



2001
Asahi Glass
Environmental Report

Company Outline (as of 3/31/2001)

Official Name	Asahi Glass Co., Ltd.
Address	12-1 Yuraku-cho 1-chome, Chiyoda-ku, Tokyo, Japan 100-8405
Founded	September 8, 1907
Incorporated	June 1, 1950
President	Shinya Ishizu
Capital	90,472 million yen (Shares issued 1,175,242,497)
Employees	7,275 (consolidated basis employee count 48,809)

Business Areas

Flat Glass and Construction Materials General Division:

Flat glass for buildings and residences
Mirrors
Housing construction materials
Decorative glasses for retailers
External cladding for buildings
Sidings for housing etc.

Fabricated Glass General Division:

Fabricated glass for automobiles
Processed glass for industrial use

Display Glass General Division:

CRT glass products
Flat-panel display products

Chemicals General Division:

Inorganic chemicals
Organic chemicals
Ion exchange membranes
Fluorinated materials
Urethane products etc.

Ceramics & Refractories Division:

Various refractories
Aluminous cement
Fine ceramics etc.

Electronic Materials & Products General Division:

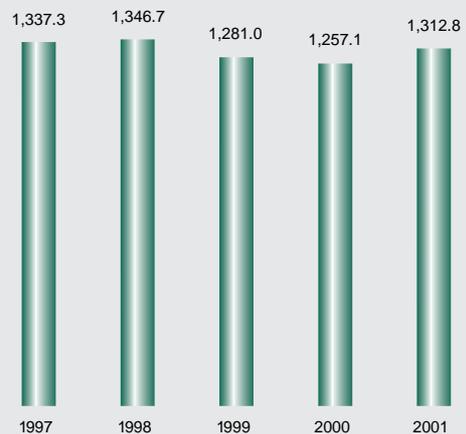
Glass frit paste
ICs/Circuit boards
Synthetic quartz/High purity silicon carbide
Opto-electronics goods etc.

Other Businesses:

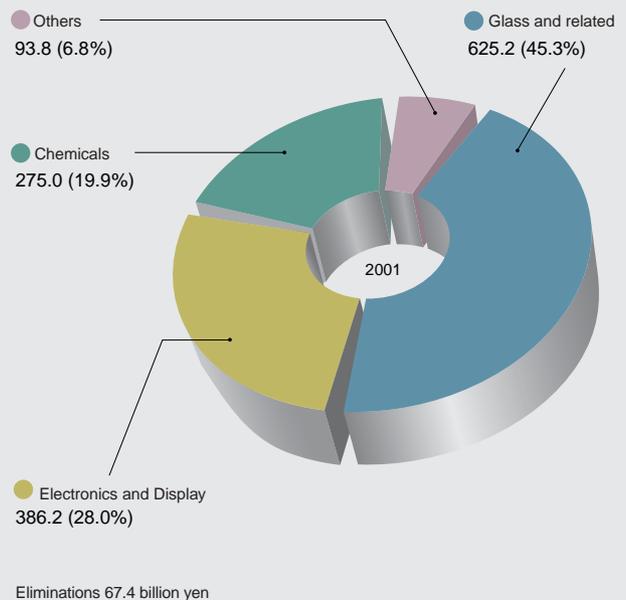
Protein synthesizing system (using yeast)
Fluorinated resin optical fibers etc.

Financial Data

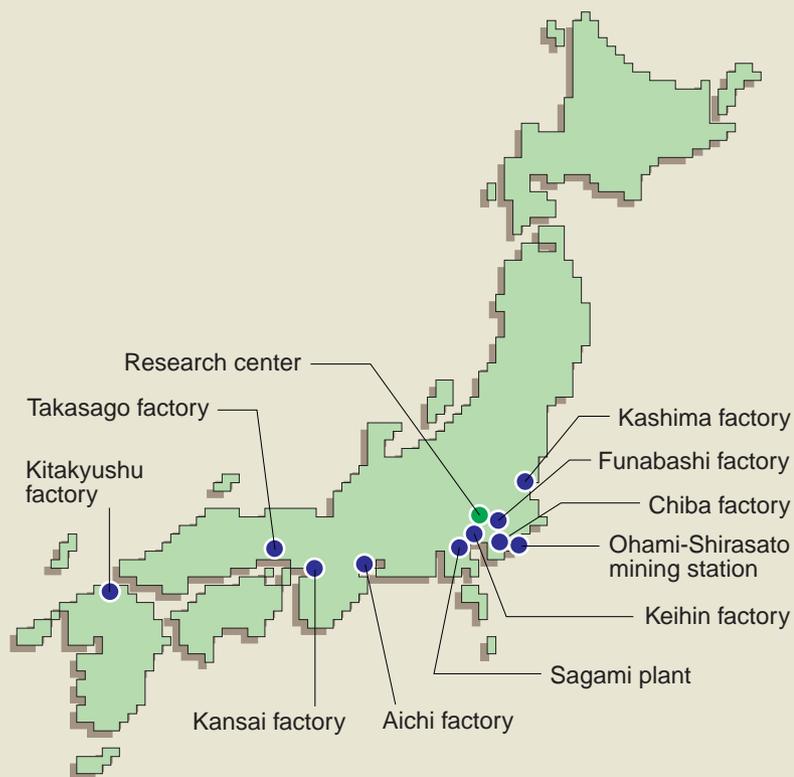
Consolidated Sales Trends (units: billion yen, rounded to nearest 100 million)



Consolidated Sales by Segment (units: billion yen, rounded to nearest 100 million)



List of Major Facilities Involved



Research center 1150 Hazawa-cho, Kanagawa-ku, Yokohama 221-8755

Kansai factory 2 Nishimukoujima, Amagasaki 660-0857
Main products: flat glass, flat panel display (FPD) glass substrates

Kitakyushu factory 5-1-1 Makiyama, Tobata-ku, Kitakyushu 804-8520
Main products: fabricated glass, chemicals, exterior siding boards

Keihin factory 1-1 Suehiro-cho Tsurumi-ku, Yokohama 230-0045
Main products: flat glass, flat panel display (FPD) glass substrates

Takasago factory 5-6-1 Umei, Takasago 676-8655
Main products: CRT glass bulbs, ceramics, components for silicon carbide semiconductor equipment

Chiba factory 10 Goikaigan, Ichihara-shi 290-8566
Main product: chemicals

Funabashi factory 1-10-1 Kitahonmachi, Funabashi City 273-0864
Main products: CRT glass bulbs

Aichi factory (Taketo) 1 Aza-Asahi Taketo-cho, Aichi Pref. 470-2394
Major products: flat glass, fabricated glass, polycarbonated sheets

Aichi factory (Toyoda) 9-30-1 Umetsubo-cho, Toyoda-shi, Aichi Pref. 471-0064
Major product: fabricated glass

Kashima factory 25 Higashi-Wada, Kamisu-cho, Kashima-gun, Ibaraki Pref. 314-0195
Major products: flat glass, chemicals, exterior siding boards

Sagami plant 426-1 Sumida, Aikawa-machi, Aiko-gun, Kanagawa Pref. 243-0301
Major products: fabricated glass

Ohami-Shirasato mining station 940 Hosokusa, Ohami-shirasato-machi, Sambu-gun, Chiba Pref. 299-3211
Main product: natural gas

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The Scope of this Environmental Report

This report concerns what Asahi Glass has done to help protect the environment. Focusing on the factories listed at the left, it covers our main efforts up to FY2000.

The statistics provided here are for the period ending March 31, 2001.

Message from the President

We have now entered the 21st century, which many call the "environmental" century. To create a more abundant, safe and pleasant society in this century, all citizens of planet earth must be aware of the environmental impact of our activities, and actively work to reduce that impact. Japan has seen a consistent move to enact environmental laws and regulations promoting a society that recycles its resources. All members of the corporate community therefore face increasingly onerous responsibilities.

The business of Asahi Glass revolves around processing materials that have a relatively high impact on the environment. That is why we voluntarily place so much emphasis on tackling environmental protection issues in our operations. We are concentrating on five key areas: active management and full disclosure of the environmental impact of our activities; countermeasures for global warming; recycling and the reduction of industrial wastes; responsible management of chemicals; and promotion of environmental protection business. Through our participation in the Japan Responsible Care Council and the World Business Council for Sustainable Development, we are making every effort to exchange information on the environment and to cooperate with other enterprises in Japan and overseas in tackling environmental issues.

Last April, our company established a new medium-term business plan known as "Shrink to Grow 2003." In it, we put forward new objectives for environmental protection. From this year, the scope of environmental protection activities will expand to embrace the entire Asahi Glass group, including our subsidiaries and affiliates. The plan also includes initiatives aimed at zero emissions of hazardous materials in production processes, carrying out life-cycle assessments, and introducing environmental accounting, as well as active efforts to disclose more information.

As a leading company in the basic materials sector, we are committed to a pioneering role in dealing with environmental issues.

This report describes some of our environmental activities and the successes we have achieved. We hope it will help you to understand how Asahi Glass is dealing with these issues, so critically important for mankind.

Please feel free to bring to our attention any ideas or comments you may have.

October 2001



Shinya Ishizu, President



The Asahi Glass Group's Environmental Policy

The principle upon which the Asahi Glass Group engages in environmental management activities is as follows: Active contribution to environmental protection is a fundamental responsibility of enterprises towards the global society within which they operate. This principle is implemented in the following environmental management activities.

- 1 We are committed to the preservation of the environment of Earth as a top management priority in all our corporate activities.
- 2 We will make every effort to establish the organizations and systems required to preserve the environment and to work for continuous improvements.
- 3 We will comply with laws, ordinances, regulations, treaties and agreements designed to preserve the environment. We will also set and work to achieve voluntary objectives to reduce environmental impacts.
- 4 We will work to develop and provide society with products, technologies and services that reduce environmental impacts.
- 5 We will publicize our overall environmental preservation activities to ensure that they are properly understood by society.



Asahi Glass Environmental Guidelines

1 Active Management and Information Disclosure

The Corporate Environment & Safety Directorate draws up a company-wide annual environment plan and then conducts environmental audits to check how well the plan is carried out. The company also tries to motivate both directors and employees to tackle environmental problems through sharing of all relevant information. In addition, we actively disclose information to customers and others outside the company. What is more, to stringently deal with environmental problems, all the plants in Japan will soon be ISO14001 compliant.

2 Measures Against Global Warming

Asahi Glass' glass-making and chemical manufacturing are both energy-intensive production processes, and the company manufactures gases now known to have a greenhouse effect, such as HFC and SF₆. At Asahi Glass, we take this responsibility seriously and are intent on minimizing the environmental impact of our operations. This is not only discharging our responsibility to society; we see it as essential to ensure the continuing existence of the company.

Naturally, we are doing our best to cut down on energy consumption in our day-to-day operations; however, we are also actively innovating to come up with process technology that will contribute to solving the problem of global warming.

3 Waste Reduction and Recycling

Reduction of the wastes created in our production processes is a major issue for the materials processing industry in general. Asahi Glass has set and publicly announced clear quantitative targets and is dealing firmly with the problem.

We are also seeking the cooperation of users so that products made with our products can be collected and recycled when they end their useful life.

4 Responsible Management of Chemicals

Although many chemical substances have proved useful in helping us achieve convenience and comfort in life, the effects of some of these substances are causing concern because of their harmful effects on health and the environment.

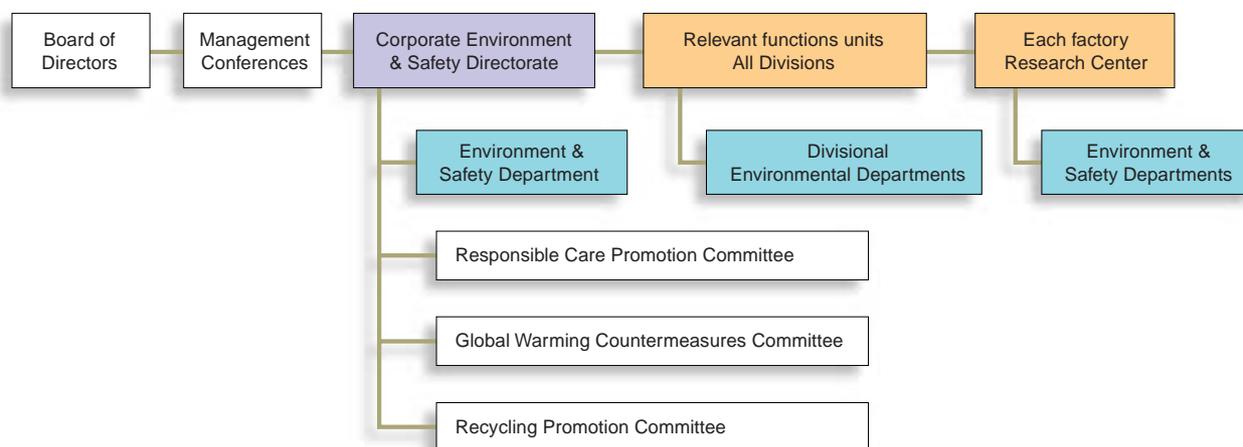
We are working to minimize the amount of chemicals emitted into the air and water from production processes. At the same time, in our desire to prevent problems, we will provide continued support to customers, helping to ensure that chemicals are properly handled during transport, use and final disposal.

5 Environment-Related Business

Asahi Glass has been increasing its presence in the environmental business field. Rather than take a purely defensive stance, we actively seek to anticipate and meet social needs as they arise. We are taking advantage of our strengths as a materials company to develop new businesses, seeking to anticipate and meet social needs by producing materials that are energy efficient or free from harmful substances.

The people at Asahi Glass are seriously committed to providing products and technologies that have no impact on the environment and to making their own special contribution to society.

Organizations Concerned with the Environment



Coordination of company activities

To generally control environmental policies, including those involving global issues, and to coordinate and promote action, the Corporate Environment & Safety Directorate has been set up under the leadership of an executive vice president.

The activities of the Directorate are listed below.

1. Keep abreast of relevant environmental issues in and outside the company
2. Establish the company's policy toward environmental issues
3. Identify practical themes for environmental activities
4. Set up policies and promote actions to arrive at concrete results

In some cases, specific policies are examined and expedited by the groups organized within the Directorate.

Action teams

Action teams are deployed in every division and at each factory to carry out concrete activities in accordance with the decisions of the Corporate Environment & Safety Directorate.

To give two examples: a team has been drawn from the flat glass and fabricated glass divisions to work out how to re-cycle automotive glass; another team to collect and recycle used CRT glass bulbs was formed in the display division.

Staff

To carry out the administrative tasks required by the Corporate Environment & Safety Directorate, the Environment & Safety Dept. has been set up at the company head office. Meanwhile, the heads of each factory and of the Research Center have also set up Environment & Safety Depts. under their direct supervision.



Environmental Management System



Complying with ISO14001

As soon as the ISO14001 global standards for environmental management were published in February 1997, we made it company policy to bring every factory up to standard.

Already eight of our ten factories have been formally certified. Among these, the Keihin, Sagami, and Takasago factories were in the news as the first factories in Japan to be certified in the flat glass, automotive glass, and TV tube sectors.

Work is proceeding at each of the remaining factories towards achieving certification by March 2002.

Progress toward complete ISO14001 certification



Facility name	Certification date	Accreditation Body
Keihin factory	Feb. 1998	Japanese Standards Association
Sagami plant	Aug. 1998	Japanese Standards Association
Takasago factory	May 1999	Japanese Standards Association
Kashima factory	Oct. 1999	Japan Chemical Quality Assurance Ltd.
Aichi factory	Mar. 2000	Japan Quality Assurance Organization
Funabashi factory	May 2000	Japanese Standards Association
Research Center	Jul. 2000	JIC Quality Assurance Ltd.
Kansai factory	Dec. 2000	Japan Quality Assurance Organization
Kitakyushu factory	Mar. 2002 (proj.)	—
Chiba factory*	Mar. 2002 (proj.)	—

* Includes Ohami-Shirasato mining station .



We are also proceeding toward the certification of domestic and overseas subsidiaries and affiliates.

Progress toward complete ISO14001 certification

Domestically,

Asahi Glass Urethane Co., Ltd.	Oct. 1999
Optrex Corporation, Amagasaki Factory	Feb. 2000
SP Pacific Ltd.	Mar. 2000
Asahi Glass Fine Techno Co., Ltd.	Mar. 2000

Overseas,

Shanghai Asahi Electronic Glass Co., Ltd. (China)	Jan. 1999
AP Technoglass Ohio Plant (AFG Industries)	Sept. 1999
AP Technoglass Kentucky Plant (AFG Industries) (USA)	Dec. 1999
Zibo Asahi Glass Fused Materials Co., Ltd. (China)	Sept. 2000
PT. Asahimas Chemical (Indonesia)	Jun. 2001
Engro Asahi Polymer and Chemicals Ltd. (Pakistan)	Aug. 2001

Environmental Auditing

As part of our effort to improve the company's overall environmental record, to get a clear picture of what we are doing, we started environmental auditing in 1994. Now we evaluate the operations at all of our factories and the Research Center.

Actual procedures include annual auditing of the records and documents from each facility. When the findings indicate the need for action the head of the Environment and Safety Department goes to the site for an on-site audit. The results of this are included in the reports that the head of the directorate mentioned above makes to the president of the company.

Environmental auditing over the past five years

Year	On-site audits	Documentary audits
1996	Sagami plant, Aichi factory, Kansai factory, Research Center	All the factories in Japan including those on the left and the Research Center.
1997	Kitakyushu factory, Takasago factory, Chiba factory, Kashima factory	As above
1998	Keihin factory, Funabashi factory, Aichi factory, Sagami plant	As above
1999	Kitakyushu factory, Chiba factory, Kashima factory	As above
2000	Keihin factory, Funabashi factory	As above

Environmental activities at consolidating subsidiaries and affiliates now merging with parent

Asahi Glass has a continuing commitment to measures aimed at environmental protection, both at domestic and international subsidiaries and affiliates. In order to keep track of and improve upon environmental protection activity at related companies, from 1995 we have been carrying out environmental audits at related companies on a continual basis, focusing particularly on the chemical side.

In addition, from FY2001 the company is making it clear that environmental protection activities that have all been focused on Asahi Glass itself will now be expanding out to the Asahi Glass group companies. Thus, Asahi Glass' environmental protection activities will be integrated as never before with the related companies, domestic and overseas. (Plans are to have domestic related companies integrate from FY2001, with overseas related companies becoming integrated from FY2002.)



Environmental auditing at an overseas subsidiary:
Engro Asahi Polymer and Chemicals, Pakistan





Environmental Accounting

In May of 2000, the then-Environmental Agency released an Environmental Accounting Handbook which indicated such items as definitions for, means to track, and ways to publicize, the costs and benefits of efforts to preserve the environment. In addition, in March of 2001, the Ministry of the Environment released the Environmental Accounting Handbook II. Increased effectiveness in all of our environmental efforts will be demanded from us, not to mention implementation of the content of these handbooks.

For Asahi Glass' part, we intend to be making reference to the guidebook released by the Ministry of the Environment as we establish our environmental accounting. From 2000, we have established model offices for the implementing of environmental accounting, and have started to track the data needed for environmental accounting.

At the present time, we here present the environmental accounting data for Kashima factory, one of the company's major facilities, as a representative example.

Note that our plan is to print up the fully totaled results of environmental accounting for the whole of Asahi Glass in the Asahi Glass Environmental Report 2002.

Kashima factory: Environmental protection costs, and benefits related to these protection measures

Units: million yen

Costs of environmental safeguards	Details	What we are doing	Amount of investment	Expenditure amounts
	(1) Environmental protection costs due to production/service activities			219
	Pollution prevention costs	Treatment of exhaust gases, sewage	172	1,258
	Costs for protection of the earth's environment	Treatment of agents causing global warming	23	27
	Resource cycling costs	Disposal of product waste	24	369
(2) Costs to limit burdens caused upstream or downstream due to production/service activities		Use of recycled paper, etc.	0	91
(3) Environmental protection costs incurred through administrative activities		Personnel costs, costs for meetings, etc.	0	61
(4) Environmental protection costs incurred through research and development			0	0
(5) Environmental protection costs incurred in activities to benefit society		Maintenance of green lands	0	22
(6) Costs for dealing with environmental damages		Pollution assessments, etc.	0	29
	Total		219	1,857

Note: The environmental protection costs listed above are calculated solely for the costs of the Kashima plant alone. Joint administrative and investment costs for the whole company are not included.

Units: million yen

Economic benefits	Details	Amount
	Revenues gained from recycling	124
Cost reductions through saving of energy	140	
Reductions in waste disposal costs due to recycling	118	
Cost reductions through reducing resource use	3	
	Total	385

Note: The calculation of economic benefits given above has been done using only firm results that have already been realized, such as gains on sales of materials recovered, and curtailments in costs



Environmental Awareness Education Etc.

In line with our policy of ensuring the effective promotion of environmental protection by an aware workforce, Asahi Glass is committed to environmental education and the sharing of information.

Instruction and Training

Company-wide environmental training

For employees from anywhere in the company, lectures are being held to cover the range of laws and ordinances that deal with environmental protection and disaster security, as part of employee training in legal matters. Also, the company has begun offering Environmental Seminars from 2001 for employees of Asahi Glass and the group companies.

Environmental law training – actual status	
Period of instruction	Attendance
1998~1999	221
2000	88

Division-based environmental education

Education is promptly given locally as required to cover the technical and legal aspects of activities in each division. For example, in the Chemicals Division, at a branch office, at their factory, or at R&D facilities, employees may receive instruction concerning environmental technology or explanations of changing laws and regulations. At factories that have received ISO14001 certification, as part of the continuous improvement policy, employees at every level receive environmental education.

Training for Chemicals Division – actual status	
Period of instruction	Attendance
1997~1999	289
2000	91

Environment-related Qualifications Held by Staff

At Asahi Glass, we encourage our staff to obtain various kinds of official qualifications as part of their ongoing education. For major environment-related qualifications, the number of staff possessing each is as follows:

Holders of Major Environment-Related Qualifications (as of end of March, 2001)

Qualification	Number Qualified	
Environmental Management System Auditor	Senior Auditor	1
	Auditor	2
	Asst. Auditor	14
Pollution Control Manager	Air	393
	Water	474
	Noise	122
	Vibration	34
	Dust	17
	Senior	11
Environmental Certified Measurer	18	
Working Environment Measurement Expert	158	

Qualification	Number Qualified	
Energy Administrator	Electrical	80
	Thermal	284
HP Gas Product Safety Manager (A, B, C)	1,152	
Hazardous Material Chief Engineer (A, B)	2,152	
Chief Engineer for Radioactive Substances	57	
Operations Chief for Handling of Organic Solvents	878	
Designated and Other Chemicals Supervisor	1,080	
Poisonous and Harmful Substances Supervisor	152	
Waste Treatment Plant Superintendent	41	
Manager, Specially Controlled Industry	63	

Note: only office and technical staff totaled

Disclosure of Information

An environment homepage has been created for all company employees. We also send out the Environment Quarterly in order to share and communicate the latest environmental information from both within and outside the company.



Environment Homepage on the company intranet



Energy Saving & Water Resources Protection



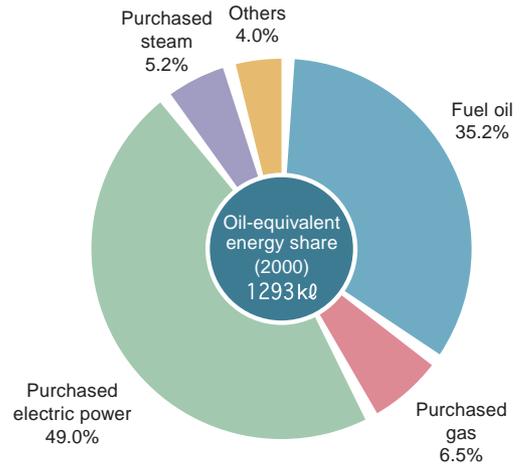
Guidelines

Asahi Glass is a consumer of many types of energy, with salt electrolysis facilities that consume large amounts of electric power and glass melting facilities that consume huge quantities of fuel oil; the types of energy sources used by the company are also quite diverse.

Under these circumstances, Asahi Glass thinks that it is important to be acting steadily to develop energy-saving measures dealing with various different types of energy use, building up good results with these efforts.

Also, in order to protect water resources, the company is setting up numerous treatment facilities to allow closed-loop system water usage, such as the use of cold water in the manufacturing process, as part of its efforts to reduce company use of water.

Shares for Various Types of Energy Use

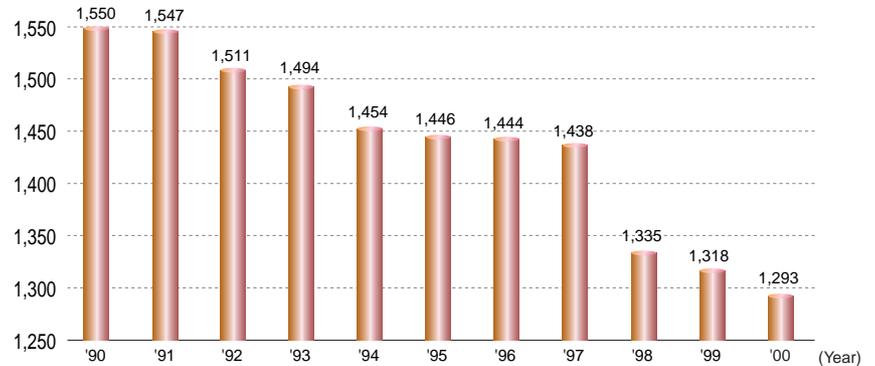


Results

As a result of company measures to reduce total energy usage and water usage, they are on the decline.

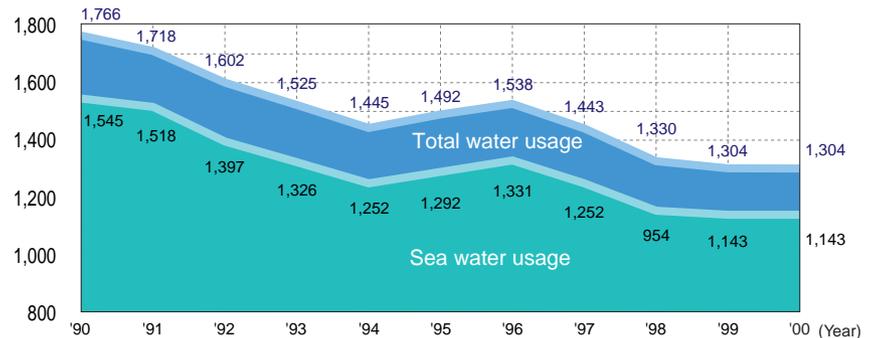
Total Energy Usage

Oil-equivalent energy use (1,000 kℓ/FY)



Water Usage

Trends in use of water resources (million m³/FY)





Measures Against Global Warming

Greenhouse Gas Guidelines

Energy-intensive processes, such as oil-fired glass fusion and salt electrolysis, which uses electricity, cause relatively large CO₂ emissions. Moreover, as a producer of HFC and SF₆, two of the types of greenhouse gas targeted for reduction at COP3, we are seriously committed to reducing production site emissions.

Well in excess of the national target of minus 6% by between 2008 to 2012, the company has acted to reduce its CO₂ emissions to 12% below the 1990 baseline as of 2000. Great improvements in energy efficiency have come from plant intensification and innovative technology: at subatmospheric pressure flat glass refining can be done at a lower temperature (SAR method); oxygen combustion developed for bulb manufacture has been extended to flat glass; and at the Kashima Plant the IM method has reduced the power requirements for salt electrolysis.

Major measures against greenhouse gases

Category		Chemicals	Glass and ceramics
CO ₂	Due to energy use (arising from use of combustion, electricity, etc.)	More energy-efficient salt electrolysis	SAR,* oxygen combustion technology,** plant intensification, switch from fuel oil to LNG
	Not due to energy use*** (arising from chemical reactions)	Switch to natural ash	—
SF ₆ HFC	—	Emissions from production and filling processes	—

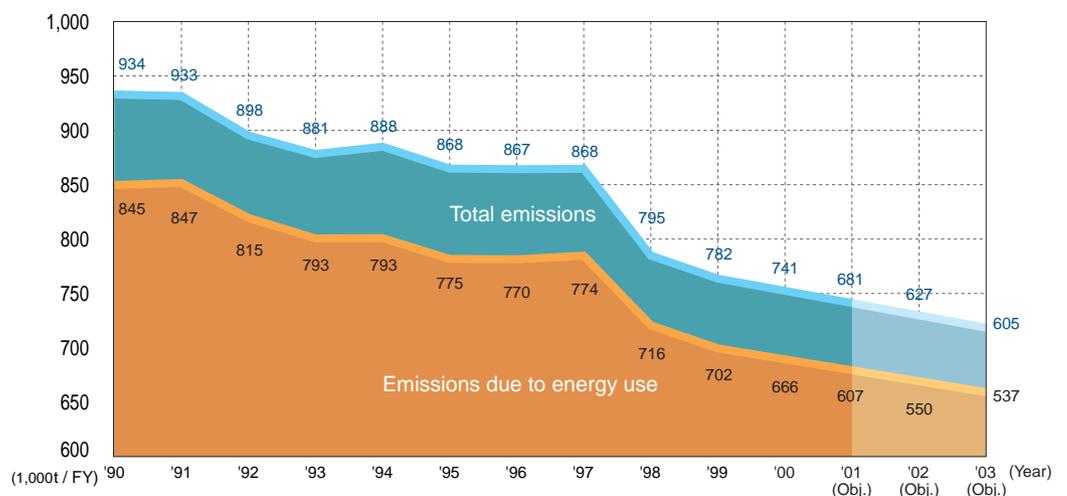
*** See Eco Plant on p. 20 for details

*** A typical source of CO₂ emission not due to energy use is the release of gas from reactions during soda ash production.

Results

As you can see from the graphs below, Asahi Glass has been steadily reducing CO₂ emissions. Based on 1990 totals, 21% curtailment by 2000 has exceeded the target of 12% reduction to be achieved by that year.

Changes in the amount of CO₂ emissions (1,000t / FY)





Record of Effective Measures

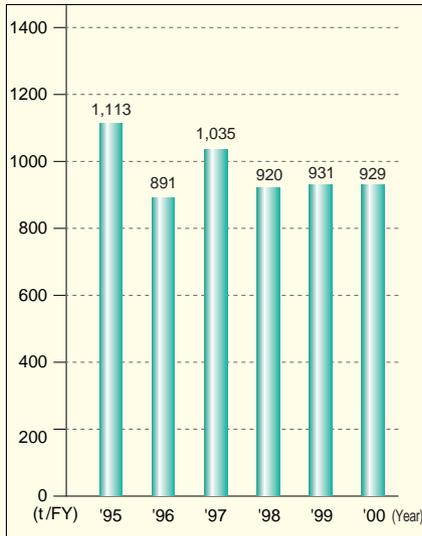
To reduce the levels of SO_x, NO_x, COD, and other adverse effects of emissions on air and groundwater quality, we have entered into agreements on pollution prevention with the municipalities in which our factories are located. In compliance with the law, our factories are equipped with desulfurization, denitration, wastewater treatment, and other antipollution equipment. We are strongly committed to further reducing emissions and are actively seeking effective ways to decrease environmental impact.

We place particular emphasis on the reduction of NO_x, and will be equipping more of our glass furnaces with oxygen combustion technology.

Indices for major emissions that affect the environment

Atmospheric Pollutants

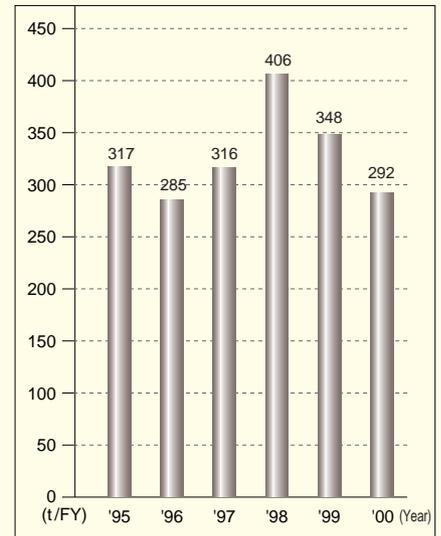
■ SO_x



■ NO_x

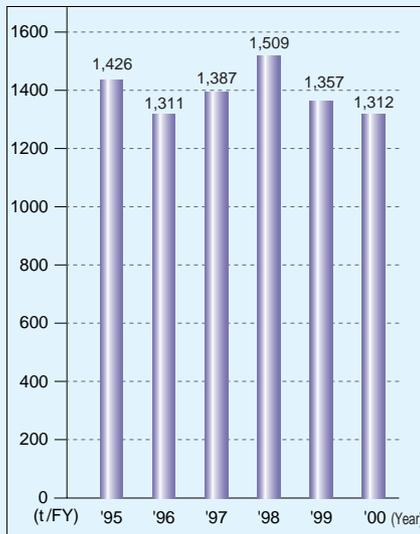


■ Particulates

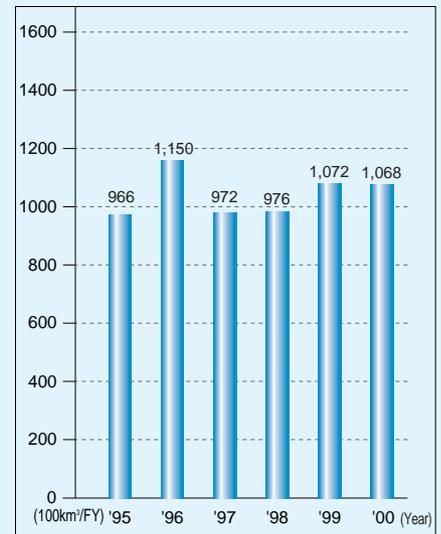


Water Pollutants and Waste Water Volume

■ COD



■ Wastewater





Actions at Site of Production

Compliance with the PRTR Law

Based on the PRTR (Pollutant Release and Transfer Register) Law from 2001, Asahi Glass will be required to track and compile data on the total amounts of pollutants we transfer and release for some 354 Class 1 Designated Chemical Substances, and from 2002 on, submit reports on the data thus collected to the government.

Asahi Glass has been involved in establishing pollutant control systems even before this legislation. From 1996, the company began a voluntary effort to track and compile pollutant release and transfer figures, while also working to reduce emissions. Note that according to totaled results for 2000, Asahi Glass is using 56 out of the 354 reportable pollutants.

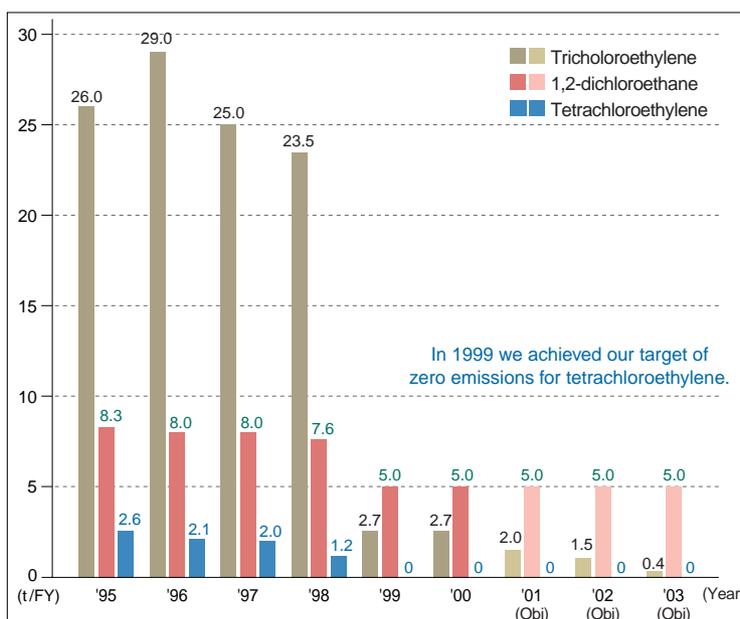
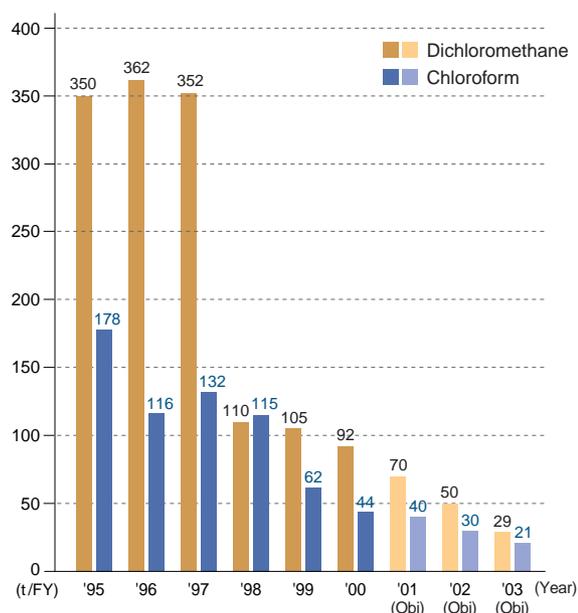
Looking toward the future, we will be working not only on responsible management of reportable pollutants, but also on reducing use and emissions of such substances.

Facility Name	No. of reportable substances
Kansai factory	1
Kitakyushu factory	3
Keihin factory	5
Takasago factory	10
Chiba factory	36
Funabashi factory	7
Aichi factory	3
Kashima factory	22
Sagami plant	3
Research center	1
Company as a whole	56

Tracking and reducing amount of pollutants released

Volatile organic compounds (such as dichloromethane) produced by Asahi Glass are widely used as raw materials for the making of chemical products, cleaning solvents, reaction solvents and so forth. Yet in the meantime, due to applicable laws and ordinances, we need to take various preventative measures in light of the impact these products may have on the environment and on people's health. Acting together with the industry, Asahi Glass will be working to have all parties be fully aware of appropriate methods of use, and also working to reduce emissions from factories. We are making a particular effort to reduce discharges into the atmosphere through such means as building up our recovery facilities.

Trends for volatile organic compound emissions





Safety During Use and Disposal

Material Safety Data Sheet System

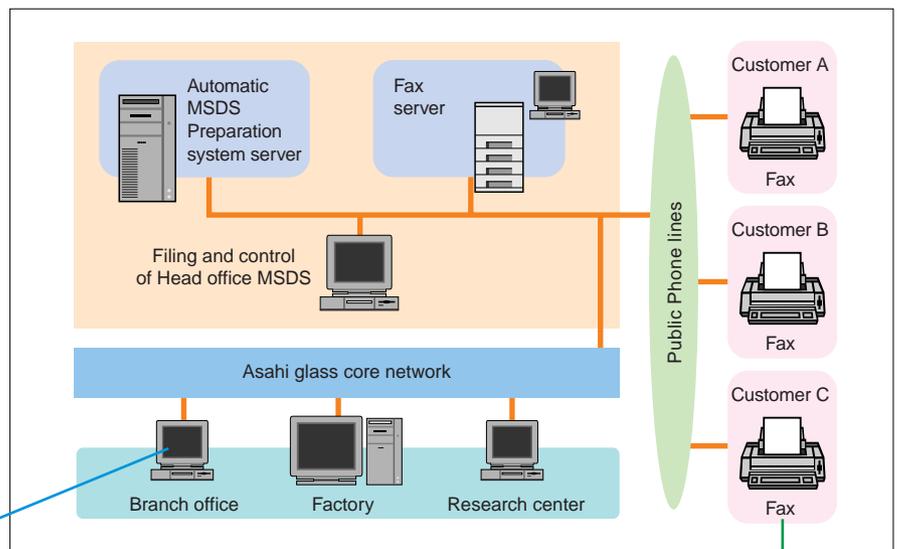
Since 1992, Asahi Glass has used Material Safety Data Sheets (MSDS) to communicate the proper handling, characteristics, and environmental impact of products during use and at the disposal stage. To ensure that all customers without exception receive this information we have set things up so that company-prepared MSDS are automatically issued via the company LAN.

Distribution of MSDS

Types prepared (Japanese)	Types prepared (Other languages)
950	410

(as of end of March, 2001)

MSDS system schematic



When an MSDS is created or revised, the relevant sales representative is automatically informed, and the MSDS is simultaneously forwarded to registered customers by fax.



Actions Concerned with Distribution

Yellow card system

To be prepared for any contingency during the transport of potentially hazardous loads, drivers receive yellow cards.

These cards have instructions about what to do if an accident happens when chemicals or high-pressure gas are being transported. They provide advice for the driver, those present at the scene, the fire services, the police, and/or the highway authority about what to do in case of such an emergency.

As of March 2001, the company had produced 60 types of yellow card.



Passed out as a shipment goes out



Yellow cards

Transport vehicle accident mutual support group membership

1. Local High-Pressure Gas Fire Prevention Association

To minimize the effect of any accident that may occur involving transport vehicles, Asahi Glass is part of this mutual support system covering the whole of Japan.

2. Company facilities registered with Japan Chemical Industry Association as able to provide neutralizing agents in the event of accidents.

If an incident occurs, facilities may be called upon to provide neutralizing agents (soda ash, slaked lime).

Distribution safety inspections

To ensure the safe transportation of chemicals, safety inspections are carried out at distribution depots.

☆ In 2000, there were no serious accidents impacting the environment that involved products in transit.



Measures Against Industrial Waste



Guidelines

Asahi Glass has taken on the task of actively reducing the volume of product wastes. We gave ourselves the very high target of reducing total waste output to 10% of the 1995 level by the end of FY2000.

The Recycle Promotion Committee, responsible for checking the overall progress being made, is organized as a cross-section of the entire company, and also decides policy and the actions to be taken.



Recycling Promotion Committee

Concrete examples of reductions/recycling

We already use as raw materials glass cullets and cerium glass grindings from CRTs and have reduced waste. Almost all concrete siding and soda ash scrap is being recycled.



Bins to segregate waste



The Zero Emissions Challenge

In the basic materials industries, it is a quite daunting challenge to bring wastes to zero, but we have set the goal of zero emissions by 2003 for our flat glass factories (Kansai, Keihin, Aichi and Kashima), and are taking various measures to accomplish this. We have also set the goal of zero emissions by 2005 for our fabricated glass plants (Kitakyushu, Sagami and Aichi – these plants mainly create car window glass), and are already actively working to achieve this.

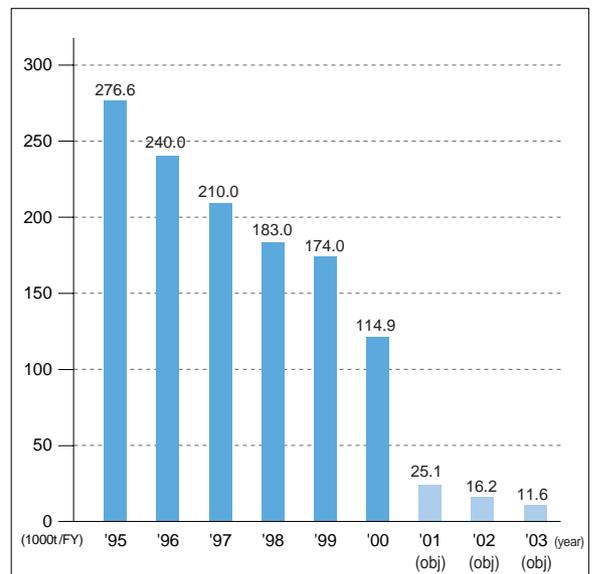


Results

We have been working at a high pitch to achieve our goal—a 90% cut in waste levels by 2000—but unfortunately actual results came to only 56%.

So, we have decided to work toward a new goal of 90% cut in waste by 2001, one year later than planned, and aiming for cuts of 95% for 2002.

Waste reduction trends





Soil Surveys and Remediation Measures



Guidelines

Asahi Glass is conducting soil and groundwater tests for the presence of contaminants at each of the factories, the Research Center, and those other company properties where there is some danger of contamination. The tests are being conducted in compliance with the Ministry of the Environment's Implementation Standards for Soil and Groundwater Surveys and Remediation Measures (January 1999). In situations where survey results indicate that the soil is contaminated, not only will this information be disclosed, adequate clean-up measures will also be taken.



Taking a soil sample



A soil-boring survey

Subsurface soil contamination at the Chiba factory

Based on soil and ground water tests conducted at the work sites of our Chiba Factory and at our affiliated company, Asahi Penn-Chemical Co., Ltd. from March 2000 to April 2001, it became clear that there were high concentrations of volatile organic pollutants in the soil and ground water at these facilities. When we learned of these results, we notified government authorities about the levels of contamination and our intended countermeasures, and then made the situation public through the mass media.

Presently, under the direction of the authorities, we are drawing up plans to prevent the diffusion of pollutants from both of these sites. At the same time, we will continue to conduct detailed soil and ground water surveys at both sites to determine contamination levels, as well as carrying out permanent remediation measures.



Environment-Related Business

By actively applying our core competence in glass and chemical technologies we are developing a broad range of environment-related businesses.

Eco Systems and Eco Business

Recycling systems

Recycling of television tubes

In April 2001, the Electric Appliance Recycling Law came into effect, and thorough recycling of TV parts has begun. To actively develop technology for recycling the tubes of old TVs, Asahi Glass took part from the outset in the TV Working Group of the Association for Electric Home Appliances. Currently, recycling is taking place at the Takasago and Funabashi plants, with glass from old television tubes being loaded into glass melting furnaces.

Cullets from old TV bulbs waiting for reuse



Transport of cullets

Automotive glass recycling

Asahi Glass has formed an Automotive Glass Recycling Team with participation from the relevant business units, and is working with related companies in the sector to aggressively deal with the issues. Ensuring quality is the biggest problem preventing us from recycling the cullet from end-of-life vehicles.

Asahi Glass is developing sorting technology to allow the receipt of automotive glass scrap and for float-tank evaluation of this type of cullet. We are moving forward with the development effort necessary for a system to recycle automotive glass.



Facility for cleaning of cullets

Recovered glass

Collection and breakdown of environmentally detrimental substances

Collection and breakdown of specified fluorocarbons

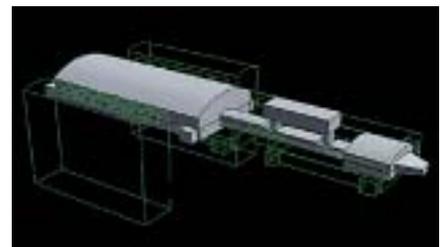
Based on international resolutions to preserve the ozone layer in the Montreal Protocol and to prevent global warming in the Kyoto Protocol, Asahi Glass is actively endeavoring to cooperate through process control and the development of replacement products. Along with these efforts in 1998, we started commercial operations to safely collect and dispose of unwanted CFCs and HCFCs. Moreover, after decomposing HFC23, which has high global warming potential, we have synthesized fluorite for further recycling into hydrofluoric acid. We have received public funding for ongoing technical development of this process.

Steps taken for CFCs and similar substances

Substance	Main application	Relevance to international agreement		Company efforts	
		Ozone layer conservation	Anti global warming	Manufacturing	Destroying
CFC (specified FC)	Coolants, solvents, foaming agents	○	×	Discontinued	Underway
HCFC (repl. FC)		○	×	Phasing down production	Underway
HFC (new FC)		×	○	Controlled exhaust emission	Underway
SF ₆	Insulation, etching agent	×	○	Controlled exhaust emission	Underway
Halon	Fire extinguishing agent	○	×	Discontinued	Viable

SAR: Subatmospheric glass refining process

Subatmospheric refining (SAR) is a new technology that allows bubbles, which mar the quality of commercial glass, to be removed at a lower melt temperature. Reducing the pressure means that gas inclusions can be removed at 1500°C rather than 1600°C, and this results in large fuel savings of around 30%. The combination of oxygen combustion technology and SAR has also meant a stunning reduction in emissions: 50% for CO₂ and 75% for NO_x. SAR is such an effective green technology that we are deploying it at all our plants.



Oxygen combustion technology for CRT glass fusion furnaces

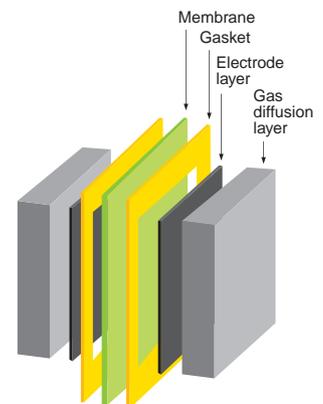
By using oxygen instead of air in the furnaces for CRT glass it is possible to greatly reduce the amount of exhaust gas. Emission of nitrogen oxides (NO_x) is cut by half and 20%–40% less fuel oil is needed. The technology was introduced to the Funabashi Plant in 1998 and we plan to install it at other plants in Japan, such as the flat glass furnace at the Keihin factory. Asahi Glass Group companies overseas are considering implementation, especially after seeing the excellent results already obtained by SAT in Thailand and VGI in Indonesia.

Ion-exchange membrane using salt electrolysis: Flemion

Since bringing the ion-exchange membrane known as Flemion to the market in 1978, Asahi Glass has continued with an integrated energy-efficient approach in the area of salt electrolysis. Using Flemion in electrolytic baths makes it possible to run processes at low voltages, so it is now possible to realize substantial energy savings compared with the previous mercury or diaphragm methods. Also, based on the technology and track record that we have built up, our company plans to develop high-performance membranes for fuel cells, then make use of customers' feedback in worldwide development of the environmental business lines that will be expected of us.



Fluoride-based ion-exchange membrane Flemion (for fuel cell use)



Membrane electrode assembly (MEA) structural drawing



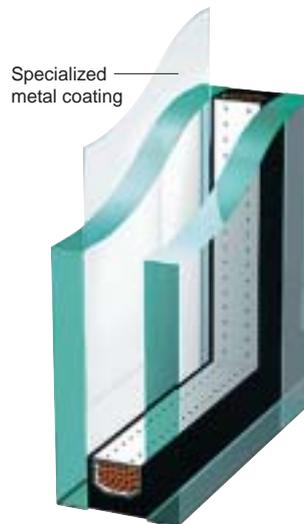
Eco Products

Products that help prevent global warming

Energy-saving double glazed glass for home use

The degree to which windows, a building's main apertures, are insulated plays a large role in holding down the amount of carbon dioxide emissions. Through the use of high thermal insulation double-glazed glass overlaid with a specialized metal coating (for warm climates: Sunbalance; for cold climates: Sunlane), carbon dioxide emitted by climate control systems can be cut substantially, as compared to when conventional single sheet glass is used.

If all residences in Japan were fitted with double glazing, and their heat insulation performance, including for walls and floors, were to be brought up to next-generation energy-saving standards, estimates show that there would be a potential decrease in fuels use equivalent to 4,000,000t in annual carbon dioxide emissions. This amount is equivalent to 1.2% of the total emissions from Japan in 1996.



Solar panel power generation for residential use

These solar panel modules have crystalline cells sandwiched between two sheets of reinforced glass. These modules are photovoltaic units that are closely integrated with their buildings – while the power cells absorb the heat waves and produce energy savings, they are also making possible just the right balance of lighting. Also, since its large-module, frameless structure can be used with skylights and curtain walls, with façades or at the eaves, it is possible to create unique architectural spaces. This product shows every promise of enabling a building's owners and tenants to better present themselves as grappling with the issues of the environment.



Products free from hazardous substances

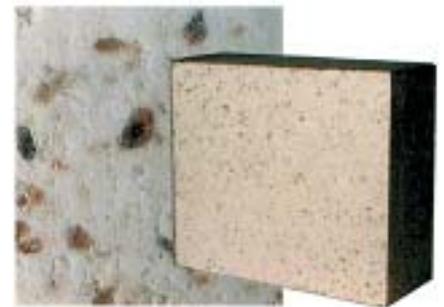
Arsenic-free glass for liquid crystal panels

When the glass used for TFT-LCD panels contains arsenic, the scrap glass generated during processing is harmful to the environment. By proactively removing arsenic, the source of the problem, Asahi Glass was ahead of the industry.



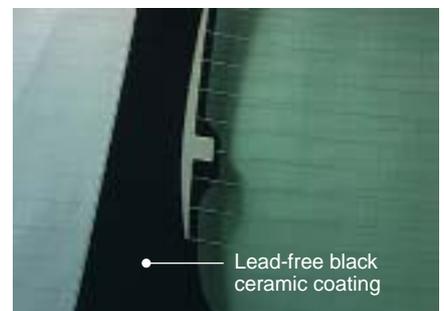
Chrome-free bricks

The bricks that we make for cement kilns are completely chrome-free. Cement works all over Japan use these bricks because they contribute to a better environment.



Lead-free coating for automotive glass

As soon as we recognized the problem we got rid of the lead from the black ceramic enamel that is used for coating the periphery of the windshield and back windows of automobiles. We now provide lead-free products to the automotive industry.





Eco Products

Super-durable, recyclable products

F-Clean

Fluoropolymer film for agricultural and horticultural uses

Extended product life will make a big difference to the form that our sustainable society will take.

F-Clean, the fluoropolymer film for hothouses, is a long-life product that makes good use of the excellent stain and weather resistance of fluoroplastics: it can be used for 10–20 years. Furthermore, to facilitate the recycling of valuable fluoroplastic, we have created a system to collect from all over Japan, then process, and give a new lease of life to old fluoropolymer film.



Products that help prevent air pollution

Ecosafe

System to clean black smoke from stationary diesel engines

Although diesel engines are more energy efficient and emit less CO₂ than gasoline engines, their great drawback has been harmful particulate matter that makes the exhaust gas black. Asahi Glass developed a device to solve this problem by cleaning the gas. This product won the year 2000 Industrial Technology Institute Director's Prize



Aclesia

Agent for preventing plumes of exhaust gases from heavy oil boilers

A derivative of sodium bicarbonate, Aclesia does an excellent job of removing any acidic traces to be found in gases. It can extract sulfur trioxide out of the exhaust gases produced by heavy oil-burning boilers, and prevents the plume of smoke caused by sulfuric acid. It is also excellent for the removal of acidic traces, and hydrogen fluoride, sulfur dioxide, hydrogen chloride and boric acid levels can be reduced to very low concentrations.

Before use
of Aclesia



After use
of Aclesia





Interactive Efforts with Local Communities



Beautification Efforts Around Our Factories

Holiday Garbage Pick-Up Drives
Aichi Factory: Garbage pick-up along the national route in front of the factory, and around the nearest station



“Hana Ippai Undo”
(tr. Filling the world with flowers)
Funabashi Factory: We are actively involved in planting flower beds on our factory grounds and along surrounding streets, so that they can be filled with flowers.



Involvement at the Local Community Level



The Ebi river drainage basin, bursting with nature

Each of our factories holds presentations and other activities aimed at town governments in the area, where we explain the details of our business activities and how we are dealing with the environment. In addition to these disclosure efforts aimed at the local community, we are actively participating in various environmental conservation events, as well as acting as joint sponsors.

Association of Firms to Beautify the Ebi River

Funabashi Factory: The Ebi River Basin Society was formed in 1972 with the goal of restoring the Ebi River, running within Funabashi City. Since then, our Funabashi factory has been acting as chair; currently, there are nine companies in the association. We continue to be involved in various activities such as our participation in city-sponsored environmental conservation events, participating or jointly sponsoring events put on by citizen environmental groups, and inspection tours by association members of waste-water treatment facilities with the goal of promoting water quality conservation awareness.



Creating a flower garden together with citizens' groups on land for Ebi River Regulating Pond (serving as an overflow basin).



Commendation & Assistance for Environmental Efforts

The Asahi Glass Foundation, which was established in 1933, commends funds to worthy projects and provides assistance to people who are working to solve global environmental problems or carrying out associated technical research.



Blue Planet Prize



The winners of the world's largest international environmental prize commending work for the global environment are chosen from candidates nominated in Japan and overseas. Every year, two award recipients are chosen. Each winner receives a certificate and a trophy, along with a supplementary award of JPY 50 million.

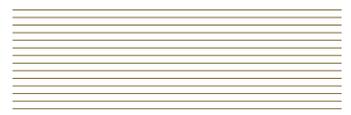
In 1992, the year of the Earth Summit in Rio de Janeiro, the Asahi Glass Foundation established the Blue Planet Prize. This international prize is an annual award given in recognition of individuals or organizations that have made major contributions to solving global environmental problems.

The prize is a way of showing sincere appreciation for the achievements of winners who can be expected to continue their important work. The prize was also set up in the hope that if activities associated with the award make even only a few more people on Earth more deeply aware of the global environmental issues, they will act from wherever they are to do something about the problems.

Named the Blue Planet Prize, this award also embodies the desire that, on our shared blue Earth, the common possession of all people, life will remain sustainable into the future.



Prizewinners of 2000
Dr. Theo Colburn, U.S.A.
Dr. Karl-Henrik Robert, Sweden



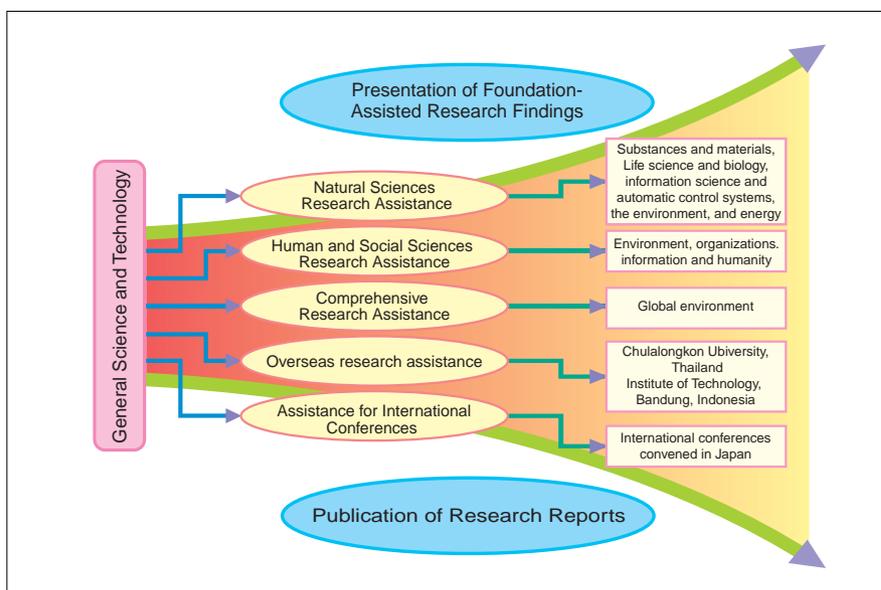
Areas for Recognition: Environmental problems such as global warming, acid rain, ozone depletion, tropical rain-forest destruction, destruction of ecosystems and species extinction, desertification, water pollution, and environmentally induced afflictions.

Environmental issues related to energy, population, food, water, environmental ethics, policies, disease caused by environmental change, waste treatment and recycling.



Research Assistance

Since its launch in 1933 as the Asahi Foundation for Chemical Industry Promotion, the foundation has built up a long record of grant programs, mainly in applied chemistry. In 1990, to symbolize a broader concern with public benefit, the name changed to the Asahi Glass Foundation. At the same time, the focus expanded to the encouragement of pioneering research, with support for “Scientific technology to open the way to the future generations,” including in the environmental field.



Research grants as of March 31, 2001

Period	1933–2000
No. of grants	5,154
Total amount	JPY 5.67 billion

Seminars to report research results	
Japan	9 meetings
Thailand	9 meetings
Indonesia	5 meetings
U.S. (Oklahoma)	1 meeting
Czech Republic	1 meeting
Research reports	77 volumes

Research assistance in 2000 totaled JPY254.5 million in 166 grants.

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ASAHI GLASS CO., LTD.

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Responsible Care

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