Welcome to your CDP Climate Change Questionnaire 2021

C0. Introduction

C0.1

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

The NSG Group (Nippon Sheet Glass Co., Ltd. and its group companies) is the world's leading supplier of glass and glazing systems, operating in the business areas of Architectural, Automotive and Creative Technology. The Group has principal operations around the world and sales in over 100 countries, employing approximately 26,000 people.
The Architectural business manufactures and supplies architectural glass as well as glass for the solar energy and other sectors. The Automotive business serves the original equipment (OE) and aftermarket replacement (AGR) glazing markets. Creative Technology comprises several discrete businesses, including lenses and light guides for printers and scanners, and speciality glass fiber products such as glass cord for timing belts and glass flake.
The Group offers various solutions based on its proprietary online coating technology, such as glass for thin-film solar panels, building integrated photovoltaic (BIPV), electrochromic windows and thermochromic glass, as well as low emission (low e) and vacuum glass. These products support the increasing and evolving requirements of society for more energy efficient and smarter buildings including zero emission buildings and houses (ZEB and & ZEH). In the automotive industry, heated windshield and low e glass is expected to enhance energy saving of vehicles. Glass cord used in car engine timing belts, which can replace metal chains, also contributes to vehicles' weight reduction and energy saving. Not only are the products used to reduce energy consumption, but also to generate energy.
The Group conducts its business in accordance with the NSG Group Sustainability policy. The NSG Group considers that glass has a unique role to play in society's attempt to reduce greenhouse gas emissions and mitigate the effects of climate change. The Group promotes more usage of glass to reduce the energy consumption of society, including that of buildings, vehicles, facilities and equipment, as well as to generate or conserve energy.
At the same time, glass production remains energy intensive and emits a significant amount of greenhouse gas. In order to maximize the net benefit to sustainable development, it is critical for the Group to minimize the emissions from its manufacturing processes, in addition to making environmental contributions through its products.
The Group's initiative to lower greenhouse gas emissions from its manufacturing processes includes a wide range of activities such as; development of low carbon fossil fuel technologies;

converting the existing electricity supply contracts to certified renewable sources, and on-site self generation, including the installation of solar panels at Group sites. The Group is also conducting research to reduce greenhouse gas emission from glass furnaces such as the usage of waste heat recovery systems, the identification of alternative fuel technologies and process optimization. As part of these initiatives the Group's SBT initiative targets were approved in October 2019.
Through these activities, the Group aims to reduce its environmental impacts, balancing the need of all its stakeholders.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date	Indicate if you are providing emissions data for past reporting years
Reporting year	January 1, 2020	December 31, 2020	No

C0.3

(C0.3) Select the countries/areas for which you will be supplying data.

Argentina
Austria
Belgium
Brazil
Canada
Chile
China
Finland
Germany
India
Italy
Japan
Malaysia
Mexico
Norway
Poland
Spain
Sweden
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

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(s)	Please explain
Chief Executive Officer (CEO)	The CEO, who is also a member of the Board of Directors (BOD), is responsible for oversight of Sustainability issues including climate-related issues from determination of targets, aligning them with business strategies to reviewing its progress. Sustainability is embedded in the NSG Group from supporting initiatives to utilize glass in order to reduce the energy consumption or to generate or conserve energy, to minimizing GHG emission, ensuring that in obtaining the raw materials natural habitats and biodiversity are preserved or enhanced. The Board of directors establish the Group's basic policies and goals including climate-related policies and targets. Climate-related issues are mainly discussed at the Management Committee (MC) and Sustainability Committee (SC) based on these policies and targets. The CEO chairs both Committees. They discuss the strategies and action plans to fulfill the sustainability goals as well as risk and opportunities, review their progress and report/propose to the Board. The Board of Directors monitors and reviews the sustainability targets, strategies and action plans to connect them to business aspects as well as associated risks and opportunities, oversee progress and provide instructions. An expert in the ESG field continued as a director in 2020, with active guidance given at board meetings and many other opportunities. The Group risk management policies including climate-related risks are discussed

	at Strategic Risk Committee, which the CEO chairs and report to MC and the Board of Directors via the Audit Committee. Chief Risk Officer ("CRO") is also appointed from among the Executive Officers. In CY2020, in addition to the regular agenda, the BOD also monitored and decided the following climate actions: 1) Mid-term ESG and climate strategy At a CY20 board meeting, a new ESG strategy was proposed in line with the formulation of the next mid-term management plan. MC discussed the strategies and actions to achieve both corporate growth and social contribution. The CEO approved the strategy outline and reported it to the board. The BOD reviewed the plan and will monitor its progress. The MTP including new ESG strategy was suspended and revised due to COVID-19. Discussions progressed from the second half of CY20 and into CY21. The new medium term management plan, Revival Plan 24, was formulated and announced in May 21.

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 strategy Reviewing and guiding major plans of action Reviewing and guiding risk management policies Reviewing and guiding business plans Monitoring implementation and performance of objectives Overseeing major capital expenditures, acquisitions and divestitures Monitoring and overseeing progress against goals and	Addressing climate-related issues is considered by the Group as a material matter. Especially; CO2 emission reduction, reduction of waste and expanding sales of environmental contribution products. These are regarded to be critical action items by the Group. The Board of directors establish the Group's basic policies and goals including climate-related policies and goals. The Management Committee (MC) and Sustainability Committee (SC) discuss the strategies and action plans to fulfil the policies and goals and the board monitors and reviews the progress. Examples from this reporting year include as below; 1) Setting the targets concerning climate-related issues and monitoring implementation of action plans. The Group engaged with the SBT in 2018 and decided on a CO2 emission reduction target. Based on this, the Global Sustainability Director provided a report and the Board of Directors conducted a review of the Group's GHG reduction trend and progress towards its compliance with SBT.

	targets for addressing climate-related issues	In 2019, the CO2 reduction target and the acquisition of certification by the SBT initiative was deliberated in the SC, decided by the CEO and subsequently approved by the Board of Directors in August 2019. In addition, the Board of Directors reviews, monitors and supervises regularly the long-term GHG reduction target, measures to achieve this target including technology development plan, prospect of delivery and required investment including capex and human resources. 2) Medium- to long-term strategy (inclusive of challenges associated with climate change). At the board meeting in the first half of CY20, the CEO raised and Chief Corporate Planning Officer (CCPO) explained the medium- to long-term strategy concerning the climate-related issues as a key part of the ESG strategy. The discussion covered both risks and opportunities for stakeholders. The main themes, targets and KPIs were determined. Next MTP including new ESG strategy was suspended and revised due to COVID-19. Discussions progressed from the second half of CY2020 to the first half of CY2021, and the new medium-term management plan, Revival Plan 24, was formulated and announced in May 2021. The progress of them are reviewed and overseen by the CEO (overall management) and COO (responsible for products, operation and other business areas), who are the members of the Board of Directors and monitored by the Board of Directors as regular agenda. 3) Risk management policies The Group risk management policies including climate-related risks are discussed in the Enterprise Risk Management process at the Strategic Risk Committee, which the CEO chairs and report to MC and the Board of Directors via the Audit Committee. Chief Risk Officer (CRO) is also appointed from among the Executive Officers. Sustainability Committee takes specific responsibility to monitor and steer the Group's response to Environmental and Climate Change risks and opportunities and these activities are reported to the Board.

C1.2

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

Name of the position(s) and/or committee(s)	Responsibility	Frequency of reporting to the board on climate-related issues
Chief Executive Officer (CEO)	Both assessing and managing climate-related risks and opportunities	Half-yearly

C1.2a

(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored (do not include the names of individuals).

In the Group, climate issues are monitored by the Management Committee (MC) and Sustainability Committee (SC).
The MC is constituted and established in order to enable the CEO to efficiently and adequately fulfil the basic policies and goals established by the Board of Directors as the Executive Officer having ultimate and overall responsibilities. At the SC the concrete actions for the sustainability policies and goals are managed and discussed. The principal purposes of the SC are to act as advisory body for the CEO to review the strategy, to coordinate all sustainability activities in the NSG Group and to ensure effective communication of these matters with our stakeholders. Both Committees are chaired by the CEO and attended by the COO & Vice-president, the CFO & Vice-president, Heads of the Strategic Business Units (SBU) and global leaders of the major support departments including Sustainability, Procurement, Ethics and Compliance, Legal, R&D, Engineering, Corporate Planning, HR and Finance.
In the reporting period, the global leaders of each functions reported the updates on sustainability targets and the CEO approved the material items described as follows.
1） SBT initiatives
The Group participated in SBT in 2018. In the reporting period, the CO2 reduction target was examined, and the CEO approved the target. The Group’s target was certificated by SBT initiative in October 2019.
Considering mitigation of the risks associated with climate change brings business opportunities compatible with environmental contribution, the Group set forth a CO2 emission reduction target and at the same time, the CEO externally announced that the Group would pursue the following initiatives:
- Converting the energy source in the glass manufacturing process from heavy oil to natural gas
- Implementation of CO2 reduction measures in the glass manufacturing process
- Supplying energy saving/generating glass, e.g. vacuum glass, solar energy glass, etc., to reduce CO2 emission
Subsequently, a roadmap for reducing CO2 emission was laid out and action plans were discussed to deliver these initiatives. These activities are carried out under guidance from the

COO in R&D, Engineering, Procurement and other corresponding departments respectively and their progress is monitored and reviewed by SC.
2) Definition of environmental contribution products
For the purpose of raising awareness of environmental contribution products inside of the Group, their definition is reviewed from the standpoint of the UN SDGs. The medium-term numerical targets were presented to each SBU to expand the sales of environmental contribution products. The progress of this activity is to be monitored. This target is currently suspended due to the impact of COVID-19 and to be revised when its impact on our business is identified.
3) Installation of internal carbon pricing
A proposal was made and approved by the CEO to introduce the internal carbon pricing system to enhance awareness of carbon pricing across SBUs and support departments and to incorporate CO2 emission into the evaluation criteria of a large-scale project of the Group. Based on this decision, the environmental impact of all large investments will be managed. In addition, the implementation of these is carried out with the confirmation of all MC members and the approval of the CEO.
4) ESG strategy
The new ESG strategy integrated within the new medium-term management plan, Revival Plan 24, was formulated and announced in May 2021. In this ESG strategy, risks and opportunities involved in various ESG items including challenges associated with climate change were evaluated. Both addressing environmental problems through GHG emission reduction and the sales expansion of environmental contribution products were taken up as one of major challenges for the Group. In the SC, under this ESG strategy, each SBU presented issues to be dealt with and a concrete action plan with appointed owners was approved by the CEO.

Regarding budget policy and strategy, each SBU and function gives presentation and the CEO gives an approval.

Activities in each SBU are managed by the COO. In 2020, the Global Sustainability Director gave a monthly briefing on sustainability issues to the COO while reporting annual schedule update and additional discussion on specific agenda in MC. Such agenda included an update concerning SBT research and the related action plan, feedback on internal carbon pricing discussion, and the need for additional resources to address climate change issues including CO2 emission reduction projects.
In addition, the COO chairs a committee that oversees energy & carbon management activities across the Group operations. This committee also consists of representatives from each group function (major support departments) and SBU heads. The output from this committee feeds into the higher-level committees (e.g. SC).
Among others, CO2 impact of large-scale CAPEX projects are proposed to MC and approved by the CEO.

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	Type of incentive	Activity inventivized	Comment
Chief Procurement Officer (CPO)	Monetary reward	Energy reduction project Energy reduction target	CPO has a personal objective to continue to extend the energy management programme in line with the agreed plans. This objective is linked to performance related pay.

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	2	The Group considers short term to be the financial reporting year. Short term operational objectives and financial budgets are defined to deliver a published forecast. Risks and opportunities to the budgets are identified and assessed.
Medium-term	2	4	The Group considers medium term to be 2-4 years. This is the timescale for the published NSG Group Medium Term Revival Plan (RP24), which sets out the Group's short term business strategy, capital investment plans and key performance targets/indicators. The Group Strategic Risk Committee assesses the risks and opportunities in relation to both the RP period and the longer horizon beyond, in order to implement and monitor effective treatment.

Long-term	4	15	Financial investment business cases consider a maximum of 10-15 years. The furnace life is 15 years.

C2.1b

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

On a regular basis, the NSG Group Strategic Risk Committee formally defines its risk appetite and risk tolerance thresholds, based on the financial strength of the Group, and its strategic and operational objectives.

Quantitative impact measurement criteria are defined for each of five levels from very low to critical, across four vectors - Financial/Operational/Compliance/Reputation. Compliance impact includes EHS.

- Financial impact criteria range from "very low" - less than 1.2 Oku (JPY 120,000,000) to "critical" - greater than 40 Oku (4,000,000,000)
- Operational impact criteria range from "very low" less than two day outage or 1% of annual production to "critical" - outage greater than 6 months or 10% of annual production
- Compliance EHS impact criteria range from "very low" slight injury or slight and temporary environmental effect to "critical" - catastrophic safety or environmental incident with multiple fatalities or long term environmental impact
- Reputation impact criteria range from "very low" - localised and short-lived to "critical" - international and long-term.

Likelihood measurement criteria are defined for each of five levels from highly likely (annual) to highly unlikely (one in a hundred years).

The various permutations of impact and likelihood are mapped to define the thresholds for risks that are (a) within appetite (b) beyond appetite but within tolerance; and (c) beyond tolerance.

When a specific threat or opportunity event is assessed, it is measured against each of the impact and likelihood scales to plot its assessed position vs the appetite and tolerance thresholds. Events which are beyond appetite can be defined as having a substantive financial or strategic impact, and therefore require a treatment strategy/plan.

The minimum impact thresholds, beyond which events are outside **the Group** appetite and tolerance, are currently defined as 1.2 Oku (JPY 120,000,000) and 10 Oku (JPY 1,000,000,000) respectively.

Overall strategic impact is assessed using the capital planning and investment appraisal process, which is overseen by the Investment and Capital Committee (ICC). Following a formal stage and gate process, the financial impact of strategic investment opportunities is assessed against cash generation and return on capital employed minimum targets.

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

More than once a year

Time horizon(s) covered

Short-term
Medium-term
Long-term

Description of process

NSG Group employs a two-tiered risk management framework comprising the Strategic Risk Committee (SRC) and the Enterprise Risk Management Team (ERMT), both of which are under the supervision of the Management Committee, and ultimately the Board. The framework is designed with reference to ISO31000.
The SRC's members are mostly executive officers. One of the executive officers is appointed Chief Risk Officer (CRO).
The SRC is chaired by the CRO and composed of the CEO, CFO and CRO, the Heads of each Group Function, and the Heads of each Strategic Business Unit. The Group Sustainability Director is a member of the SRC.
The SRC determines the company-wide risk management framework, and periodically reviews strategies, policies and procedures concerning risk management throughout the Group. Based on this framework, the SRC classifies the high-level risks as those assessed as having a substantive impact on the Group as whole, or those that should be ordinarily managed by SBUs or Group functions.
The SRC then monitors how those risks are being addressed and directs that additional treatment measures be taken if required. For high-level risks, the SRC appoints "risk owners" to manage the reporting of risk information and the progress of countermeasures.
The CRO is secretary for all SRC meetings and, as representative of the committee, periodically reports to and receives feedback from the Management Committee and the Audit Committee regarding the effectiveness of the Group's basic internal control system and risk management structure. In each of FY2020 and FY2021, the SRC convened three meetings and reported once each to the Management Committee and

the Audit Committee.
The ERM Team is chaired by the CFO and its members include SBU general managers and heads of functions including accounting, finance, and operational risk. Every year this team identifies, assesses, and prioritizes risks pertaining to business execution and endeavors to improve the effectiveness of risk management by formulating necessary measures to mitigate risks.
As noted at question C2.1 above, the impact and likelihood of the risks and opportunities identified are assessed against a standard framework of risk appetite, including financial, reputational, compliance and operational continuity measures. This enables risks and opportunities to be numerically quantified and, where assessments are beyond the defined appetite, target assessments and remediation actions can be defined.
The approach adopted by the SRC includes activities to mitigate climate impact / risk and opportunities. NSG climate related risks and opportunities focus on 1) operational cost savings for our energy intensive industry (energy reduction and carbon legislation compliance), 2) increasing profitability through the sale of value added products that will allow customers to mitigate now /adapt in future to climate change and 3) resilience to physical damage/ production loss caused by climate-induced changes in weather patterns. All SBU business reviews address these climate related risks.
In addition to the SRC and ERMT, the Group has established a number of operational forums which also play key role in the integrated risk management process. These include the Risk Engineering Board (REB), the Sustainability Committee, the Investment and Capital Committee (ICC) and the Energy Committee. The REB reviews mitigation and adaptation programs, in association with the Group's insurers, in relation to existing and proposed operations. The insurer-provided independent risk engineering audit process assesses and scores each asset risk. The risk and recommendation database is reviewed quarterly at the REB and the highest scored risks are assigned priority action. The risk mitigation programs include business continuity planning in response to adverse or unusual weather conditions.
Strategic opportunities, including those related to Climate Change, are identified through the strategic planning processes operated by each SBU and by the Group as a whole. A formal capital and business case "stage/gate" approval process is then followed, overseen by the ICC, which includes detailed quantification, analysis and management of the opportunity. Following the formal stage and gate process, the financial impact of strategic investment opportunities is assessed against cash generation and return on capital employed minimum targets.
Energy risk is monitored and managed through processes overseen by the Energy Committee. These processes include the planning of energy consumption and the hedging of energy costs through the placement of forward contracts. The risk of increasing energy costs is also managed through SBU operational cost control projects.
The Sustainability Committee takes specific responsibility to monitor and steer the Group's response to Environmental and Climate Change risks and opportunities. Climate-related risks and opportunities are then managed and monitored at many levels within the Group e.g. Energy procurement category meetings; SBU Board meetings; Risk Engineering Board, Energy Committee. Significant risks are reported to the SRC and Management Committee as necessary. The process has allowed us to capitalize on

opportunities and include the future development of innovation energy saving and generating products in our Medium Term Plan.

Transition case study - The Board have recognized the opportunities associated with manufacturing glass for PV panels and invested in new plants in USA and Vietnam with a min 15 y life. Alternative furnace fuel sources are also being considered and a hydrogen firing initiative is being piloted in the UK. This reduces the risk of losing this significant opportunity.

Physical case study – River flood defences have been built around Sandomierz, to prevent a repeat of the flood that occurred several years ago. Similarly, during the investment planning process, the location for the new solar glass plant in Luckey Ohio was assessed for flood risk, using FEMA Flood Zone Designations.

the ERMT manages a "bottom up" assessment of the risks and opportunities that relate to the achievement of the budget. The period of assessment includes the financial year and the process is operated through a network of risk champions. Each SBU Region identifies and assesses the key risks and opportunities including the cause and effect, the current impact and likelihood and the strength of mitigations and controls. For risks beyond appetite, target assessments and action plans are added. The resulting risk registers are approved by the SBU heads and monitored through ongoing business management processes. The approved registers are reviewed and consolidated by the ERMT and, at least annually, a formal review is held with each SBU Head. The SBU risk registers include significant transition and physical climate related risks including emissions pricing, product substitution, flood and windstorm.

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	Regulatory environmental risks are included in the Strategic Risk Committee and all levels below. EHS functions manage regional environmental legislation. EU and UK carbon tax legislation poses a significant financial risk to the Group as Carbon prices have risen significantly in the last year. Energy Efficiency Directive and Energy Performance Building Directive provide an opportunity to sell more value added solar control products in renovated buildings and helping them to adapt to climate change risks.

Emerging regulation	Relevant, always included	Emerging regulation is reviewed by the SBUs and EHS functions who attend Trade Associations, eg Glass For Europe and Glass Alliance Europe have been closely involved in consultations of future EUETS Phase 4 (2021-2030) Glass For Europe has also been active in consultation on the EPBD in Architectural, EUETS Phase 4 and other potential national carbon taxes The recently introduced European Green Deal and Fit For 55 package to meet demanding EU CO2 reduction targets will make significant changes to multiple pieces of European energy and tax legislation. There will be opportunities presented by the requirement to renovate, insulate and adapt buildings in the Energy Efficiency Directive as increased targets are made mandatory. The new EUETS for buildings will drive the need to renovate with value added solar control products. The new EUETS for vehicles will drive the need for low emitting vehicles. Both of these will help society to adapt to new climate change risks. Changes to European (and UK) Emissions Trading System EUETS (UK ETS) will increase the cost of EU (UK) allowances and reduce the allocation of free allowances. Future changes to the Energy Tax Directive must be closely monitored.
Technology	Relevant, always included	Our business strategy aims to adapt innovative products to meet future legislative requirements eg electric vehicles, low energy buildings, photovoltaic panels
Legal	Relevant, always included	Legal requirements are considered by SBUs and fed up the management chain according to the risk rating.
Market	Relevant, always included	Non regulatory customer requirements are reviewed by SBUs and gaps are discussed at the six monthly Sustainability Committee. eg requirements for LEED and BREEAM sustainable building certification, requests for carbon emission data and requirements for reductions, increased recycled content. Customers are interested in the CDP climate change questionnaire , recycled content and the setting of a SBT, helping to meet their scope 3 emission reduction targets. help with vehicle electrification strategy and decarbonisation of buildings.
Reputation	Relevant, always included	Reputation is included in the Group risk severity calculation. This could be affected if our sites fail to meet regulatory requirements or we fail to meet our customer's voluntary requests.

Acute physical	Relevant, always included	Acute physical risks, e.g. from flood and typhoon are assessed by NSG's insurers and are reported to the Risk Engineering Board. The strategic and bottom up risks assessments conducted by the SRC and ERMT also include these weather-related natural catastrophe risks.
Chronic physical	Relevant, always included	Major asset loss and plant location risk is assessed by the Group's insurers and are reported to the Risk Engineering Board. Increasing global temperatures is an opportunity for NSG to increase sales of glass that will keep automotive and architectural customers cool.

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

Emerging regulation

Carbon pricing mechanisms

Primary potential financial impact

Increased direct costs

Company-specific description

Regulatory risk considers the cost of environmental compliance. eg This includes the current European Emission Trading System (EUETS) carbon costs and the potential for other countries to introduce carbon taxes in order to meet their National Determined Contributions resulting from the Paris Agreement and COP26

Time horizon

Short-term

Likelihood

Virtually certain

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

1,464,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Group environmental compliance risk management is classified as a strategic risk. EUETS compliance costs are included within this total Phase 3 CY18 = 2.6M Euro Phase 4 predicted costs = 12M euros per year if carbon costs 60 Euro /tonne. Used an exchange rate of 122Y per Euro to report above (122 * 12M euro = 1,464,000,000 Yen)

Cost of response to risk

300,000,000

Description of response and explanation of cost calculation

To mitigate this risk, we operate with a continuous programme of energy efficiency improvement projects to ensure that our businesses run as energy efficiently as possible. eg waste heat recovery, low carbon electrical generation capacity, process sub-metering. We have invested in energy saving technologies at multiple sites including working in partnership with 3rd party suppliers. The ISO50001 Energy Management Standard has been introduced across all EUETS member operations in Germany and Italy. NSG is increasing recycled content where the level of contamination is acceptable. This reduces the amount of energy required to melt the glass and also minimises the emission of process CO2 due to decomposition of the carbonate raw materials. In the longer term, we will continue with these energy saving initiatives and EUETS allowances will be purchased if these measures are insufficient.

Comment

Operational cost saving activities are reducing money spent on energy.

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Upstream

Risk type & Primary climate-related risk driver

Market

Increased cost of raw materials

Primary potential financial impact

Increased direct costs

Company-specific description

49 billion Yen annually spent on energy is currently at risk of price fluctuations.
Raw materials with high embodied carbon (eg sodium carbonate) could also be at risk.

Time horizon

Medium-term

Likelihood

Virtually certain

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

3,660,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

30 M Euro impact expected due to the cost of rising energy costs (fossil fuel and electricity)
30M * 122 = 3.66 billion Yen

Cost of response to risk

1,000,000,000

Description of response and explanation of cost calculation

To mitigate this risk, energy hedging where applicable. Energy efficiency projects. Longer term contracts. On site electricity generation.

Comment

1M US Dollars Human resource costs of management. Financial hedging costs. Legal costs for each energy contract.

Identifier

Risk 3

Where in the value chain does the risk driver occur?

Downstream

Risk type & Primary climate-related risk driver

Reputation

Shifts in consumer preferences

Primary potential financial impact

Decreased revenues due to reduced demand for products and services

Company-specific description

Consumers are choosing to buy energy saving / energy generating products. NSG Group will suffer if we don't innovate and produce value added energy saving products. Customers are also asking us to set Science Based Targets. This requirement has caused the Group to consider R&D investments that will overcome technical barriers and consider how to decarbonise glass making by 2050.

Time horizon

Short-term

Likelihood

Very likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

100,000,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Medium Term Revival Plan (RP24) aims to increase sale of value added products from 1/3 to 1/2.
Value added products include products that save or generate energy.
Calculation of estimated impact based on revenue loss associated with reduced demand of products, so not achieving the RP24 ambition of increased VA contribution
122Y/Euro *0.8 Bn euro = 100 billion yen

Cost of response to risk

10,000,000,000

Description of response and explanation of cost calculation

The risk has been mitigated by the following actions: A new strategic role of Climate Change Director was created to lead the initiatives needed to reduce climate change impact in 2018 and continued during 2020. Expansion of the Climate Change with the additional role of climate change technical manager created and filled.
RP24 continues the previous MTP2 strategy requires a shift to value added products Setting SBT helps to meet customer requirement. This will require new furnace designs, investigation of Carbon capture techniques and increased cullet recycling.

Comment

Identifier

Risk 4

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Acute physical
Increased severity and frequency of extreme weather events such as cyclones and floods

Primary potential financial impact

Increased insurance claims liability

Company-specific description

In recent years NSG has suffered windstorm and flood losses in Asia, Europe and North America. eg Windstorm triggered asset losses occurred in Chiba Japan during 2019.
NSG Group has invested in flood defences to minimise risk and reduce insurance premiums.
Major asset loss is considered to be a critical strategic risk for NSG Group and is discussed at the Strategic Risk Committee
Insurance cover is limited in high risk areas and the business is subject to some uninsured losses.

Time horizon

Short-term

Likelihood

Very likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
1,220,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure
10 M Euro cost of insurance premiums.
Non determined uninsured losses
10MEero * 122Yen = 1.22 billion Yen

Cost of response to risk
1,000,000,000

Description of response and explanation of cost calculation
This risk is mitigated via the Business Continuity Management process

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?
Direct operations

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

Decision to invest 40 billion Yen in 2 new furnaces in Vietnam and North America to supply glass for the increasing solar energy market in 2019, with start up of operations in 2020 and 2021.
Investment of @20 billion to expand operations in Argentina for supply of high performance glazing products to start production in 2022.

Time horizon

Short-term

Likelihood

Very likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

30,000,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Assume 30 billion Yen revenue from investment in 2 float plants started in 2020/21.

Cost to realize opportunity

60,000,000,000

Strategy to realize opportunity and explanation of cost calculation

RP24 plan to increase revenue by increasing the sale of value added products
Investing in plants to manufacture glass for solar panels and other high performance glazing products

Comment

Identifier

Opp2

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Energy source

Primary climate-related opportunity driver

Use of lower-emission sources of energy

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

Reputational benefits if NSG can help customers meet their scope 3 targets by reducing our scope 1 and 2 emissions.
Reduced exposure to future fossil fuel price increases.
Have continued to utilise low carbon electricity source in Germany, UK, Italy, Spain in 2020. Expanded the use of renewable electricity in other operations, e.g. Argentina, Chile, Poland, Japan in 2020.
Continued to investigate the energy efficiency and wider decarbonisation actions necessary to meet SBTs

Time horizon

Medium-term

Likelihood

Virtually certain

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

30,000,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

4 million tonnes glass x Current EU ETS carbon price at @ €60 / tonne = €240M
240MEuro *122 = 30 billion Yen
Ability to reduce costs with longer term contracts

Cost to realize opportunity

400,000,000

Strategy to realize opportunity and explanation of cost calculation

Increase number of low carbon electricity contracts around the globe.
Construction of a UK solar PV generation facility.

Comment

Based on 2% assumed premium for future renewable REGOs
Pay a premium for wind PPA.

Identifier

Opp3

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Resource efficiency

Primary climate-related opportunity driver

Use of more efficient production and distribution processes

Primary potential financial impact

Reduced direct costs

Company-specific description

We could reduce production/energy cost by improving energy efficiency in glass manufacturing processes by applying new technology/equipment. This will be needed to achieve a science based target

Time horizon

Long-term

Likelihood

Very likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

2,350,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Based on a 21% reduction in operational carbon (SBT) and estimated long term cost of carbon emission of €10/tonne (e.g. carbon offset cost) and reduction of EU ETS allowance cost (@€60/tonne CO2) 321kt purchased EU and UK ETS allowances * 60Euro /tonne * 122 Y/Euro = 2.35 billion Yen

Cost to realize opportunity

10,000,000,000

Strategy to realize opportunity and explanation of cost calculation

Appoint a new Climate Change Technical Manager to support and lead multiple carbon reduction initiatives.

Set up a Carbon 2050 R&D project to investigate potential technologies to achieve SBT. eg carbon capture technologies, use of increased cullet, furnace technology step changes.

Comment

Estimated cost of meeting science based target requirements.

C3. Business Strategy

C3.1

(C3.1) Have climate-related risks and opportunities influenced your organization's strategy and/or financial planning?

Yes, and we have developed a low-carbon transition plan

C3.1a

(C3.1a) Is your organization's low-carbon transition plan a scheduled resolution item at Annual General Meetings (AGMs)?

	Is your low-carbon transition plan a scheduled resolution item at AGMs?	Comment
Row 1	No, and we do not intend it to become a scheduled resolution item within the next two years	In 2021 the AGM included an overview of the NSG 2050 net zero ambition and associated strategy to achieve this ambition. It is anticipated that this information will become a standard item at future AGM but not as a scheduled resolution item within the next two years.

C3.2

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

Yes, qualitative and quantitative

C3.2a

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

Climate-related scenarios and models applied	Details
2DS	Methodology - Science Based Targets initiative Sector Decarbonisation Approach to setting Science Based Targets Boundary – whole NSG Group Time horizon up to 2050 Inputs – Scope 1, 2 and 3 baseline emissions Assumptions – Assume grid will be fully decarbonised by 2050 (if not earlier) Analytical methods - Used SBT Sector Decarbonisation Approach Excel tool (v8.0) to calculate emission reductions required Changes from reference scenario. Also considered; 2025, 2030, 2035, 2040 and 2050 Changes to organisation's strategy or business model, examples include; Development of 5 step decarbonisation road-map for NSG Group to deliver 2050 net zero carbon vision. Continued revision of renewable electricity procurement strategy to support achievement of defined SBT within the short, mid and long term, with defined internal targets for business units to achieve as proportion of electricity purchased from certified renewable sourced. Use of the shadow internal carbon price for all capex projects that result in carbon reductions Commitment to improve energy & carbon efficiency of all major operations from design changes associated with repair projects (e.g. glass furnace cold repairs) Existing R&D decarbonisation framework project has been split into multiple individual projects to ensure resource commitment at an appropriate level and greater visibility of key decarbonisation project activities.

	How results have directly influenced business objectives and strategy, examples include; Collaboration within NW England industrial cluster for Hydrogen deployment. This involves NSG being an industrial partner to undertake large scale Hydrogen firing trials on a glass manufacturing furnace. Cullet management team developing solutions for how cullet can be used as an NSG resource instead of a recycled material. Initial results from renewable electricity procurement pilot has confirmed required approach to wider roll-out and implementation of procurement renewable electricity strategy. Key decarbonisation technical projects have been prioritised using a RACI assessment allowing an increased focus of resources on projects with highest impact to delivering NSG Group targets. Continued discussions with various providers of CCS solutions to establish viability of technology application to the glass industry processes. Key solution providers identified and collaborations with government, academia and private companies continue to be investigated Monitoring procedures implemented, examples include; Environmental reporting software utilised with the capability of tracking energy efficiency projects with optimal ROI. Project database disseminated across all sites within the Group utilising various communication methods and direct support from central manufacturing excellence teams to individual sites to ensure successful implementation of key projects identified. Various data tracking templates utilised to measure success of specific project activities implemented, for example carbon savings associated with improved compressed air management solutions. How are results and outcomes used and reported? Examples include; Scenario analysis and resulting NSG decarbonisation strategy was presented to the management committee in September 2020 to facilitate internal approval of actions required to support delivery of SBT. Updates of performance to date and action plans for decarbonisation presented to Sustainability and Operations Management committees on a minimum quarterly basis to ensure continued commitment and refinement of action plan & broader strategy for decarbonisation approval.
2DS	NSG contributed significantly to the development of both the UK's Decarbonisation and energy efficiency roadmap action plan and the EU flat glass industry decarbonisation strategy. Both publications present a blueprint of practical measures which industry and government can take to towards the progressive net decarbonisation of the glass industry. The UK action plan is the culmination of the government’s Decarbonisation and

	energy efficiency roadmap 2050 project – a three-year programme of fact-finding and collaboration with seven energy-intensive industries See https://www.britglass.org.uk/news-comment/uk-glass-industry-decarbonisation-action-plan-published https://www.britglass.org.uk/news-comment/british-glass-publish-industry-wide-net-zero-strategy Multiple potential pathways describe requirements that lead to a the UK meeting its legally binding target of an 80% cut in CO2 emissions by 2050 (against the 1990 baseline). The implementation of these actions forms the basis of the NSG Group activities towards decarbonisation. It includes actions that are industry specific but also cross cutting actions that can be applicable across multiple industries. One key aspect is the opportunity to establish benefits of circular aspects of effective carbon management with multiple sector engagement. A specific example of this is the development of the use of hydrogen as an alternative to conventional fossil fuel within the NW England industrial cluster. NSG is active within this project (Hynet) as an industrial partner for utilisation of hydrogen within high temperature manufacturing processes.

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	NSG Group, following best practice defined within the TCFD framework, has continued to further refine during 2020 a KPI to measure the revenue associated with sales of climate impact related products over the mid and long term horizon. This has resulted in some key asset investment strategic decisions in this area. Specifically, the construction of two new float glass manufacturing operations dedicated to the production of products for the photovoltaic generation market. These new production facilities come on stream in 2020 and 2021. An additional example of the commitment of all NSG employees to recognise the impact they can have on society via the products & services the company offers is the continued utilisation of the 'Our Vision, My Action' program during 2020. Launched in 2019, this program

		encouraged all employees to think about how our Mission, Aspiration and Core Values might guide our actions and asked everyone to write down the individual action they will take on a piece of paper and post it on a dedicated website that can be accessed by colleagues around the world. This included the need to reduce embodied carbon and increase recycled content. The NSG Management Committee members launched the activity by posting their individual actions on this site. In the spirit of one of the Core Values "Ensure efforts to serve society," NSG Group donated one US dollar against each employee submission of My Action to The Climate Group, an international non-profit organization active in climate and energy initiatives.
Supply chain and/or value chain	Yes	Increasing engagement during 2020 with several suppliers of key, high carbon impact raw materials. This greater collaboration with the supply chain is a conscious effort to establish win-win scenarios through sharing aspects such as: low carbon technologies, development of products to reduce emissions associated with our manufacturing processes, etc. Customers will receive products with lower embodied carbon. This will help to reduce their scope 3 emissions to achieve their own carbon targets and commitments and enhance our reputation. This scope 3 activity has focused on the highest impact raw materials within the NSG supply chain and has led to a greater understanding of the activities being undertaken within the supply chain for scope 1 & 2 reduction. This is a short term horizon action repeated biannually.
Investment in R&D	Yes	Continuing development of energy generating and energy efficient products. Includes mid to long term strategic development product strategy with key partners in both the supply and customer chain to improve performance of products in use as well as reducing embodied carbon of products manufactured. One specific example includes the continuous development and new product launch during 2019/20 of a product to improve photovoltaic generation efficiency and extend product lifetime and performance to achieve the highest industrial performance standard to date. Mid to long term development in furnace technology to identify potential pathways to significant step changes in embodied carbon content of the flat glass process. More than 5 discrete project activities have been undertaken with significant budget commitment in capex, opex and resource support to these activities. This investment is an essential

		aspect of the NSG decarbonisation pathway to meet the 2030 SBT target and lay the foundation for delivery of the 2050 net zero vision.
Operations	Yes	Continued focus on Carbon and energy efficiency activities during 2020 has supported the achievement of targets within the final year of the current medium term plan. Key points from this short to medium term activity will be extended, with the establishment of actions for the next medium term strategy of NSG Group (RP24). As carbon and energy cost contributes to ~10% of operational spend, energy savings will mitigate the risk of current increasing energy prices and future carbon costs. For example, the current impact of legislation within Europe (EU ETS) and Japan has increased the profile of CO2 cost within those regions. This CO2 cost contributed to the establishment of the Internal Carbon price which is used as an indication of the potential cost of CO2 taxes globally. Assuming a $50/tonne ICP and ~3Mt CO2 (scope 1), results in a indicative cost impact of $150M. Additional legislation impact is also resulting in a change in operational philosophy at certain sites across the Group. This activity focuses on the level of energy intensity by energy type, resulting in additional costs/savings depending on local energy mix. Monitoring of the impact of this local legislation, driven primarily by national government commitments to climate change protocols requires some dedicated resource effort to ensure a positive impact where possible. Other specific activities during 2020 included further development and application of a world class manufacturing framework to include carbon and energy management activities. Production sites self assess their status within this framework which supports the development and implementation of projects to improve efficiency to a best in class level. The impact of Covid19 during 2020 was also closely monitored at operational level in terms of energy and carbon management. This included establishing a dedicated management team to monitor impacts, develop actions to mitigate impact, disseminate these practices across all Group operations and review the impact of these measures (standard PDCA approach). The focus of this activity was to ensure any reduction in facility utilisation was matched by appropriate reductions in energy consumption and carbon emission. The management team reviewed the site performance on a monthly basis while encouraging sites to

		react immediately to any unexpected deviation in performance.

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 Capital expenditures Capital allocation Access to capital	Further adoption of the TCFD framework during 2020 has reinforced the clear link between future revenue opportunity from climate change related products manufactured by NSG. The increased sale of these climate related, Value Added (VA) products has positively contributed to the Medium Term Plan Phase 2 target achievement during the period 2015 - 2020. The recognition of the positive impact from these products has resulted in the mid to long term strategic decision of capital allocation and investment into two new float operation lines to specifically produce products dedicated to the Photovoltaic market. The plan includes investing a total of approximately 38 billion yen in the expansion of production capacity of online TCO (transparent conductive oxide) coated glass to support the growing solar market. The investment will fund the upgrade and restart of a currently dormant float line in Vietnam and the construction of a new glass production facility in the United States during 2019 - 2021 years. The expanded global production capacity for TCO glass is expected to accelerate a shift in the company's product portfolio towards VA (value-added) products while supporting a long-term supply agreement with First Solar, the world's leading provider of comprehensive photovoltaic (PV) solar systems. Global solar demand is expected to see a double-digit increase every year in the next three years and First Solar is expanding its production capacity for Series 6, the latest thin film module system with higher efficiency and energy yield. Manufactured with the online coating technology, in which a conductive oxide on the glass surface is formed during its passage through the float line, NSG Group's TCO glass is very durable with a wide range of applications. With the expanded supply capability for VA products, such as solar glass and other products, NSG Group intends to drive its growth strategy while supporting the increased use of renewable energy. The access to capital is reinforced by such investments in sustainable technology growth areas. As well as the significant investment into new

		production facilities, capital has continued to be spent in order to purchase energy efficient equipment. Much of this has been in conjunction with energy supplier partnerships. Activity within TCFD framework adoption also highlights the impact of operational energy costs. This continues to emphasise the need to support the ongoing activities to improve energy & carbon impact as a result of the multiple energy efficiency initiatives. Numerous examples of project activities have been implemented during the year, which in some cases are reinforced by the application of the Group Internal Carbon Price. The application of the ICP is now established as a key component of the financial planning activity, managed by the Group finance teams, within any project business case that leads to a significant impact on carbon emission.

C3.4a

(C3.4a) Provide any additional information on how climate-related risks and opportunities have influenced your strategy and financial planning (optional).

i) how business objectives and strategy have been influenced by climate-related issues;
NSG Group's published mission is 'To be the global leader in innovative high-performance glass and glazing solutions, contributing to the conservation and generation of energy, working safely and ethically'
NSG Group's Guiding Principles include 'staying ahead by constantly developing advanced technologies, innovative products and applications' and 'Exploiting synergies and eliminating waste, to ensure competitiveness'
The NSG Group Medium term Plan ("MTP") Phase 2 is based on the Long term Strategic Vision of "Transform into a VA Glass Company". Spanning the three year period from FY2018 through FY2020, Key activities are to "achieve financial sustainability" and "start the transformation into a VA Glass Company." With a variety of VA (Value added) products, NSG Group is well positioned to help mitigate the impact of climate change while improving safety and comfort in our living spaces. Glass manufacturing is inherently energy intensive, so energy efficiency of NSG's operations and their impact on the climate is a fundamental part of our business.

ii). Is business strategy is linked to an emissions or energy reduction target?
Energy is >10% of operational spend so reduction is a key part of Group strategy. Scope 1&2 emissions are reported from all sites to the Sustainability and Energy Committees which develop and monitor progress on Group energy and CO2 reduction targets. 2015-2020 reduction strategy is 1% intensity CO2 reduction / t of equivalent product. In 2019 the Group committed to a verified Science Based Target, covering all activities within NSG Group associated with Scope 1 and Scope 2 emissions. The SBT is a 21% reduction in absolute CO2 (e) emissions vs a 2018 baseline year. This commitment is a clear statement of the ambition and recognition of the impact that the Groups operations have. As a result of the SBT commitment, activities been reviewed and a new roadmap developed to deliver the target of

2030, but also beyond the 2030 timeline. There is some consideration ongoing around longer term targets and how these will link with various stakeholder expectations.
In addition, there is an increased focus in the opportunity that climate change brings to the Group with the enhancement of strategy around product development to benefit customers & broader society. As previously stated, this is one key aspect of the NSG Group vision and there are numerous examples within the CDP response of how this opportunity focus is shifting the manufacturing footprint of the Group.

iii). Most substantial business decisions made during the reporting year that have been influenced by the climate change driven aspects of the strategy
The Group has communicated its medium and long term plans to focus business on increasing the proportion of sales of innovative and technically advanced value added products and services. This substantial decision includes making products that meet expanding market needs for energy saving products in buildings and vehicles. (eg photovoltaic glazing, energy saving glazing for hot and cold climates, efficient engine glass timing belts, battery separators for stop/start car systems and lightweight glazing to help the car technology evolution)
NSG has restructured the business to improve the capacity utilisation of furnaces; maximising their efficiency and reducing carbon emissions.
Procurement is continuing to switch from heavy fuel oil to natural gas on our most energy intensive float glass operations to improve emissions quality and reduce embodied carbon.
Procurement decisions have been made to pay a premium for low carbon electricity in Europe. and other regions.
The implementation of a SBT led to the development of various R&D projects to identify the barriers to achieving the required CO2 reductions.
The NSG Group engagement with First Solar Inc (a major U.S. company in solar energy systems), is contributing significantly to the Group's future growth, including the construction of two new solar glass production facilities in the United States and Vietnam.

iv). Aspects of climate change that have influenced the strategy
Global concerns over climate change are driving legislation which influences NSG's operational costs and product offerings. Climate change presents both a risk and an opportunity:
Manufacturing costs increase as energy tax and carbon emission legislation increases.
However, increasing legislation and market awareness is helping to enhance NSG's income from value added business with products helping end users adapt to climate change through their use. R&D are developing next gen technologies to meet ever more stringent environmental performance specifications that will allow society to prevent and adapt to climate change.

v). How the short-term strategy has been influenced by climate change.
The MTP 2 covers the three-year period from FY2018 to FY2020. It recognises climate change mitigation and adaptation needs and highlights increasing sales volumes coming from green market sectors; assigning capital expenditure to support capacity expansion in these sectors. In 2020 we continued cost saving initiatives to reduce exposure to rising energy costs, meet Group internal energy efficiency targets and reduce our carbon emissions. The output from the original Carbon 2050 R&D project identified technological barriers to meet the SBT

requirements. Subsequently several project activities have continued to increase visibility of activities and ensure adequate resources are allocated.

vi). How the long-term strategy has been influenced by climate change;
NSG's Strategic Vision defines the direction to 2030, the risks and opportunities associated with mitigating and helping end users adapt to climate change remaining a core focus: Market analyses help to understand changing customer expectations that are increasingly influenced by climate change, e.g electric vehicle usage. Work with trade associations to engage governments and develop energy efficient product legislation for new technology e.g vacuum insulating glazing. Progress R&D road map for the technologies required to meet the environmental challenges up to 2050, these include themes for buildings, photovoltaics, lighting and vehicles.

vii). How this is gaining a strategic advantage over our competitors;
Energy efficient product legislation has introduced technical barriers to NSG's existing and developing markets. We are pushing governments to legislate further and remove the least energy efficient products from the market. NSG's internal initiative is driving product improvement programmes to maintain our competitive advantage.

viii. How the Paris Agreement has influenced the business strategy
The process of transition planning and the risk of future Intended Nationally Determined Contributions (INDCs) has encouraged the Group to set a Science Based Target.

C4. Targets and performance

C4.1

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

Both absolute and intensity targets

C4.1a

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

Target reference number

Abs 1

Year target was set

2019

Target coverage

Company-wide

Scope(s) (or Scope 3 category)

Scope 1+2 (location-based)

Base year

2018

Covered emissions in base year (metric tons CO2e)

4,152,897

Covered emissions in base year as % of total base year emissions in selected Scope(s) (or Scope 3 category)

100

Target year

2030

Targeted reduction from base year (%)

21

Covered emissions in target year (metric tons CO2e) [auto-calculated]

3,280,788.63

Covered emissions in reporting year (metric tons CO2e)

3,544,895

% of target achieved [auto-calculated]

69.7163358265

Target status in reporting year

Underway

Is this a science-based target?

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

Target ambition

2°C aligned

Please explain (including target coverage)

The Science Based Target proposal was submitted to the SBTi in August 2019 and confirmed as verified in October 2019. Nippon Sheet Glass Co., Ltd.'s target for scope 1 and 2 emissions is a reduction of absolute emissions 21% by 2030 from a 2018 base year, which exceeds the minimum ambition for 2°C pathway defined by the absolute contraction approach and is therefore considered ambitious.
Nippon Sheet Glass's base year scope 3 emissions are not more than 40% of its total emissions. Therefore, Nippon Sheet Glass is not required to set a scope 3 target.
2019 was an exceptional year across NSG Group operations for emissions associated with the Covid19 pandemic. As a result of the pandemic, utilisation across the operational base was restricted according to customer demand. The impact for absolute carbon emission from this reduced level of utilisation is reflected in the lower level of absolute emissions reported. Activities for decarbonisation across the operations continued during the year according to the defined roadmap. However, it is

important to recognise that the emission reduction reported above is associated with a combination of decarbonisation activities and reduced operational utlisation.

C4.1b

(C4.1b) Provide details of your emissions intensity target(s) and progress made against those target(s).

Target reference number
Int 1

Year target was set
2015

Target coverage
Company-wide

Scope(s) (or Scope 3 category)
Scope 1+2 (location-based)

Intensity metric
Metric tons CO2e per metric ton of product

Base year
2014

Intensity figure in base year (metric tons CO2e per unit of activity)
0.78

% of total base year emissions in selected Scope(s) (or Scope 3 category) covered by this intensity figure
70

Target year
2020

Targeted reduction from base year (%)
6

Intensity figure in target year (metric tons CO2e per unit of activity) [auto-calculated]
0.7332

% change anticipated in absolute Scope 1+2 emissions
-4

% change anticipated in absolute Scope 3 emissions
0

Intensity figure in reporting year (metric tons CO2e per unit of activity)

0.78

% of target achieved [auto-calculated]

0

Target status in reporting year

Revised

Is this a science-based target?

No, but we are reporting another target that is science-based

Target ambition

Please explain (including target coverage)

Baseline 2014 0.78 tonnes CO2e per tonne of equivalent product. Target 0.73
2015 0.77 1.5% improvement
2016 0.76 1.5% improvement
2017 0.75 1.4% improvement
2018 0.73 2.1% improvement
2019 0.74 1.4% deterioration
2020 0.78 4.6% deterioration

Overall performance of 6% target was achieved by end of 2018. Continued deterioration in performance during 2020 associated with the significant impact of deteriorating market conditions associated with Covid-19 pandemic and associated reduction in utilisation of the group operations. While an active program of carbon management was in place to minimise the impact of this reduced utilisation, a significant quantity of the carbon emission is independent of production utilisation, i.e. 'fixed' rather than variable. Subsequently absolute emissions decreased significantly while indexed emissions (associated with product output) deteriorated. Without the successful proactive management of energy & carbon during this low utilisation period, the indexed performance would have been significantly worse.

SBT verified in October 2019 which will require modification to intensity target from 2021 onwards. These two targets (SBT & revised intensity target) have become an integral part of the new revival strategic plan of NSG Group announced in May 2021.

C4.2

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

Target(s) to increase low-carbon energy consumption or production
Other climate-related target(s)

C4.2a

(C4.2a) Provide details of your target(s) to increase low-carbon energy consumption or production.

Target reference number
Low 1

Year target was set
2018

Target coverage
Company-wide

Target type: absolute or intensity
Absolute

Target type: energy carrier
Electricity

Target type: activity
Consumption

Target type: energy source
Renewable energy source(s) only

Metric (target numerator if reporting an intensity target)
Percentage

Target denominator (intensity targets only)

Base year
2018

Figure or percentage in base year
18

Target year
2024

Figure or percentage in target year
50

Figure or percentage in reporting year
25

% of target achieved [auto-calculated]
21.875

Target status in reporting year

Underway

Is this target part of an emissions target?

This target is part of the verified SBTi and will support the absolute reduction in scope 2 CO2 emissions. The target has been integrated into the new medium term revival plan (RP24) of NSG Group strategic activity to support the development of renewable electrical generation capacity and responsible sourcing and consumption of energy aligned with SDG #12 and #13

Is this target part of an overarching initiative?

Science-based targets initiative

Please explain (including target coverage)

The target will cover all NSG Group activities Scope 2 market based purchases of electrical energy. The target is aligned with the NSG Group SBT verified in October 2019.

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

2015

Target coverage

Company-wide

Target type: absolute or intensity

Absolute

Target type: category & Metric (target numerator if reporting an intensity target)

Waste management
metric tons of waste diverted from landfill

Target denominator (intensity targets only)

Base year

2014

Figure or percentage in base year

30,000

Target year

2020

Figure or percentage in target year

18,000

Figure or percentage in reporting year

18,414

% of target achieved [auto-calculated]

96.55

Target status in reporting year

Underway

Is this target part of an emissions target?

The target is not specifically part of the NSG SBT for GHG emission reduction. However, it is related to the broader sustainability activities within NSG Group and is one of the Group sustainability targets within the medium term plan (MTP) of NSG Group.

The recognition of the impact landfill waste can have on GHG emissions was recognised by the Group at the establishment of this target in 2015. The target has been achieved ahead of the target year and consequently the target is currently under review to ensure continued progress is achieved.

Is this target part of an overarching initiative?

Other, please specify

Reduction in waste to landfill to contribute towards reduction in methane emissions to atmosphere associated with landfill waste

Please explain (including target coverage)

The target covers 100% of NSG Group operations. It is aimed at reducing waste to landfill from NSG operational activities. It is closely aligned with the UN SDG #12 Responsible consumption and production and UN SDG #13 climate action. Reduction in the generation of waste and the redirection of waste previously destined for landfill are two of the key activities within this target scope. As a result of this activity, 40% of the waste previously destined for landfill (~12k tonnes) has been avoided in 2019. This will lead to a reduction in methane emission to atmosphere associated with this waste avoidance.

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	23	2,745
To be implemented*	170	20,300
Implementation commenced*	137	16,353
Implemented*	74	101,251
Not to be implemented	12	4,565

C4.3b

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

Initiative category & Initiative type

Energy efficiency in production processes
Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)

10,793

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

190,000,000

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

9,000,000

Payback period

<1 year

Estimated lifetime of the initiative

11-15 years

Comment

Aligned with SDG #12 responsible consumption and production and SDG #13 climate action, 190M Yen savings delivered by 22 furnace operational efficiency projects. Activities included improved efficiency of furnace design, increasing quantities of recycled material content (waste glass)

Initiative category & Initiative type

Energy efficiency in buildings
Heating, Ventilation and Air Conditioning (HVAC)

Estimated annual CO2e savings (metric tonnes CO2e)

2,200

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

115,000,000

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

290,000,000

Payback period

1-3 years

Estimated lifetime of the initiative

11-15 years

Comment

Several Lighting (LED) & HVAC project initiatives during CY20 including replacement/upgrade of equipment and optimisation of settings.

Initiative category & Initiative type

Energy efficiency in production processes
Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)

6,507

Scope(s)

Scope 2 (location-based)
Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

175,000,000

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

520,000,000

Payback period

1-3 years

Estimated lifetime of the initiative

11-15 years

Comment

44 process related projects related to electrical systems energy efficiency across the process by installing improved data management systems and increasing operational awareness. In addition, the further integration of improved efficiency motors, drives and transformer solutions.

Initiative category & Initiative type

Low-carbon energy consumption
Low-carbon electricity mix

Estimated annual CO2e savings (metric tonnes CO2e)

81,751

Scope(s)

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

0

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

0

Payback period

<1 year

Estimated lifetime of the initiative

3-5 years

Comment

Several project initiatives regarding the purchase of renewable electricity from certified renewable sources, including PPA contract structures and on site renewable generation projects. Countries where projects were implemented included Poland, Japan, Argentina, Chile and USA.

C4.3c

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

Method	Comment
Compliance with regulatory requirements/standards	Continued implementation of ISO50001 in Germany, Italy and Finland to minimise energy taxes. Need to reduce EUETS Carbon allowance purchases
Dedicated budget for energy efficiency	Pilot projects to demonstrate what is possible following capital expenditure. Dissemination of these key projects widely across the Group site as capex / payback criteria are met.
Dedicated budget for low-carbon product R&D	Revival Plan (RP24) includes a focus on value added products including energy saving glass. Development of these products continues to be a fundamental focus of R&D activities across all SBU's of NSG Group. A number of R&D projects were launched as individual activities with dedicated management resources to identify low carbon furnace technology options during the reporting year in support of delivery of longer terms SBT objectives. Investment decisions continued to be supported by dedicated ICP of $50/tonne CO2 to be applied to all capital projects >100000000 investment.
Dedicated budget for other emissions reduction activities	Funding to support the continued development and implementation of low carbon solutions that can be applied to the glass manufacturing process. Technology typically proven via energy pilot program or from experience of implementing similar technologies in other energy intensive industries. Often can involve collaboration with ESCO partners, but not in all cases.
Employee engagement	Employee energy awareness training has taken place each year from 2016. In the reporting year this included several remotely delivered (as a consequence of the Covid19 pandemic) training courses involving representatives from across the spectrum of Global operations. In addition, the continued development of existing energy champions across other Group operations progressed. Training and awareness also delivered to numerous representatives of key central functions such as engineering, R&D, procurement, IR, HR, etc.
Partnering with governments on technology development	Continued contribution to British Glass and Glass Alliance Europe Decarbonisation Roadmaps, working with UK and other EU governments in developing a route to low carbon glass making by 2050. The BG roadmap was published at the end of 2018 and has continued to be developed during the reporting year, with NSG employees chairing the working Group for decarbonisation. Glass for Europe published the initial draft for the EU flat glass industry decarbonisation

	pathway in 2019, which has been actively discussed during the reporting year and revised with a new net zero ambition pathway (published in July 2021) NSG also actively participating with national and local government authorities in several countries to support the development of national deployment of low carbon technologies. This includes participation as the industrial partner for application of several low carbon technologies in the glass industry, e.g. Hydrogen as an alternative fuel (Hynet project)

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products or that enable a third party to avoid GHG emissions.

Level of aggregation

Group of products

Description of product/Group of products

Automotive glazing products

Are these low-carbon product(s) or do they enable avoided emissions?

Avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify

See comment below

% revenue from low carbon product(s) in the reporting year

10

Comment

Studies have shown that reducing a standard vehicle's thermal load by 5% reduces energy consumption of the air con unit by 10%. Given that solar control glass can contribute to reducing inside cabin temperatures by more than 10%, it has the potential to improve overall fuel consumption efficiency by 2% and up to 4% in some cases (Source: B. Taxis-Reischl & Fa. Behr - Energieverbrauch Klimaanlagen und Wege zur Verbrauchsreduzierung - 1997.) This represents scope 1 savings in petrol and diesel

cars and scope 2 savings in electric vehicles.
Annual estimation example: if an average diesel car emits 168 gCO2e / km (https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020)
a 2% fuel efficiency saving represents a CO2e saving of 3.36 g/km. If a driver travels 15,000km / year, this is an annual saving of 50,4 kg CO2e per car. This type of small saving is not suited originating CERs or ERUs within the CDM or JI framework.

Level of aggregation

Group of products

Description of product/Group of products

ARCHITECTURAL SOLAR CONTROL GLAZING

Are these low-carbon product(s) or do they enable avoided emissions?

Avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify

see comment below

% revenue from low carbon product(s) in the reporting year

10

Comment

NSG manufactures solar control glass that helps minimise the amount of air-conditioning required in a building. Energy savings from installation of solar control glass by far outweigh the energy consumed in manufacturing the glass. The potential for solar control glass to cut CO2 emissions from buildings has been analysed by the Dutch scientific institute TNO. "Impact of Solar Control Glazing on energy and CO2 savings in Europe" (TNO Report 2007-D-R0576/B by TNO Built Environment and Geosciences, Delft, The Netherlands). It found the following: Greater use of solar control glass in residential and non-residential buildings in the EU could save between 15 and 85 million tonnes of CO2 annually by 2020 if installed optimally. This could help building occupants to reduce scope 2 emissions and reduce electricity required for air conditioning. Large glazed areas increase natural night and also reduce electricity usage for lighting (scope 2 reduction). The calculation of the potential benefit of solar control glass in the 27 EU Member States took various key factors into account. Direct or extrapolated data were used for local climatic conditions; the mix of energy sources in use and the nature of the building stock (categorised by, for example, age, construction materials, whether residential or not, air-conditioned or not). This type of small project is not suited originating CERs or ERUs within the CDM or JI framework.

Level of aggregation

Group of products

Description of product/Group of products

ARCHITECTURAL LOW EMISSIVITY GLAZING

Are these low-carbon product(s) or do they enable avoided emissions?

Avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify

See comment below

% revenue from low carbon product(s) in the reporting year

10

Comment

A low emissivity (low E) glass coating reflects heat back into the building, thereby reducing the heat loss through the window. It reduces heating energy and reduces scope 1 emissions for gas heating and scope 2 emissions for electric heating. The potential for Low-E insulating glazing to cut CO2 emissions from buildings has been analysed in a study by the Dutch scientific institute TNO. The study concludes that as much as 97 million tonnes of CO2 emissions could be avoided annually by the year 2020 if Low-E insulating glass was used optimally in new and old buildings throughout Europe (ie. all existing and new, residential and non-residential buildings). The potential energy saving per year could be as much as 912,000 TJ by the year 2020 leading to an EU wide reduction in CO2 emissions of up to 90 million tonnes annually. The calculation of the potential benefit of greater use of Low-E insulating glass units in the 27 EU Member States took various key factors into account. Direct or extrapolated data were used for local climatic conditions; the mix of energy sources in use and the nature of the building stock (categorised by, for example, age, construction materials, whether residential or not, centrally-heated or not). This type of small project is not suited originating CERs or ERUs within the CDM or JI framework.

C5. Emissions methodology

C5.1

(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).

Scope 1

Base year start

January 1, 2010

Base year end

December 31, 2010

Base year emissions (metric tons CO2e)

3,716,429

Comment

Scope 2 (location-based)

Base year start

January 1, 2010

Base year end

December 31, 2010

Base year emissions (metric tons CO2e)

1,097,315

Comment

Scope 2 (market-based)

Base year start

January 1, 2010

Base year end

December 31, 2010

Base year emissions (metric tons CO2e)

0

Comment

This was not measured in 2010 and therefore our market based contribution to scope 2 was zero in the base year.

C5.2

(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

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)

2,816,631

Comment

Scope 1 emissions reduced versus prior years as a result of; carbon reduction / energy efficiency activities and the impact of low process utilisation associated with the Covid-19 pandemic.

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

In 2020 we continued to use Sphera Cloud data collection software that calculates both location and market based emissions.

C6.3

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

Reporting year

Scope 2, location-based

728,264

Scope 2, market-based (if applicable)

529,934

Comment

Scope 2 emissions reduced versus prior years as a result of; carbon reduction / energy efficiency activities and the impact of low process utilisation associated with the Covid-19 pandemic.

C6.4

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

No

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

Metric tonnes CO2e

1,532,339

Emissions calculation methodology

Scope 3 factors from Sphera environmental reporting software are used to calculate scope 3 emissions based on quantity of each material consumed that is entered into the global reporting software.
These emission factors are updated on an annual basis by the software provider. The factors are taken from a internationally recognised provider of LCA analysis software, e.g. GABI.
In addition, scope 3 emission associated with bought in glass utilises a factor based on EU28 float flat glass ts of 1.12 kg CO2(e) / kg glass purchased.

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

0

Please explain

Capital goods

Evaluation status

Relevant, calculated

Metric tonnes CO2e

4,000

Emissions calculation methodology

Scope 3 factors from Sphera environmental reporting software are used to calculate scope 3 emissions based on quantity of each material consumed that is entered into the global reporting software.
These emission factors are updated on an annual basis by the software provider. The factors are taken from a internationally recognised provider of LCA analysis software, e.g. GABI.

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

0

Please explain

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

Evaluation status

Relevant, calculated

Metric tonnes CO2e

472,302

Emissions calculation methodology

Scope 3 factors from Sphera environmental reporting software are used to calculate scope 3 emissions based on quantity of each energy type consumed that is entered into the global reporting software.
These emission factors are updated on an annual basis by the software provider. The factors are taken from a internationally recognised provider of LCA analysis software, e.g. GABI.

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

0

Please explain

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Metric tonnes CO2e

5,737

Emissions calculation methodology

External consultants carried out a life cycle analysis study on a flat glass for Glass For Europe. Upstream transportation data for the locally sourced materials was obtained but finally considered insignificant (<1%) for inclusion in the report when compared to the

emissions from the glass melting process. So we have assumed that this is 1% of 1.3kgCO2 emitted to make 1 kg glass. 0.0013 x 4, 412,822 tonnes glass melted in CY 19 = 5737t CO2

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

0

Please explain

Waste generated in operations

Evaluation status

Relevant, calculated

Metric tonnes CO2e

15,072

Emissions calculation methodology

Scope 3 factors from Sphera environmental reporting software are used to calculate scope 3 emissions based on quantity of each waste type generated that is entered into the global reporting software.
These emission factors are updated on an annual basis by the software provider. The factors are taken from a internationally recognised provider of LCA analysis software, e.g. GABI.

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

0

Please explain

Business travel

Evaluation status

Relevant, calculated

Metric tonnes CO2e

1,468

Emissions calculation methodology

Calculation method. NSG's global travel agency records total kms travelled by air. Emission factors provided by the World Resources Institute are used to calculate ghg emissions. Data quality is good Conversion Factors Short Distance Flights (281 miles and below) - 0.29kg/mile Medium Distance Flights (Between 282 and 994 miles) - 0.20kg/mile Long Distance Flights (995 miles and over) - 0.18 kg/mile Conversion Factors Short Distance Flights (1500 miles and below each way) - 0.43kg/mile Medium

Distance Flights (Between 1500 and 3500 miles each way) - 0.26 kg/mile Long Distance Flights (3500 miles and over each way) - 0.32 kg/mile

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

0

Please explain

Business travel was significantly lower with the impact of Covid19 pandemic which resulted in reduced travel / increased working from home.

Employee commuting

Evaluation status

Relevant, calculated

Metric tonnes CO2e

2,000

Emissions calculation methodology

Assume 20% of 27,000 NSG employees travel 40km return journey for 230 days per year in a medium sized car. This is an over-estimation but is not significant for total Group CO2 emissions. Direct impact 0.00019443 kgCO2 / m Indirect impact 0.00003923 kg CO2 / m.

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

0

Please explain

Business commuting was significantly lower with the impact of Covid19 pandemic which resulted in reduced travel / increased working from home.

Upstream leased assets

Evaluation status

Not relevant, explanation provided

Please explain

No upstream leased assets within NSG Group

Downstream transportation and distribution

Evaluation status

Relevant, calculated

Metric tonnes CO2e

119,408

Emissions calculation methodology

Distance based methodology used by major US suppliers (31% of US transport spend) to calculate US emissions using SmartWay platform of the US EPA website. (1.04 kg CO2e / km)
2.688 kg CO2e / litre fuel based methodology applied to fuel data supplied by Japanese and European suppliers (42% of Japanese transport spend and 67% of European transport spend). Factors taken from www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

Suppliers provided fuel and distance data to cover 47 % of Global road transport spend.
Europe 67% of transport spend emitted 43,795 tonnes CO2e. Assume 100% emitted 65,366 tonnes.
Japan 42% of transport spend emitted 5,326 tonnes CO2e Assume 100% emitted 12,681 tonnes
NA 31% of transport spend emitted 10,601 tonnes CO2 Assume 100% emitted 34,197 tonnes
Total Europe + Japan + NA = 94% Group transport spend = 112,243 tonnes CO2e +6% for missing South America and South East Asia (excluding Japan) = 119,408 t CO2e for Group road transport 59,722 tonnes CO2 calculated by suppliers = 50% emissions

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

50

Please explain

Processing of sold products

Evaluation status

Relevant, calculated

Metric tonnes CO2e

600,000

Emissions calculation methodology

Based on sold glass volume to solar customers and applying a factor for heating glass to 600 C based on NSG data. Sold glass volume to non solar customers - applied a factor for NSG downstream processing.

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

0

Please explain

Use of sold products

Evaluation status

Not relevant, explanation provided

Please explain

Reported separately as customers avoided emissions. Products do not consume energy in use and many actively generate or save energy

End of life treatment of sold products

Evaluation status

Not relevant, explanation provided

Please explain

End of life glass will actually save ghg emissions if recycled at the end of life. If not recycled, it will not decompose to emit ghg

Downstream leased assets

Evaluation status

Not relevant, explanation provided

Please explain

No downstream leased assets in NSG Group

Franchises

Evaluation status

Not relevant, explanation provided

Please explain

Several small franchises in North and South America but their impact will be negligible.

Investments

Evaluation status

Relevant, calculated

Metric tonnes CO2e

200,000

Emissions calculation methodology

Management control joint ventures are included in our Group reporting 50% ownership of a furnace in Russia, 50% ownership of 3 float lines in South America Assume 1 float line emits @100,000 tonnes CO2 / year. Four float lines = 200,000 tonnes CO2 e per year

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

0

Please explain

Other (upstream)

Evaluation status

Not relevant, explanation provided

Please explain

All NSG Group upstream activities emissions are already accounted for in the data reported in other scope 3 emission categories, therefore this category is not relevant.

Other (downstream)

Evaluation status

Not relevant, explanation provided

Please explain

All NSG Group downstream activities emissions are already accounted for in the data reported in other scope 3 emission categories, therefore this category is not relevant.

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	368	This is from a wood fired boiler on a site in Finland.

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

6.7

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

3,346,565

Metric denominator

unit total revenue

Metric denominator: Unit total

499,200,000,000

Scope 2 figure used

Market-based

% change from previous year

1

Direction of change

Decreased

Reason for change

Revenue has decreased by 10.2 % and emissions have reduced by 11%. Emission reduction was achieved by a combination of energy & carbon efficiency project implementation, e.g. operational efficiency projects, renewable energy purchases and lower process utilisation at operations.

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	2,816,631	IPCC Second Assessment Report (SAR - 100 year)

C7.2

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

Country/Region	Scope 1 emissions (metric tons CO2e)
EU28	1,023,982
Asia Pacific (or JAPA)	843,042
North America	540,036

South America	409,571

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)
AGR	10,105
Architectural	2,301,101
Automotive	391,449
Creative Technology & Fine Glass Division	111,207
Central functions and Global R&D	2,768

C7.3c

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

Activity	Scope 1 emissions (metric tons CO2e)
Glass melting	2,631,196
Glass processing	185,435

C7.5

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

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)	Purchased and consumed electricity, heat, steam or cooling (MWh)	Purchased and consumed low-carbon electricity, heat, steam or cooling accounted for in Scope 2 market-based approach (MWh)
EU28	246,109	97,655	610,280	462,532
Asia Pacific (or JAPA)	273,169	237,284	510,785	4,033
North America	168,189	152,558	380,983	140
South America	40,797	42,438	213,189	21,761

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)
AGR	3,308	2,795
Architectural	327,918	200,099
Automotive	340,241	282,590
Creative Technology & Fine Glass Division	51,080	40,379
Central functions and Global R&D	5,717	4,070

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)
Glass melting	317,173	204,669
Glass Processing	411,091	325,265

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	Direction of change	Emissions value (percentage)	Please explain calculation

	(metric tons CO2e)			
Change in renewable energy consumption	81,751	Decreased	2.2	The impact of active renewable energy contracting implemented during the year, resulted in 81,751 tonnes of CO2 reduction (as detailed in section 4.3b). This 81,751 tonnes represents a reduction of 2.1 % based on the calculation of 81,751 / scope 1 + 2 (mkt) as reported last year. Calculation numbers are; (81,751 / 3,759,684) *100 = 2.2%
Other emissions reduction activities	19,500	Decreased	0.5	The impact of 'other emissions reduction activities' implemented during the year, resulted in 19,500 tonnes of CO2 reduction (as detailed in section 4.3b). This 19,500 tonnes represents a reduction of 0.5% based on the calculation of 19,500 / scope 1 + 2 (mkt) as reported last year. Calculation numbers are; (19,500 / 3,759,684) *100 = 0.5%
Divestment	0	No change	0	
Acquisitions	0	No change	0	
Mergers	0	No change	0	
Change in output	311,868	Decreased	8.3	The impact of 'change of output' associated with Covid19 pandemic resulted in 311,868 tonnes reduction in 2020. This 311,868 tonnes represents a reduction of 8.3% based on the calculation of 311,868 / scope 1 + 2 (mkt) as reported last year. Calculation numbers are; (311,868 / 3,759,684) *100 = 8.3%
Change in methodology	0	No change	0	
Change in boundary	0	No change	0	
Change in physical operating conditions	0	No change	0	

Unidentified	0	No change	0	
Other	0	No change	0	

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 10% but less than or equal to 15%

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	No
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)	LHV (lower heating value)	0	10,467,263	10,467,263
Consumption of purchased or acquired electricity		460,557	1,226,722	1,687,279
Consumption of purchased or acquired heat		3,883	11,588	15,471
Consumption of purchased or acquired steam		0	12,435	12,435
Consumption of self-generated non-fuel renewable energy		2.3		2.3
Total energy consumption		464,440	11,879,782	12,344,272

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	No
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.

Fuels (excluding feedstocks)
Natural Gas

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
8,536,795

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-cogeneration or self-trigeneration
0

Emission factor
0.05625

Unit
metric tons CO2e per GJ

Emissions factor source
IEA v13 June 20 eGRID 2018 Emission factor from cross sector tools (Aug 2012) Stationary Combustion Table 1-3 IPPC 2006 Guidelines for National Greenhouse Inventories. Natural Gas (direct)

Comment

Fuels (excluding feedstocks)
Diesel

Heating value
LHV (lower heating value)

Total fuel MWh consumed by the organization
48,977

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-cogeneration or self-trigeneration

0

Emission factor

0.07453

Unit

metric tons CO2e per GJ

Emissions factor source

IEA v13 June 20 e GRId 2018 Emission factor from cross sector tools (Aug 2012) Stationary Combustion Table 1-3 IPPC 2006 Guidelines for National Greenhouse Inventories. Gas / Diesel oil (direct)

Comment

Fuels (excluding feedstocks)

Fuel Oil Number 4

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

1,950

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-cogeneration or self-trigeneration

0

Emission factor

0.07914

Unit

metric tons CO2e per GJ

Emissions factor source

UK Defra Conversion factors 2019 version 1.01 updated 31 May 19
https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019 Fuels -
liquid fuels- fuel oil - Energy nett cv basis Scope 1

Comment

Fuels (excluding feedstocks)

Fuel Oil Number 5

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

1,224,021

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-cogeneration or self-trigeneration

0

Emission factor

0.07914

Unit

metric tons CO2e per GJ

Emissions factor source

UK Defra Conversion factors 2019 version 1.01 updated 31 May 19
https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019 Fuels -
liquid fuels- fuel oil - Energy nett cv basis Scope 1

Comment

Fuels (excluding feedstocks)

Fuel Oil Number 6

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

199,418

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-cogeneration or self-trigeneration

0

Emission factor

0.07914

Unit

metric tons CO2e per GJ

Emissions factor source

UK Defra Conversion factors 2019 version 1.01 updated 31 May 19
https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019 Fuels -
liquid fuels- fuel oil - Energy nett cv basis Scope 1

Comment

Fuels (excluding feedstocks)

Liquefied Natural Gas (LNG)

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

315,853

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-cogeneration or self-trigeneration

0

Emission factor

0.0568

Unit

metric tons CO2e per GJ

Emissions factor source

UK Defra Conversion factors 2019 version 1.01 updated 31 May 19
https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019 Fuels -
Gaseous fuels- LNG - Energy nett cv basis Scope 1

Comment

Fuels (excluding feedstocks)

Liquefied Petroleum Gas (LPG)

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

108,977

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-cogeneration or self-trigeneration

0

Emission factor

0.06397

Unit

metric tons CO2e per GJ

Emissions factor source

UK Defra Conversion factors 2019 version 1.01 updated 31 May 19 https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019 Fuels - gaseous fuels- LPG - Energy nett cv basis Scope 1

Comment

Fuels (excluding feedstocks)

Petrol

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

30,875

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-cogeneration or self-trigeneration

0

Emission factor

0.06973

Unit

metric tons CO2e per GJ

Emissions factor source

IEA v13 June 20 Emission factor from cross sector tools (Aug 2012) Stationary Combustion Table 1-3 IPPC 2006 Guidelines for National Greenhouse Inventories. Motor gasoline (direct)

Comment

Fuels (excluding feedstocks)

Waste Oils

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

396

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-cogeneration or self-trigeneration

0

Emission factor

0.81992

Unit

metric tons CO2e per GJ

Emissions factor source

Emission-Factors-from-Cross-Sector-Tools-(August-2012).xlsx
Stationary Combustion, Table 1-3
IPCC 2006 Guidelines for National Greenhouse Gas Inventories, http://www.ipcc-nggip.iges

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	110,149	110,149	2.3	2.3
Heat	39,679	39,679	853	853
Steam	11,946	11,946	0	0
Cooling	0	0	0	0

C8.2e

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

Sourcing method

Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type

Low-carbon energy mix

Country/area of consumption of low-carbon electricity, heat, steam or cooling

United Kingdom of Great Britain and Northern Ireland

MWh consumed accounted for at a zero emission factor

69,800

Comment

Sourcing method

Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type

Low-carbon energy mix

Country/area of consumption of low-carbon electricity, heat, steam or cooling

Germany

MWh consumed accounted for at a zero emission factor

197,328

Comment

Sourcing method

Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type

Low-carbon energy mix

Country/area of consumption of low-carbon electricity, heat, steam or cooling
Poland

MWh consumed accounted for at a zero emission factor
99,348

Comment

Sourcing method
Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type
Low-carbon energy mix

Country/area of consumption of low-carbon electricity, heat, steam or cooling
Italy

MWh consumed accounted for at a zero emission factor
52,842

Comment

Sourcing method
Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type
Low-carbon energy mix

Country/area of consumption of low-carbon electricity, heat, steam or cooling
Austria

MWh consumed accounted for at a zero emission factor
5,862

Comment

Sourcing method
Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type

Low-carbon energy mix

Country/area of consumption of low-carbon electricity, heat, steam or cooling

Spain

MWh consumed accounted for at a zero emission factor

8,453

Comment

Sourcing method

Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type

Low-carbon energy mix

Country/area of consumption of low-carbon electricity, heat, steam or cooling

Netherlands

MWh consumed accounted for at a zero emission factor

994

Comment

Sourcing method

Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type

Low-carbon energy mix

Country/area of consumption of low-carbon electricity, heat, steam or cooling

United States of America

MWh consumed accounted for at a zero emission factor

140

Comment

Sourcing method

Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type

Low-carbon energy mix

Country/area of consumption of low-carbon electricity, heat, steam or cooling

Argentina

MWh consumed accounted for at a zero emission factor

3,355

Comment

Sourcing method

Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type

Low-carbon energy mix

Country/area of consumption of low-carbon electricity, heat, steam or cooling

Chile

MWh consumed accounted for at a zero emission factor

18,406

Comment

Sourcing method

Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type

Low-carbon energy mix

Country/area of consumption of low-carbon electricity, heat, steam or cooling

Japan

MWh consumed accounted for at a zero emission factor

4,031

Comment

C9. Additional metrics

C9.1

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

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)	No third-party verification or assurance
Scope 3	No third-party verification or assurance

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

Reasonable assurance

Attach the statement

CY21 EUETS Summary Statement.pdf

Summary Statement.pdf

Page/ section reference

Page 2 for total emissions 965,031t

Page 3 for assurance opinion and standard

Document has been uploaded but is not visible 25 July 19. No option to add it today so I have e-mailed it separately to CDP Respond to ensure that you have then prior to the deadline.

Relevant standard

European Union Emissions Trading System (EU ETS)

Proportion of reported emissions verified (%)

34

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?

No, but we are actively considering verifying within the next two years

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

Japan carbon tax

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

34

% of Scope 2 emissions covered by the ETS

0

Period start date

January 1, 2020

Period end date

December 31, 2020

Allowances allocated

830,954

Allowances purchased

320,932

Verified Scope 1 emissions in metric tons CO2e

965,030

Verified Scope 2 emissions in metric tons CO2e

0

Details of ownership

Facilities we own and operate

Comment

C11.1c

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

Japan carbon tax

Period start date

January 1, 2020

Period end date

December 31, 2020

% of total Scope 1 emissions covered by tax

15

Total cost of tax paid

109,400,000

Comment

Total scope 1 emissions in Japan included = 423 271 tonnes

C11.1d

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

All European glass melting facilities are covered by the EU Emissions Trading System. . We operate with a continuous programme of energy efficiency improvement projects to ensure that

our businesses run as energy efficiently as possible. eg waste heat recovery, low carbon electrical generation capacity, process sub-metering. We have invested in energy saving technologies at several pilot sites in Europe including working in partnership with 3rd party suppliers. The ISO50001 Energy Management Standard has been introduced across all EUETS member operations in Germany and Italy. NSG is increasing recycled content where the level of contamination is acceptable. This reduces the amount of energy required to melt the glass and also minimises the emission of process CO2 due to decomposition of the carbonate raw materials. In the longer term, we will continue with these energy saving initiatives and EUETS allowances will be purchased if these measures are insufficient.

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?

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.

Objective for implementing an internal carbon price

Change internal behavior
Drive energy efficiency
Drive low-carbon investment

GHG Scope

Scope 1
Scope 2
Scope 3

Application

Pilot projects continue to be undertaken to reduce the risk of future carbon taxes and quantify the potential carbon saving opportunities associated with a new plant design. Activities included further workshops with several internal functions (R&D, engineering, Manufacturing Excellence, EHS, Procurement) identifying and assessing the viability of energy saving opportunities. These support the development of the Group's decarbonisation strategy, the future implementation of the Group's science based target setting and the production of low embodied carbon products that will help our customers to reduce their scope 3 emissions.

Actual price(s) used (Currency /metric ton)

5,512

Variance of price(s) used

Price based on 50 USD / tonne CO2e

Type of internal carbon price

Shadow price

Impact & implication

The energy saving opportunities were prioritised according to the combination of energy and carbon price impacts.
The output from the studies reveals energy saving projects that might previously not have been considered for investment to the ICC (Investment and Capital Committee). It is anticipated that continuing to use this and future studies will shift investment towards more low carbon measures.

C12. Engagement

C12.1

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

Yes, our suppliers
Yes, our customers

C12.1a

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

Type of engagement

Engagement & incentivization (changing supplier behavior)

Details of engagement

Offer financial incentives for suppliers who reduce your operational emissions (Scopes 1 &2)
Offer financial incentives for suppliers who reduce your downstream emissions (Scopes 3)

% of suppliers by number

1

% total procurement spend (direct and indirect)

15

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

75

Rationale for the coverage of your engagement

Energy represents one of the largest spend areas for NSG; In FY21(CY20) it was 15% of the total Procurement spend for the group. In addition to this scope 1 and scope 2 energy consumption represents 50% of the CO2 emissions of NSG Group. Consequently NSG Group has for some years been implementing a global energy management programme aimed at reducing our energy consumption and emissions. To date, this programme has been implemented in 25 of our sites representing 75% of our energy based scope 1 ,2 and 3 emissions. So this contributes to a 75% reduction in the energy section of qu 6.5. In every individual site project we engage with our supply base to identify a range of projects to reduce energy consumption and CO2 or to introduce renewable energy generation within the Group.

Impact of engagement, including measures of success

In 2019 the NSG Global Energy Management Programme was launched as the Energy and Carbon Management programme to reinforce the emphasis on CO2 reduction, in support of NSG's Science Based Targets (SBT) for carbon reduction, which were externally announced in October 2019. In parallel with these SBT's, NSG decided to set targets for renewable electricity to be used across the Group's operations. In 2020 the proportion of the Group's electricity coming from renewable sources grew to 25% an increase of 5% vs 2019. The commitment to increase this to 50% by 2024 remains. During 2020 NSG Group signed its first offsite Power Purchase Agreement (PPA) covering approximately 25% of electricity demand in Argentina and this project is expected to reduce carbon emissions by 5,000 tonnes per year. Additionally, renewable electricity grid supply contracts were signed in Chile and Poland to further reduce scope 2 carbon emissions. Following on from the renewable electricity grid supply contract signed in 2019, NSG Group's Settimo site in Italy was connected to a supplier's local district heating network making it the first majors manufacturing facility in NSG Group to be net zero for its energy consumption. In Japan NSG Group has signed an agreement with Osaka Gas for the supply of "carbon offset" gas to its Kyoto automotive facility. The measure of success will be the target achievement and the financial incentive is based on continued reward of business with NSG.

Comment

Type of engagement

Innovation & collaboration (changing markets)

Details of engagement

Run a campaign to encourage innovation to reduce climate impacts on products and services

% of suppliers by number

1

% total procurement spend (direct and indirect)

16

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

4

Rationale for the coverage of your engagement

Transport and Warehousing activities account for 17% of the NSG Group's procurement spend across its global operations with transportation alone accounting for 12% of this. The European road transport supplier costs account for 45%, Asia accounting for 17% and the Americas accounting for 38% of the Global Group road transport spend. The supplier engagement currently equates to 71% coverage in Europe, 37% coverage in Japan and 39% in North America. From these engagements we now collate detailed distance travelled data.

Impact of engagement, including measures of success

There is a strong emphasis on improving efficiency, reducing empty driven miles and increasing the weight of product carried, all of these initiatives will reduce our environmental impact. Many positive projects delivering environmental benefits are being actively managed. Our main focus is to work with our lead suppliers to drive sustainable improvement through network optimisation. This encompasses lane management, backloading and triangulation of flow thus increased efficiency of vehicle utilisation which reduces the number of journeys we make as a business to fulfil customer demand. Working across multiple SBU's we can drive synergies across our distribution profile. We have identified 87 possible routes so far which can drive this optimisation, trials are underway to assess the feasibility which could result in a reduction of 307 tonnes of CO2. Evaluations with our Innenlader partners remain ongoing assessing the use of liquefied natural gas (LNG) trucks in Germany, Poland and the UK. The first trial of a LNG Volvo truck was conducted in July 2020 with Nijman Zeetank in the UK and proved to be successful. On average an LNG truck can reduce CO2 emissions by up to 92% compared to that of a diesel fuelled vehicle if using Bio-LNG as the fuel substitute. A business case is being worked on to establish our own on-site refuelling facility needed which can support 36 heavy goods vehicles as the UK domestic refuelling infrastructure isn't sufficient to make the project viable. Across the world we are exploring more intermodal solutions as NSG's rail distribution only accounts for 4% of our overall volume distribution but this program has been delayed due to the impacts of the global pandemic.

Comment

The new and refreshed transportation procurement strategy introduced in 2019 prioritizes our focus on CO2 emissions and is now starting to unlock real opportunities to minimise our carbon footprint.

Type of engagement

Engagement & incentivization (changing supplier behavior)

Details of engagement

Offer financial incentives for suppliers who reduce your operational emissions (Scopes 1 &2)

Offer financial incentives for suppliers who reduce your upstream emissions (Scopes 3)

% of suppliers by number

1

% total procurement spend (direct and indirect)

9

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

1

Rationale for the coverage of your engagement

Batch Materials used in the manufacture of 'Float Glass' represents 9% of total Procurement spend. The manufacture, processing and transport of raw materials contributes 975 thousand metric tonnes of scope 3 emissions or 15% of total NSG Group CO2 emissions. Of the total CO2 emissions from any given float line, on average, around 17% comes purely from the decomposition of carbonate raw materials, with the remainder coming mainly from the melting of these and other raw materials, including cullet, to make glass, and a smaller amount from the forming and annealing processes. Evaluating alternatives to carbonate raw materials has therefore been a key focus in NSG's efforts to reduce the CO2 emissions from glassmaking.

Impact of engagement, including measures of success

In 2020 our main activity has focussed on preparing for a large scale trial of calcined dolomite on a float line in South America, where we have been working with the existing dolomite supplier and a new company which specialises in high quality calcination, enabling a suitable material to be produced for float manufacture. Calcined dolomite contains no CO2 in the form of carbonate species and current indications are that it will give a significant fuel saving as well.

Preparations are ongoing at the float line to commission engineering solutions required to carry out that trial safely, as well as ensuring a sufficient quantity of high-quality raw material will be available to trial. The aim is to conduct a trial lasting ~10 days, to enable NSG to gather all the required data and experience of working with this novel material, including energy and CO2 savings, but also any changes to the chemistry and mechanism of the production process, to evaluate if the technology is suitable for implementation across the Group. This trial has been, and continues to be, delayed by COVID, but we are optimistic the trial will be able to take place before the end of 2021.

Other activities have included re-engaging with our existing soda ash suppliers, to better understand their plans for reducing CO2 emissions during manufacture, and the assessment of other alternative materials using new analytical methods which allow us to directly quantify the melting energy requirements of these materials relative to our existing raw materials. This data gathering will continue throughout the coming year, with the goal being to be able to propose the best suite of raw materials to achieve the desired glass properties, whilst minimising CO2 emissions and input costs.

Comment

C12.1b

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

Type of engagement

Education/information sharing

Details of engagement

Share information about your products and relevant certification schemes (i.e. Energy STAR)

% of customers by number

35

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

0.01

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

Since 2016, NSG Group has been promoting low E glazing technologies to multiple multinational customers to help them to achieve their vehicle CO2 reduction targets as well as their vehicle electrification strategies. The adoption of low e glazing reduces the heat loading on a vehicle interior and reduces fuel energy consumption and hence reduces CO2 emissions or extends the electric vehicle range.

These saved emissions were reported as avoided emissions in 4.5 and not scope 3 emissions in 6.5 so we have recorded 0.01% in the box above

Impact of engagement, including measures of success

The engagement resulted in the continued successful award of business to NSG and our low e glazing will be launched in multiple customers' vehicles, resulting in reduced climate change impacts from the vehicles used by the end consumer.

Type of engagement

Collaboration & innovation

Details of engagement

Other, please specify

Co-development agreements to improve climate change impact performance of products in use

% of customers by number

1

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

15

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

Continued development to improve performance of product manufacture in use and also reduce the Scope 3 emissions of manufacturing products by customers is a key aspect of the NSG Group strategy for reducing climate change impact. Within the Architectural SBU, this activity is focused on the key customers that utilise NSG products to produce their own final product for supply to the consumer market. The activities are carried out via various joint development agreements. For scope 3 reduction in the customer processes, these developments are focused primarily on reducing the energy demand necessary in processing the glass product into a final product to be sold to the customer. For example, reducing the thickness of glass while maintaining or improving the final performance characteristics of the product will significantly reduce the energy demand at the customer premises. Such developments have to be carried out in close collaboration with the customer to ensure benefits are realised without any detrimental impact upon the customers own processes or final product performance. This customer interaction takes place across a number of key customers which take significant volumes of primary product from NSG Group to process to a final product. These key customers represent at least 80% of the scope 3 emissions associated with customer processing of NSG products.

Impact of engagement, including measures of success

NSG Group restarted a float furnace to produce TCO (transparent conductive oxide) coated glass for solar panels started in January 2020 in Vietnam. The previously dormant float furnace was upgraded as part of the plan announced in May 2018 to expand production capacity of TCO glass to support the growing solar market and in particular to support a long-term supply agreement with First Solar, the world's leading provider of comprehensive photovoltaic (PV) solar system. As a further step of the May 2018 plan,

In addition, NSG Group announced in November 2020 the start of a new float furnace to produce TCO (transparent conductive oxide) coated glass for solar panels in Luckey, Ohio, United States. The investment is also part of a long-term supply agreement with U.S.-headquartered First Solar, Inc., which operates the Western Hemisphere's largest photovoltaic (PV) solar manufacturing footprint in Northwest Ohio

Type of engagement

Collaboration & innovation

Details of engagement

Other, please specify

Co-development agreements to improve climate change impact / generation of renewable energy

% of customers by number

1

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

0

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

Development of renewable energy technologies is a key deliverable of NSG strategy. This project is a demonstration of collaboration with a customer site (internal customer) to facilitate the generation of on site PV electricity with a new product developed by NSG and a partner organisation.

Impact of engagement, including measures of success

A new type of unique BIPV façade was installed at NSG Pilkington Austria office building in Bischofshofen in cooperation with Techno-Z. The BIPV glass panels cover the entire vertical and south-facing (SE 160°) façade surface, both window and spandrel areas. The product Pilkington Sunplus™ BIPV Vision, which is partially covered with PV cells and still offers a good view to the outside, is suitable for the window areas. Pilkington Sunplus™ BIPV Spandrel was installed in the spandrel area. It is a product similar to a façade spandrel panel, which is opaque, but it is fully covered with PV cells.

Through its innovative glass technology, NSG Group will continue to save energy in the buildings and houses.

C12.3

(C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?

Trade associations

C12.3b

(C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?

Yes

C12.3c

(C12.3c) Enter the details of those trade associations that are likely to take a position on climate change legislation.

Trade association

Glass For Europe

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

As forward-looking innovative providers of state-of-the-art products and technologies, Glass for Europe members believe that it is essential to achieve balanced solutions that are sustainable from an economic, environmental and social standpoint. In this context Glass for Europe is particularly interested in the following European policies: -Energy efficiency in light of glass' contribution to energy savings -EU initiatives aimed at lowering the environmental impact of manufacturing and strengthening innovation in sustainable production -Legislation that aims to enhance the quality of glass products and their distribution Besides, Glass for Europe is involved in the discussion on the development of standards for glass products and the subsequent CE marking. Globally, it calls on EU policies to ensure a level-playing field between EU and non-EU manufacturing industries and a reform of the EU climate and energy policies to ensure that Europe's low-carbon objective becomes a growth-driver for EU industries.
NSG policy is replicated at trade association level and demonstrates public policy support for mitigating climate change. In the case of Glass for Europe lobbying position being different to NSG Group, we have the option to veto any public policy disclosure. In addition, the chair person of Glass for Europe in 2020 was an NSG director.

How have you influenced, or are you attempting to influence their position?

This position is in line with all members' climate change strategy to reduce energy consumption and carbon emissions in both manufacturing processes and in product use. We are member of the Environment, Automotive Strategy, External Relations and Standardisation Committees. -Lobbying to ensure that high performance solar control glass technologies are legally required in vehicles to reduce fuel consumption and CO2 associated with air conditioning. -We are helping to respond to consultations on Energy Efficiency Directive and are calling for a binding energy savings target for buildings -EU Emissions Trading Scheme: maintaining carbon leakage status and post 2020 legislative improvement options. Currently promoting increased recycling of end of life glass products to reduce energy consumption and CO2 emissions from glass manufacturing. Working with IfT Rossenheim on the development of an energy labelling scheme for windows to support the market uptake of advanced glazing solutions

Trade association

Flat Glass Manufacturing Association of Japan

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The association has produced LCA reports to demonstrate and support the use of high spec insulating windows that reduce CO2 emissions from buildings.Flat Glass Manufacturing Association of Japan (FGMAJ) is participating in Keidanren's Commitment to a Low Carbon Society.
In Commitment to a Low Carbon Society phase 2, FGMAJ has committed to reducing GHG emissions by 49% below 1990 levels by 2030.

How have you influenced, or are you attempting to influence their position?

All 3 member companies have the same strategy, i.e. promoting construction and automotive legislation which requires the installation of highly insulating glasses. We are members of the environment committee and support their activities. We have lobbied Japanese government for many years to establish a new regulation for high spec insulating windows. Recently, the government finally decided to revise an energy saving law which requires that all new buildings should have higher insulating windows.

Trade association

National Glass Association (NGA) and the Fenestration and Glazing Industry Alliance (FGIA)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

National Glass Association (NGA) and the Fenestration and Glazing Industry Alliance (FGIA) are actively involved with standards and codes bodies to promote sustainability initiatives relating to environmental friendliness and energy efficient glazing solutions in North America.

How have you influenced, or are you attempting to influence their position?

We are actively involved in NGA and FGIA committee meetings and contribute to lobbying activities for the legislative drivers required to install more energy efficient glazing in buildings.

Trade association

Society of Automotive Engineers

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

SAE demonstrate their commitment to society through local, national, and international public awareness programs that promote energy resource conservation and vehicle safety.

How have you influenced, or are you attempting to influence their position?

We are pushing for legislation change in the US through this trade association and want the US government to adopt the same policy in Europe which allows privacy glass (i.e. dark tinted glass) to be glazed behind the B-pillar in passenger vehicles and reduce CO2 emissions.

C12.3f

(C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?

National EHS activities are reported to the Global Sustainability Director on a monthly basis. Regional Sustainability Directors regularly meet to discuss national climate change activity and Group climate change strategy. The Group Sustainability Director is a member of the Group Sustainability Committee and contributes to the Group's risk management strategy. Trade Association membership is monitored by the Group's Competition Compliance procedures. Meeting minutes and agendas must be shared between attendees and their senior managers. This allows management to ensure that activities are in line with NSG's strategy to promote energy efficient manufacturing processes and added value, energy saving/generating glass.

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 mainstream reports

Status

Complete

Attach the document

IntegratedReport2020.pdf

IntegratedReport 2020_English.pdf

Page/Section reference

p5 and 54 CEO message p16, and pp 51-52 Material issues pp30-48 Governance pp49-50 Risk management p56 FY24 CO2 intensity target p62 SBT

pp61-66 Climate change pp 63-66 Energy saving products pp69-74 Energy pp75-77, 94-95 and 118 CO2 emissions

Content elements

Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets
Other metrics

Comment

Document has been uploaded but is not visible 25 July 19. No option to add it today so I have e-mailed it separately to CDP Respond to ensure that you have then prior to the deadline.

C15. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

No further comment

C15.1

(C15.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Shigeki Mori, CEO NSG Group.	Chief Executive Officer (CEO)

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	I am submitting to	Public or Non-Public Submission	Are you ready to submit the additional Supply Chain questions?
I am submitting my response	Investors Customers	Public	Yes, I will submit the Supply Chain questions now