group also recognizes that directors have a duty to identify risks and opportunities related to natural capital and to work to mitigate and restore natural capital. The AGC Group recognizes that addressing issues related to natural capital, including biodiversity-related issues, is a materiality (key opportunity/risk) within the AGC Group, which promotes sustainability management and advocates "environmental considerations". Matters related to natural capital issues, including biodiversity-related issues, to be discussed and reported to the Board of Directors are deliberated by the Sustainability Committee, and the implementation standards are stipulated in the "Matters to be discussed by the Sustainability Committee and Reporting Standards for the Sustainability Committee and the Board of Directors.

C15.2

(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Biodiversity-related public commitments	Initiatives endorsed
Row 1	Yes, we have made public commitments and publicly endorsed initiatives related to biodiversity	Commitment to Net Positive Gain	SDG Other, please specify 30 by 30 alliance initiating by MOEJ, JBIB, Keidanren Council for Nature Conservation, WWF Japan, CROMA

C15.3

(C15.3) Does your organization assess the impacts and dependencies of its value chain on biodiversity?

Impacts on biodiversity

Indicate whether your organization undertakes this type of assessment

Yes

Value chain stage(s) covered

Direct operations

Tools and methods to assess impacts and/or dependencies on biodiversity

IBAT – Integrated Biodiversity Assessment Tool

TNFD – Taskforce on Nature-related Financial Disclosures

Other, please specify

日本の環境省および国土交通省が公開しているデータ

Please explain how the tools and methods are implemented and provide an indication of the associated outcome(s)

Point data were created for 103 domestic and 167 overseas sites of the AGC Group by calculating the latitude and longitude of each site based on address information. From the point data, a 10 km buffer was created as the work area, and data on protected areas (KBA, WDPA) and IUCN Red List in Japan and overseas were collected from domestic open data and IBAT.

Methods of determination:

1. identification of relevant protected areas

Extraction and organization of protected areas within a 10 km buffer: Protected areas (KBAs and WDPAs) within 10 km of the sites were extracted using GIS and organized into a list.

Preparation of location maps for each site: Maps showing the protected areas (KBAs and WDPAs) within 10 km of the site were prepared. 2.

IUCN Red List species etc.
IUCN Red List species etc. within 50 km of the site were extracted from IBAT and organized into a list. 3.
3) Star chart of protected areas and IUCN Red List species
A star chart of protected areas and IUCN Red List species, etc. organized in 1-3 was made for each business site.

Relationship with ecological reserves
AGC collects data on protected areas (KBA*1, WDPA*2) and IUCN Red List species from domestic open data and IBAT*3, AGC regularly compiles the status of protected areas within a 10-kilometer perimeter for 270 domestic and overseas sites, including not only manufacturing sites but also non-manufacturing sites. In the future, we will not only identify protected areas and species, but also evaluate the impact of our business activities.
*1 KBA: Key Biodiversity Area
*2 WDPA: World Database on Protected Areas
*IBAT: Integrated Biodiversity Assessment Tool

Dependencies on biodiversity

Indicate whether your organization undertakes this type of assessment

No, but we plan to within the next two years

C15.4

(C15.4) Does your organization have activities located in or near to biodiversity-sensitive areas in the reporting year?

Yes

C15.4a

(C15.4a) Provide details of your organization's activities in the reporting year located in or near to biodiversity -sensitive areas.

Classification of biodiversity -sensitive area

Other biodiversity sensitive area, please specify

Endangered species on the Red List of the Ministry of the Environment, Kanagawa Prefecture and other prefectures.

Country/area

Japan

Name of the biodiversity-sensitive area

AGC Yokohama Techinical Center

Proximity

Adjacent

Briefly describe your organization's activities in the reporting year located in or near to the selected area

The AGC Yokohama Technical Center site is home to wild orchids, orchids and kugenumaran, which are listed as endangered species on the Red List of Japan by the Ministry of the Environment, Kanagawa Prefecture and various prefectures. Although the waterfront area is not the original habitat of these orchids, they have become a local amenity, such as enjoying their annual blooms, and since such familiar green environments are rare in urban areas, we aim to maintain them well by weeding out invasive species with the advice of outside experts and under the guidance of our employees. We continue to maintain the environment by weeding out invasive alien species with the advice of outside experts.

Gingko orchid: Listed as an endangered species in the 2020 Red List of the Ministry of the Environment and the 2020 Red List of Kanagawa Prefecture.
Gingko orchid: Listed as Endangered I, II and Semi-Endangered on the Red Lists of 39 prefectures.
Kugenumaran: Listed as Endangered II on the 2020 Red List of the Ministry of the Environment and the 2020 Red List of Kanagawa Prefecture.

Indicate whether any of your organization's activities located in or near to the selected area could negatively affect biodiversity

Yes, but mitigation measures have been implemented

Mitigation measures implemented within the selected area

Site selection
Project design
Scheduling
Physical controls
Operational controls
Restoration

Explain how your organization's activities located in or near to the selected area could negatively affect biodiversity, how this was assessed, and describe any mitigation measures implemented

During the exterior construction of the new research building at the AGC Yokohama Technical Center, it was decided to transplant rare orchids (orchid, orchid, orchid, and orchid) because they were found to be living in the existing forest area, the target area of the construction. Since the ecology of these orchids is still largely unknown and the transplanting method is still in the research stage, we decided to transplant them to a non-altered part of the same greenbelt and a suitable habitat for orchids (a place where trees such as oak trees, which are essential for the growth of orchids, and their symbiotic fungi are expected to be distributed, a place where the same species of trees have already been transplanted, and a place where the same species of trees are already distributed), while receiving sufficient guidance from an external consultant with experience in transplanting. The same species of orchids were already growing in the vicinity of the site. For the oak trees that had to be cut down, the stumps were planted back as close as possible to their original habitat, and care was taken to maintain the

orchid habitat after the transplanting. In the altered area, native tall trees were planted, mainly Japanese oak and oak species such as sudajii and arakashi, and native grasses such as chigaya and firefly magnolia were planted at the foot of the tall trees using local seeds and seedlings for landscape purposes. As a result, in April 2022, the transplanted area bloomed about the same number of orchids as the previous year, and several times as many as the previous year, including those in the non-transplanted area. Since it takes several years to determine the success or failure of transplanting orchids, a monitoring plan has been developed and management of the plantings, including orchids, is being carried out.

C15.5

(C15.5) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity- related commitments
Row 1	Yes, we are taking actions to progress our biodiversity-related commitments	Land/water protection Land/water management Species management Education & awareness Law & policy

C15.6

(C15.6) Does your organization use biodiversity indicators to monitor performance across its activities?

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	Yes, we use indicators	State and benefit indicators Pressure indicators

C15.7

(C15.7) Have you published information about your organization's response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
In voluntary sustainability report or other voluntary communications		P45-47 1

[1]agc_sus_en_2022.pdf