



Nippon Sheet Glass Co., Ltd.

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**C O R P O R A T E
P R O F I L E**



Three Business Lines

We operate three worldwide business lines: Architectural, supplying glass for the world's buildings and for solar energy applications; Automotive, producing glass and glazing systems for vehicles worldwide; and Technical Glass, operating in the display, office equipment and glass fiber sectors.

Architectural
Glass for the world's buildings and solar energy applications

40%

Contribution to Group sales*

Main products

- Thermal insulation glass
- Fire protection glazing
- Solar control glass
- Glass for solar energy
- Noise control glazing
- Safety and security glazing

Making windows better at saving energy



Our thermal insulation products combine unrivalled thermal insulation with high light transmittance and lower reflectance for a more neutral appearance. They provide thermal insulation and passive solar heat gain, helping demand for more energy-efficient windows.

Automotive
Supplying every major vehicle manufacturer in the world

50%

Contribution to Group sales

Main products

- Solar control glass
- Glazing systems
- Laminated glass
- Toughened glass
- Security glazing
- Lightweight glazing
- Aesthetic glazings

Developing value-added vehicle glazing



We play a leading role in the development of value-added vehicle glazing, delivering greater functionality to address Sustainability issues, such as CO₂ reduction, solar control, lighter and more aerodynamic glazing, vehicle end-of-life issues and recycling.

Technical Glass
World leader in thin display glass and optical devices for office machinery

10%

Contribution to Group sales

Main products

- Thin LCD glass
- Copier/printer lenses
- Glass cord
- Battery separators
- GLASFLAKE
- METASHINE®

Supplying ultra-thin glass for small LCD applications



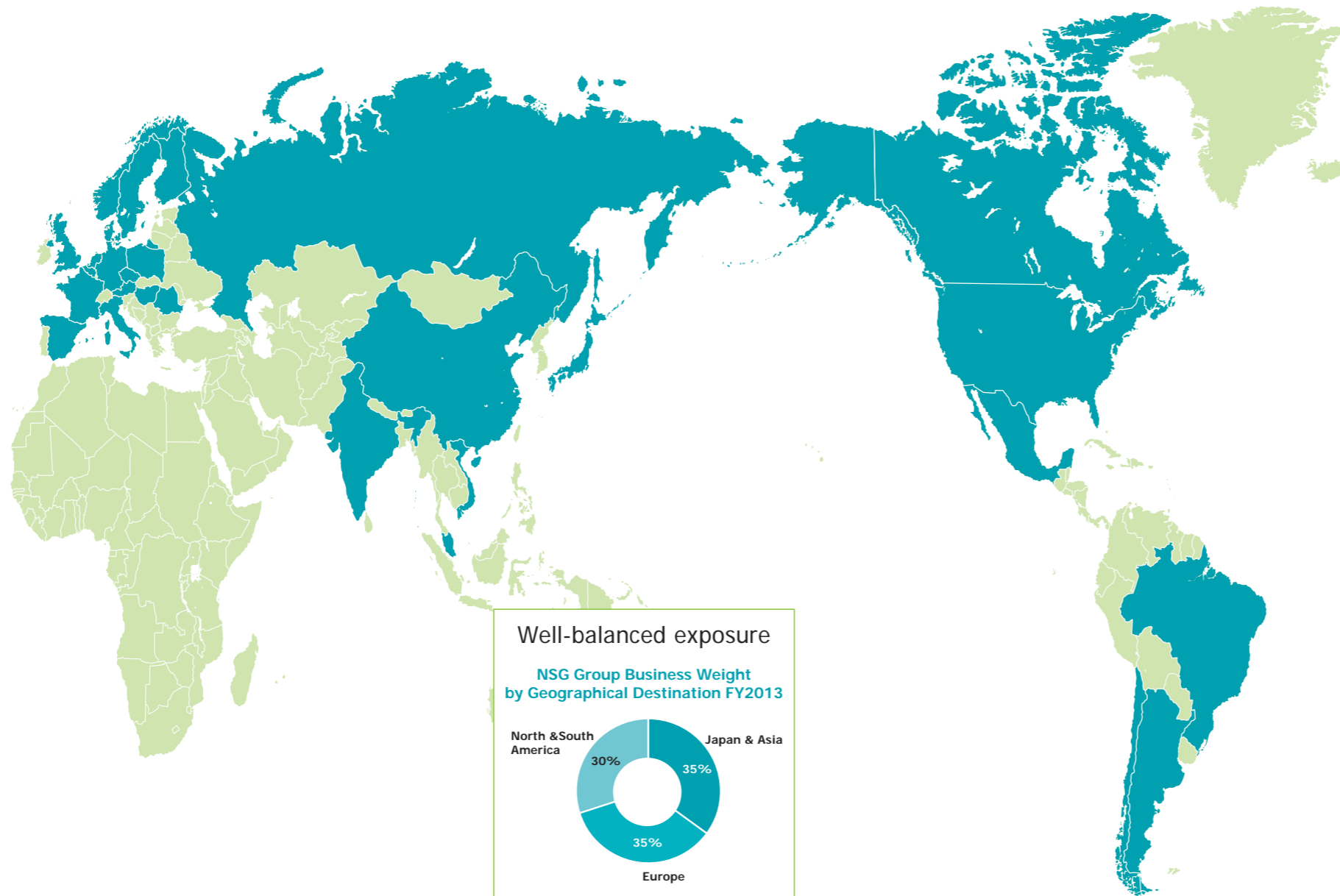
Our Ultra Fine Flat Glass products are used in the growing touch panel market, particularly in mobile phones and computers and now expanding into use in vehicles.

*Financial year ending 31 March 2015

Our Global Operations

Our operations support a worldwide customer base. We have principal operations in 28 countries, employing around 27,000 people and marketing our products in over 130 countries.

- Argentina
- Austria
- Belgium
- Brazil
- Canada
- Chile
- China
- Czech Republic
- Denmark
- Finland
- France
- Germany
- Hungary
- India
- Italy
- Japan
- Malaysia
- Mexico
- Netherlands
- Norway
- Poland
- Romania
- Russia
- Spain
- Sweden
- United Kingdom
- United States
- Vietnam



Architectural

Manufacturing
World leader in float glass technology and coatings

Principal operations in 18 countries. Overall, the Group manages, or has a stake in, 47 float lines around the world (some of which are dedicated to Automotive and Technical Glass production).

Global spread
 Major presence in Europe, Japan and North America. Also present in China, South America and South East Asia.

Automotive

Manufacturing
 Supplying the world's leading vehicle manufacturers

Principal fabrication facilities in 14 countries. Major presence in Europe, Japan, North America, South America and China.

Global spread
 Leading share of the global Original Equipment (OE) and Specialized Transport markets. Largest player globally in Automotive aftermarket glazing distribution and wholesale.

Technical Glass

Manufacturing
 Producing the world's **thinnest float glass**

Major fabrication facilities in Japan, China and Europe.

Global spread
 World leader in thin display glass, optical devices for office machinery and glass fiber products.

Europe 12,000 employees

- 10 float lines
- Two rolled plate furnaces
- Automotive OE plants in five countries
- Architectural downstream in 8 countries
- Extensive AGR network
- Technical Glass operations in UK

North America 4,400 employees

- Five float lines
- Automotive OE in US, Canada and Mexico
- Extensive AGR network in US and Mexico
- Technical Glass operations in Canada

S & SE Asia 2,000 employees

- Five float lines
- Two Automotive plants
- Technical Glass operations

Japan 4,500 employees

- Four float lines
- One rolled plate line
- Architectural downstream network
- Automotive OE plants and AGR network
- Technical Glass operations

South America 2,700 employees

- Seven float lines
- Architectural downstream operations
- Automotive OE in Brazil and Argentina
- AGR network

China 1,800 employees

- 16 float lines
- Two Automotive plants
- Technical Glass operations
- Rolled glass for photovoltaics

(As of March 2015)

Our Marketplace

Glass is a growth industry. Glass demand growth outstrips economic growth globally. Today's architects and vehicle designers are using larger surface areas in their designs, increasingly with added functionality and complexity.

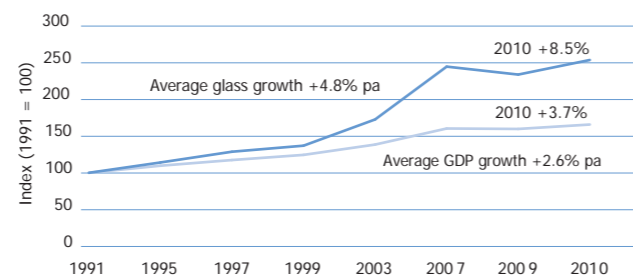
Volume growth in glass

Over the past 20 years, glass demand has grown more quickly than GDP. In spite of the current recession, over the long term, glass demand is still growing at more than 4 percent per annum.

Demand growth for glass is driven not only by economic growth, but also by legislation and regulations.

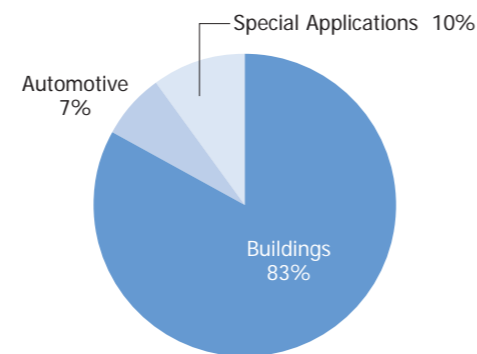
Demand for value-added products is growing at a faster rate than demand for basic glass, enriching the product mix and boosting the sales line. Value-added products, particularly coated, are delivering greater functionality in all application areas.

Global float demand and GDP growth

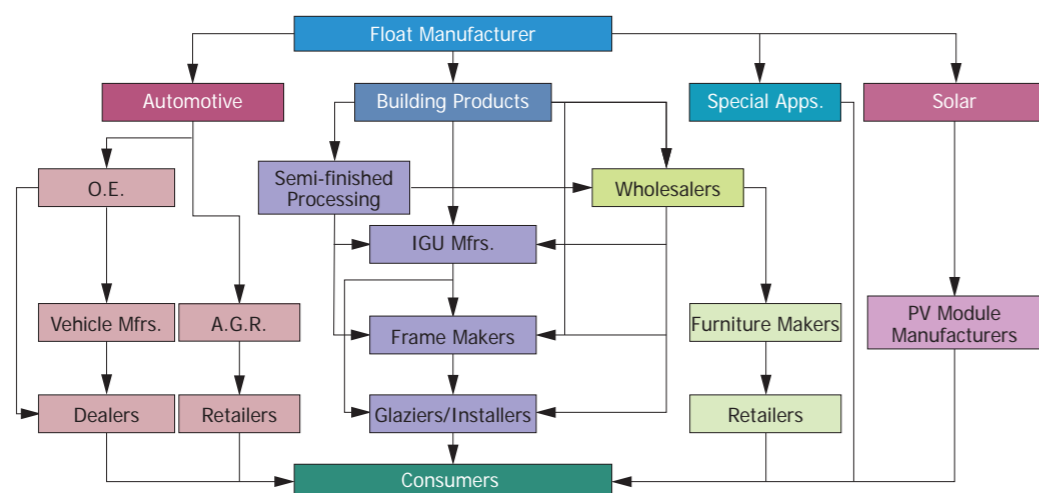


Global glass usage

Buildings	83%
New buildings	40%
Refurbishment	40%
Interior	20%
Automotive	7%
Original Equipment	80%
Replacement market	20%
Special Applications	10%
Solar Energy	10%
Other	90%



Routes to market*



*Typical structures in Europe and North America

Market and competitive environment

Europe, China and North America together account for 75 percent of demand for glass. Europe is the most mature glass market and has the highest proportion of value-added products.

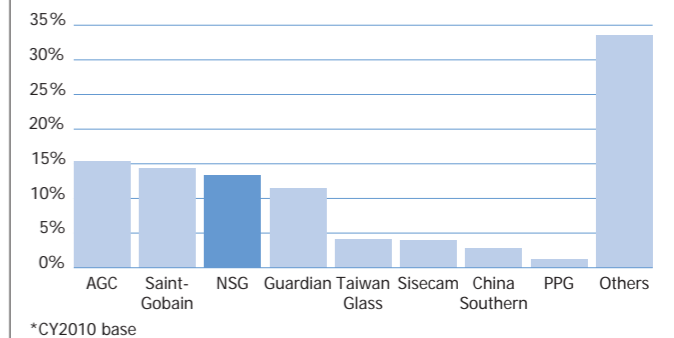
Four companies: NSG Group, AGC, Saint-Gobain and Guardian, produce around 60 percent of the world's

high-quality float glass.

There are only three glass groups with global automotive glazing capability and presence. NSG Group (Pilkington Automotive), AGC and Saint-Gobain, together with their respective associates and strategic partners, supply 70 percent of the world's OE glazing requirements.

World high-quality float glass capacities

The NSG Group has 13 percent of global high-quality capacity



Value growth

Architectural & Solar Energy	Energy-saving (solar and thermal control)	Energy-saving legislation and building regulations; reduction of energy gain and loss in buildings, decreasing the need for cooling and heating buildings.
	Safety/security	Increasing legislative requirement for safety glass in certain applications. Requirement for transparency combined with security features.
	Fire protection	Requirement for good light transmission and compliance with regulations on fire protection.
	Noise control	Increasing noise levels caused by traffic, aircraft, etc., progressively backed by legislation.
	Technical applications	Increased use of glass with special properties such as conductivity, neutrality and high transmission, for displays, transparent heating or cooling devices.
Automotive	Solar Energy	Demand for renewable energy, stimulated by government support and feed-in tariffs.
	Complexity	Designers see glazing as a crucial element in designs to differentiate vehicles.
	Curvature	Styling demands increase the complexity and depth of curves in vehicle glazing.
	Surface tolerance	Increasing depth and complexity of curvature makes surface tolerances critical, e.g. for efficient windshield wiper operation.
	Security	Crime and vandalism increase the need for security, provided by laminated side glazings.
Technical Glass	Solar control	Larger glass areas require tinted and coated glazing to reduce solar gain and air-conditioning load.
	Glazing systems	Reduced time to market and lean manufacturing require modularized glazing including trim and other fittings in one unit.
	Integrated systems	Complex antenna arrays and electronics integrated into glazing.
	Thinner touch screen interface	Move to touch screen mobile devices requires thinner and lighter top-quality ultra-thin float glass.
	High-quality energy-efficient office machinery	Demand for high-performance light guides and next-generation LED printers and copiers require high optical performance with low-energy usage.
High-performance batteries	Glass fiber battery separators help to assure improved capacity, stability and safety margins in the next generation of batteries.	
Efficient engine timing belts	NSG Group glass cord is increasingly replacing chain in engine timing belts, enabling lifetime fitting of belts that resist stretching.	
Reduction of traffic noise without light loss	Glass acoustic environmental screening attenuates noise without affecting light transmission, particularly useful in urban freeway settings.	

Glass Contribution to Climate

Glass has a unique role to play in promoting Sustainability, reducing greenhouse gas emissions and mitigate the effects of climate change. The NSG Group's high performance glass products such as Low-E glass, solar control glass and glass for solar energy, aim to reduce energy consumption in buildings and to convert power from the sun into clean renewable energy. Improving the energy efficiency in buildings and promoting photovoltaic battery through those products, we are able to make a huge contribution to mitigate climate change.

■ Glass in buildings

Buildings account for almost 50 percent of the energy consumed in developed countries. Governments are putting increased focus on legislation and policies to improve their energy efficiency.

● CO₂ emissions and low-e double glazing

The potential for low-e glass (double and triple glazing) to cut CO₂ emissions from new and existing buildings has been analyzed by the Dutch scientific institute TNO in a study undertaken for the trade association Glass For Europe.

It found that up to 90 million tonnes of CO₂ emissions could be saved annually by 2020 if all Europe's buildings (existing and new residential and non-residential buildings) were fitted with double-glazed low-e insulating glass units. An additional seven million tonnes of CO₂ emissions could be cut through a greater use of triple-glazed low-e insulating glass units for new buildings, where appropriate.

To maximize energy efficiency all year round, often the ideal glazing solution balances both solar control and low-emissivity performance.

● Thermal insulation – keeping heat in buildings

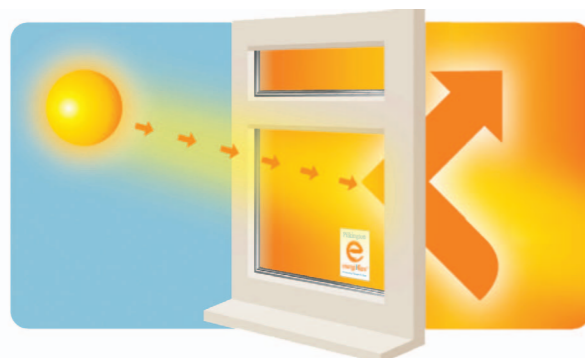
In cold weather, low emissivity (low-e) products reflect heat back into the building. Our thermal insulation products combine unrivalled thermal insulation with high light transmittance and lower reflectance for a more neutral appearance.

Our Spacia™ product was developed in Japan and was the world's first vacuum glazing commercially available, offering the thermal performance of conventional double glazing in the same thickness as single glass.

● Solar control – keeping heat out of buildings

Globally, increasing attention is being given to air-conditioned buildings, in order to reduce energy usage and CO₂ emissions, thereby creating opportunities for solar control glass. Products have special coatings applied to their surface that reflect up to 75% of the solar heat whilst transmitting the majority of the visible light.

Low-e insulating glazing can be a net contributor to energy conservation in buildings



Low-e glass is a value-added product that has a transparent coating on one surface. This reflects heat back into the building, thereby reducing heat loss through the window.

It also reduces the heat transfer from the warm (inner) pane of glass to the cooler (outer) pane, thus further lowering the amount of heat that escapes from the window.

The coating also allows large amounts of free solar energy to enter the building, thereby heating it passively.

■ Glass and solar energy

● During its life cycle, a solar panel can produce over 15 times the amount of energy used to make it.

Depending on the type, a photovoltaic panel will typically produce enough power in around two years to offset the energy used in manufacture. In other words, the input energy is equivalent to only 6.6 percent of the total output of the panel. During its life cycle, a solar panel can produce over 15 times the amount of energy used to make it.

● Our products support the three leading solar energy technologies.

Glass is an integral and important element of photovoltaic solar panels. To increase efficiency, low-iron glass, which is more expensive, but clearer than ordinary glass, is increasingly specified. Anti-reflective coatings can also increase the amount of usable solar energy. Our high-quality products are used in the three leading solar technologies aimed at converting solar energy into electricity: thin film photovoltaics, crystalline silicon photovoltaics and concentrated solar power applications.

Thin film photovoltaic solar modules



Thin film photovoltaic modules produce power at low cost per watt. They are ideal for large scale solar farms, as well as Building Integrated Photovoltaic applications (BIPV). They benefit from generating consistent power, not only at elevated temperatures, but also on cloudy, overcast days and at low sun angles.

Mehring Höhe solar park, Germany (Photo: juwi Solar GmbH).

Crystalline photovoltaic solar modules



Crystalline photovoltaic solar modules are highly efficient, but the cells are also expensive to make. So, best used in applications where space is at a premium.

Concentrated solar power applications



Concentrated solar power applications. Typically large area mirror arrays. Requires a large area and lots of sunshine. Particularly effective in sunny deserts.

Corporate Governance

Corporate governance is a key element in the Sustainability activities of the NSG Group. We are committed to effective and transparent engagement with all our stakeholders. We believe that good corporate governance contributes to sustainable development by enhancing the performance of companies and increasing their access to outside sources of capital. We aim to maintain high levels of accountability and transparency, disclosing to all our stakeholders business goals and guidelines that clearly demonstrate a responsible management approach.

Our governance structure

The NSG Group is governed by its Board of Directors, which is appointed by resolution at the General Meeting of Shareholders. The Board comprises eight directors, of which four are independent external directors and all Board committees are chaired by an independent external

director. The Board of Directors oversees the Group's economic, social and environmental performance and compliance with internal and internationally agreed standards, codes of conduct and principles.

Company with Committees

In June 2008, shareholders approved the adoption by the Group of the Company with Committees model, replacing the former Corporate Statutory Auditors model. Three committees were established.

The Nomination Committee decides the details of the agenda items to be submitted to the General Meeting of Shareholders concerning the appointment and removal of directors. The Committee consists of six directors, including four independent external directors.

The Audit Committee comprises four directors, which are all independent external directors. It conducts audits of the execution of duties by directors and executive directors and ensures that adequate risk management

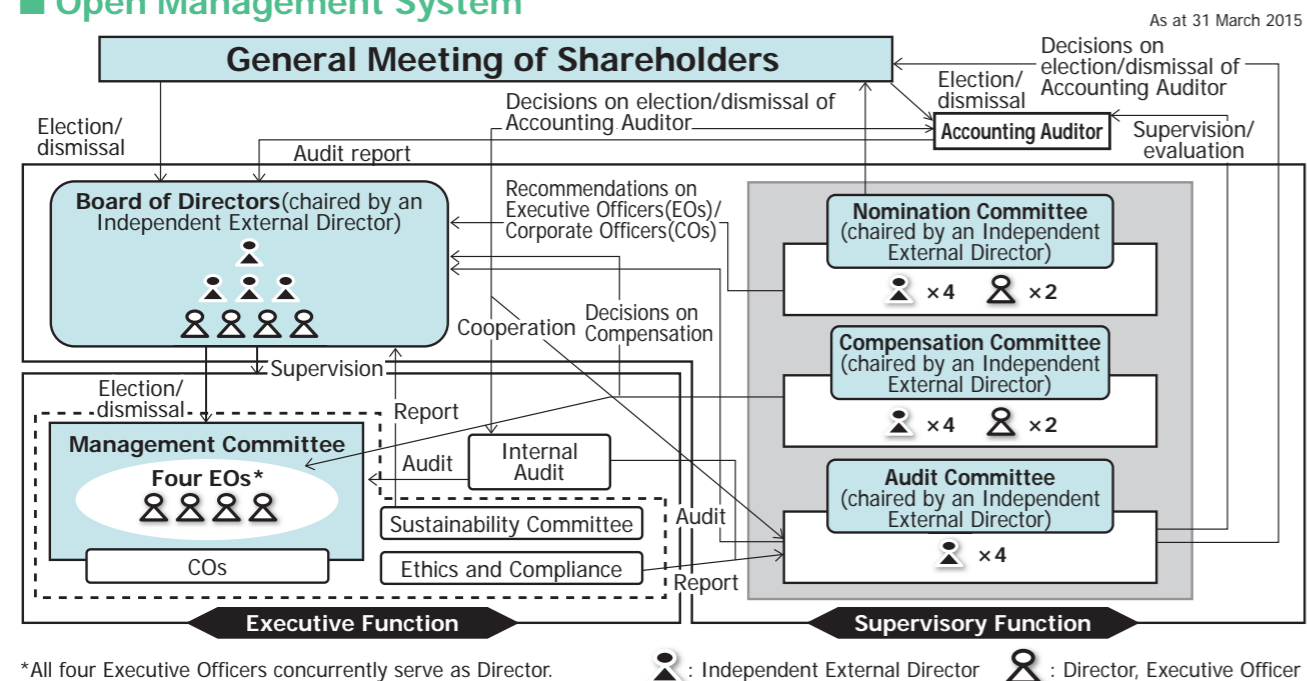
processes are followed. It also decides the details of agenda items to be submitted to the General Meeting of Shareholders concerning the appointment and removal of independent auditors.

The Compensation Committee makes decisions on compensation of individual directors and executive directors. The Committee consists of six directors, including four independent external directors.

All Board Committees are chaired by an independent external director.

***Note:** The numbers of directors and external directors described in the explanations of each Committee are the numbers of member of each Committee in FY2015.

Open Management System



Company Details

Company Name:	Nippon Sheet Glass Co., Ltd.
Established:	November 22, 1918
Tokyo Head Office:	Sumitomo Fudosan Mita Twin Bldg. West Wing, 5-27, Mita 3-Chome, Minato-ku, Tokyo, 108-6321 Japan
Paid-in capital:	¥116,449 million
Common stock:	Authorized: 1,775,000,000, Issued: 903,550,999
Employees:	Approx. 27,000 (Permanent employees, as at 31 March 2015)
Business Lines:	Architectural, Automotive, Technical Glass

Corporate History

Nov 1918	Obtained technology from Libbey-Owens-Ford Glass Co. of the United States to produce flat glass using the Colburn process. Established as America Japan Sheet Glass Co., Ltd. with its head office in Osaka.
Jan 1931	Changed the company name to Nippon Sheet Glass Co., Ltd.
Nov 1964	Installed a new float glass manufacturing process at the Maizuru Plant in Maizuru, Kyoto Prefecture.
Aug 1971	Installed a new float glass manufacturing process at the Chiba Plant in Ichihara, Chiba Prefecture.
Nov 1971	Established Malaysian Sheet Glass Sdn Bhd (MSG) in Malaysia.
Sep 1986	Established United L-N Glass Inc. in the United States of America.
Aug 1996	Established Suzhou NSG Electronics Co., Ltd. in China
Apr 1999	Merged with Nippon Glass Fiber Co., Ltd. and Micro Optics Co., Ltd.
Jul 2000	Invested in Pilkington Plc.
Jul 2004	Transferred the registered location of corporate headquarter from Osaka City to Minato-ku, Tokyo.
Jun 2006	Acquired remaining 80% equity of Pilkington Plc. and made it a subsidiary.
Jun 2008	Moved to "a Company with Committees" board structure.
Apr 2011	Implementation of International Financial Reporting Standards (IFRS)