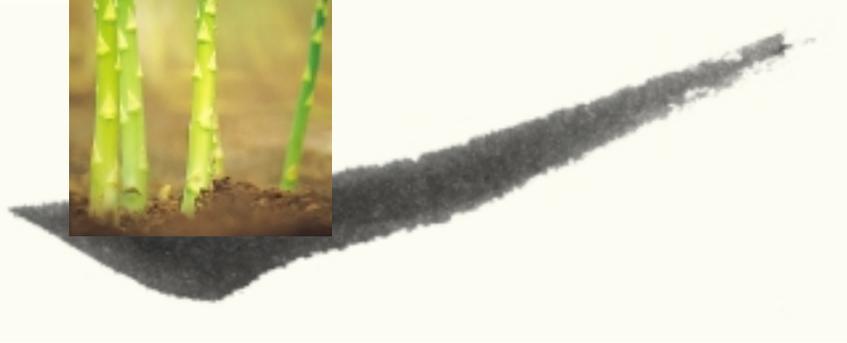




Environmentally Sound and Sustainable Development 2 • 0 • 0 • 1 Environmental Progress Report





## Forward

- 04 \_ Message from the CEO
- 05 \_ On Publishing the 2001 Environmental Progress Report
- 06 \_ Environmental Management System
- 10 \_ Production Processes & Steel Products

## Environmental Management

- 14 \_ Environmental Investment & Costs
- 15 \_ Adopting Advanced Environmental Management Tools
- 18 \_ Developing Environment-friendly Products

## Pollution Reduction

- 24 \_ Efforts to Improve Air Quality
- 27 \_ Efforts to Improve Water Quality
- 29 \_ By-product Management
- 32 \_ Preventing Global Warming

## Environmental Improvement on Site & in the Community

- 36 \_ Clean & Green Steel Works
- 37 \_ Environmental Preservation in the Local Community
- 39 \_ Environmental R&D
- 40 \_ Cooperating with External Organizations
- 41 \_ Awards & Training
- 42 \_ POSCO Today
- 43 \_ POSCO's Global Network







## Enhancing Corporate Value through Environmental Management

Increasingly severe global environmental problems are prompting the need for fundamental reevaluation of our existing social and economic paradigms. In particular, companies responsible for providing added value through their products and services are being pressured for polluting the environment and using up natural resources. The current situation dictates that companies, too, seek new approaches to environmental management.

Moreover, having an excellent environmental effort has emerged as one of the critical factors for determining corporate competitiveness. Thus, the way to raise a company's value in the marketplace is to induce sustainable consumption patterns and implement an environmental management policy that allows the economy and the environment to coexist.

Ever since our establishment, we at POSCO have embraced environmental protection as the cornerstone of our management philosophy. In December 1995, we announced our POSCO Environmental Policy, which requires us to be environment friendly in all our activities, including technology development, procurement, production, sales, and after-sales service.

Our priorities must remain focused on several areas. First, we continue to strengthen our monitoring capabilities and improve our ability to prevent pollution by studying the environmental impact of all processes. Second, we will continue to seek ways to reduce the amount of energy and other resources needed in production. Third, we constantly strive to reduce the sources of waste generation while effectively recycling any waste that is generated to prevent secondary pollution. Fourth, we regularly monitor and study environmental quality in the local community to discover and address potential risks before they become actual problems. Fifth, we are enhancing the environment friendliness of our steel products to help make the industries that use them cleaner and greener. Finally, we are developing management methods that comply with international standards and putting these methods online to improve efficiency and cut the cost of their implementation.

Meanwhile, POSCO's Environmental Management System was ISO 14001 certified early on, helping us to satisfy the demand of the international community regarding the environment. Part of our recent management improvement effort is to implement our environmental management program strategically, including the environmental sector in our company-wide process innovation project.

This Environmental Progress Report represents my personal pledge and that of our more than 19,000 employees to operate a competitive company and increase our corporate value through our environmental management effort.

A handwritten signature in black ink that reads "S. B. yoo". The signature is written in a cursive, slightly slanted style.

Chairman of the Board  
Chief Executive Officer

Sang-Boo Yoo

# On Publishing the 2001 Environmental Progress Report

POSCO has been deeply concerned about environmental issues since starting up operation in 1973. As a result, we have invested heavily in environmental protection and have engaged in various environmental management activities.

Our aggregate investment in this sector came to ₩2.1 trillion as of 2000, and the operation of our pollution prevention systems costs us ₩471.2 billion a year when we include labor, depreciation and miscellaneous other expenses. In addition, we signed a voluntary agreement with the Korean government to achieve an energy saving of 5.9%, based on the energy consumption in 1997, by 2003. In fact, our goal is to achieve an energy saving of 10% by 2005, and every employee is committed to our reaching this ambitious target. As a result, our environmental record is among the best in the industry worldwide.

We adopted an Environmental Management System that complies with ISO 14001 requirements in 1995 to continue our efforts in this regard and to scientifically measure how well we are doing. That same year, we unveiled the POSCO Environmental Policy. We establish environment-related objectives and action plans each year, and their implementation is assessed. Moreover, we have published this Environmental Progress Report each year since 1994 to keep the public informed on the results of our efforts. This report also helps interested parties understand us better and serves as a basis for us to heed their criticism and advice.

The Environmental Progress Report for 2001 stresses the following points. Today's environmental management concept involves assessing the environmental impact of all processes, from raw material extraction to product manufacture, use and disposal. POSCO is working to develop an in-house assessment program according to international guidelines. We have also explained the new internal management index, which is all-inclusive and easy to understand, that will be used from the end of this year to show how much we have improved our environmental performance. You will also learn the results of our efforts to develop environment-friendly products to replace those steel items that possibly emit harmful heavy metals while in use.

In this way, POSCO continues to proactively prevent environmental problems and keeps working to improve the integration and effectiveness of the environmental management effort. We pledge to do even more in the future to build a sustainable society.



Executive Vice President  
Chief Technology Officer

Chang-Oh Kang



# Environmental Management System

## ENVIRONMENTAL POLICY

*Environmental preservation has always been fundamental to POSCO's management approach. The company has established and enacted measures to prevent pollution from the source. Steel products have been manufactured and supplied in the most environment-friendly ways possible. To contribute to the global environmental protection effort, POSCO has instituted and strictly adheres to the following Environmental Policy. This Policy governs all activities being carried out at both the Pohang and Kwangyang Works:*

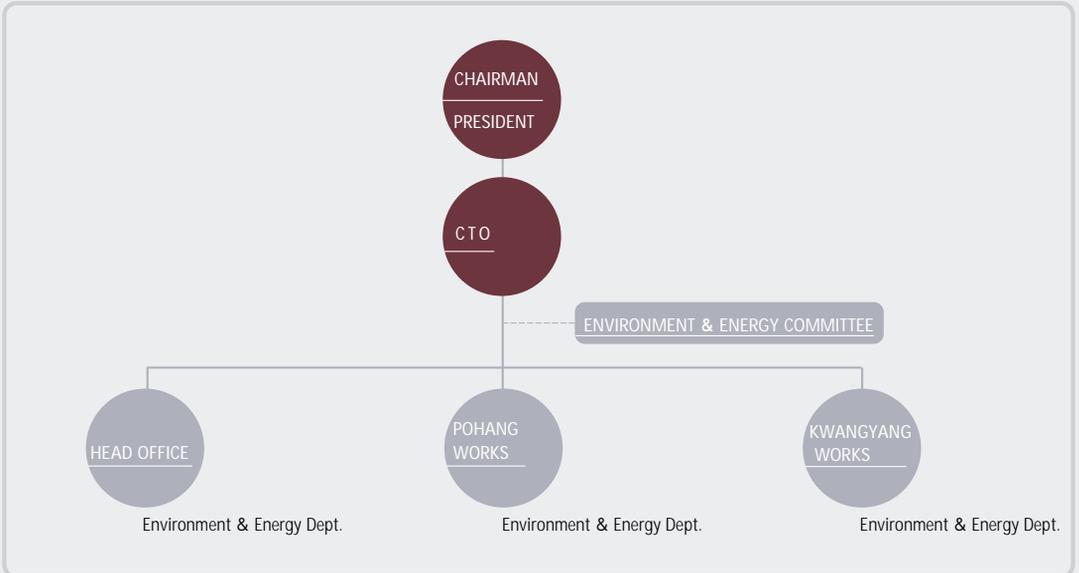
- POSCO recognizes that the environment is a key factor in corporate management strategy, and the company strives to harmonize environmental concerns with other aspects of business operation for greater overall competitiveness.
- POSCO acknowledges that all corporate activities impact the environment, and the company constantly strives to prevent pollution and improve environmental quality.
- The POSCO Environmental Policy begins with strict adherence to environment-related laws and regulations, and the company establishes and implements in-house standards that take into account the local environment in which operations are situated.
- POSCO always seeks ways to use energy most efficiently and to conserve resources used in every business activity.
- POSCO efficiently re-uses and recycles waste materials generated during production to avoid secondary pollution problems.
- POSCO establishes and implements plans for improving environmental quality and sets detailed targets to ensure that the Environmental Policy is carried out. Moreover, an audit system is in place to routinely review and evaluate the results of environmental protection efforts.
- POSCO remains committed to developing environment-related technologies, particularly cleaner technologies.
- POSCO provides thorough training to all employees so that they can take part fully in the company's proactive efforts to improve environmental quality.
- POSCO provides all interested parties with reports on Environmental Policy and objectives, and all companies working with POSCO receive guidance on environment-friendly management practices.

# Organization

POSCO's organization dedicated to environmental management consists of the Environment & Energy Department at the Head Office as well as the Environment & Energy Departments at the Pohang and Kwangyang Works. The former establishes the basic direction for environmental management and attends to issues related to external cooperation and international agreements. The two on-site departments are tasked with carrying out environmental management at the steelworks.

An external organization that includes the Environment & Energy Research Center at the Research Institute of Industrial Science & Technology (RIST) and the School of Environmental Science and Engineering at the Pohang University of Science and Technology (POSTECH) is responsible for carrying out extensive R&D related to environmental protection. The Environmental Management Center at the POSCO Research Institute (POSRI) provides support for the environmental management activities.

## INTERNAL ORGANIZATION



## EXTERNAL ORGANIZATION



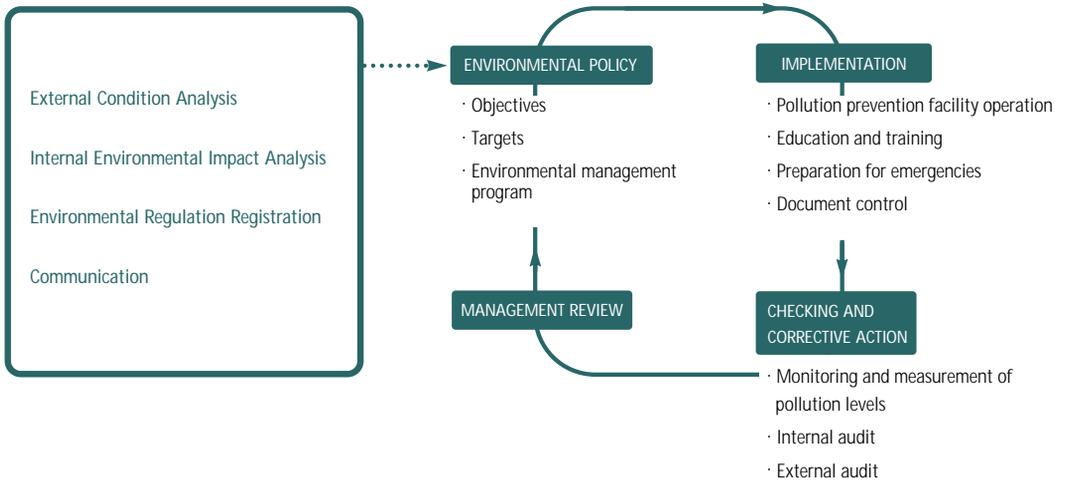
# Environmental Management System

## ENVIRONMENTAL MANAGEMENT SYSTEM

To systematically carry out environmental policy, POSCO built the Environmental Management System (EMS), which complies with ISO 14001 requirements. The EMS was certified by an official testing agency in July 1996.

The environmental policy, objectives, and detailed performance targets are decided based on the new environmental laws pertaining to the company, environmental impact and the opinions of stakeholders inside and outside the company. Environmental management programs are established and performed to achieve the objectives and targets. In addition, pollution prevention facilities are monitored and employees receive the necessary training to maintain the environmental management system.

Periodic internal and external audits are also performed to ascertain how well the Environmental Management System is working. The audit results are reported to senior managers, who weigh them against changing business realities to determine the effectiveness and appropriateness of the EMS. Their conclusions are used to amend environmental policy and objectives so that the system operates at peak effectiveness.



# Environmental Management System

## ENVIRONMENTAL OBJECTIVES AND IMPLEMENTATION

POSCO is committed to fulfilling corporate responsibilities for protecting the global environment and ensuring the local environment remains pleasant. The company recognizes that preserving the environment is a key factor of business, and corporate activities as well as environment-related systems are operated in accordance with ISO 14001, the international environmental standard. In this connection, five major environmental objectives were established during 2000, as POSCO adopted a more proactive approach to environmental management.

- OBJECTIVE 1**    **Strictly adhere to tougher new environmental laws**  
 Mid- and long-term plans were established and are now being implemented related to investment in new facilities and development of pollution prevention technology in preparation for new restrictions on pollution-causing substances. In-house standards on controlling harmful substances have been greatly tightened so that the company can readily comply with ever-stricter limits on permissible pollution discharge.
- OBJECTIVE 2**    **Continue to reduce the volume of major polluting substances**  
 The volume of waste being generated has been steadily reduced, while an increasing amount of the generated waste is being re-used. As a result, waste being put into landfills or incinerated is kept to a minimum. The contribution level for each major pollution source is calculated and prioritized for reduction efforts. Short- and long-term goals have also been established for global greenhouse gases, and the environmental quality of the local communities near the steelworks is measured so that pollution levels can be kept within WHO standards.
- OBJECTIVE 3**    **Develop and apply cleaner technology**  
 Processes are constantly upgraded and new technologies developed to reduce the generation of pollution-causing substances. Pollution prevention facilities are also operated at peak efficiency.
- OBJECTIVE 4**    **Manage the environmental quality of the community surrounding the steelworks**  
 Visible pollutants (dust and smoke) and odors are rigorously controlled. Regular studies are made to measure pollution concentration levels in the local community.
- OBJECTIVE 5**    **Adopt advanced environment management tools (LCA, EPE) to bolster EMS effectiveness**  
 Advanced environment management tools are being adopted to improve EMS performance and adhere to international environmental standards and accords.



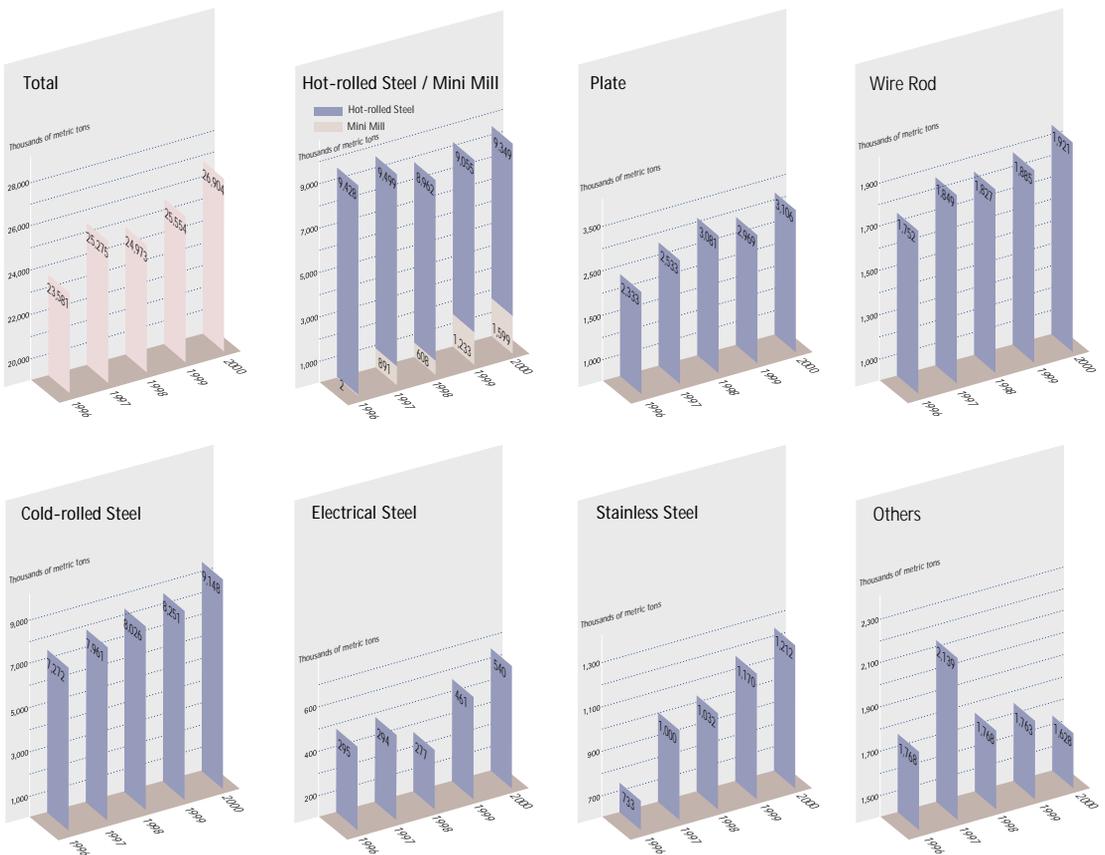
## Production Processes & Steel Products

The POSCO Pohang and Kwangyang Works turned out a combined 26.904 million tons of steel products during 2000. Carbon steel represented 95.5% of this total, while stainless steel made up the remaining 4.5% of output.

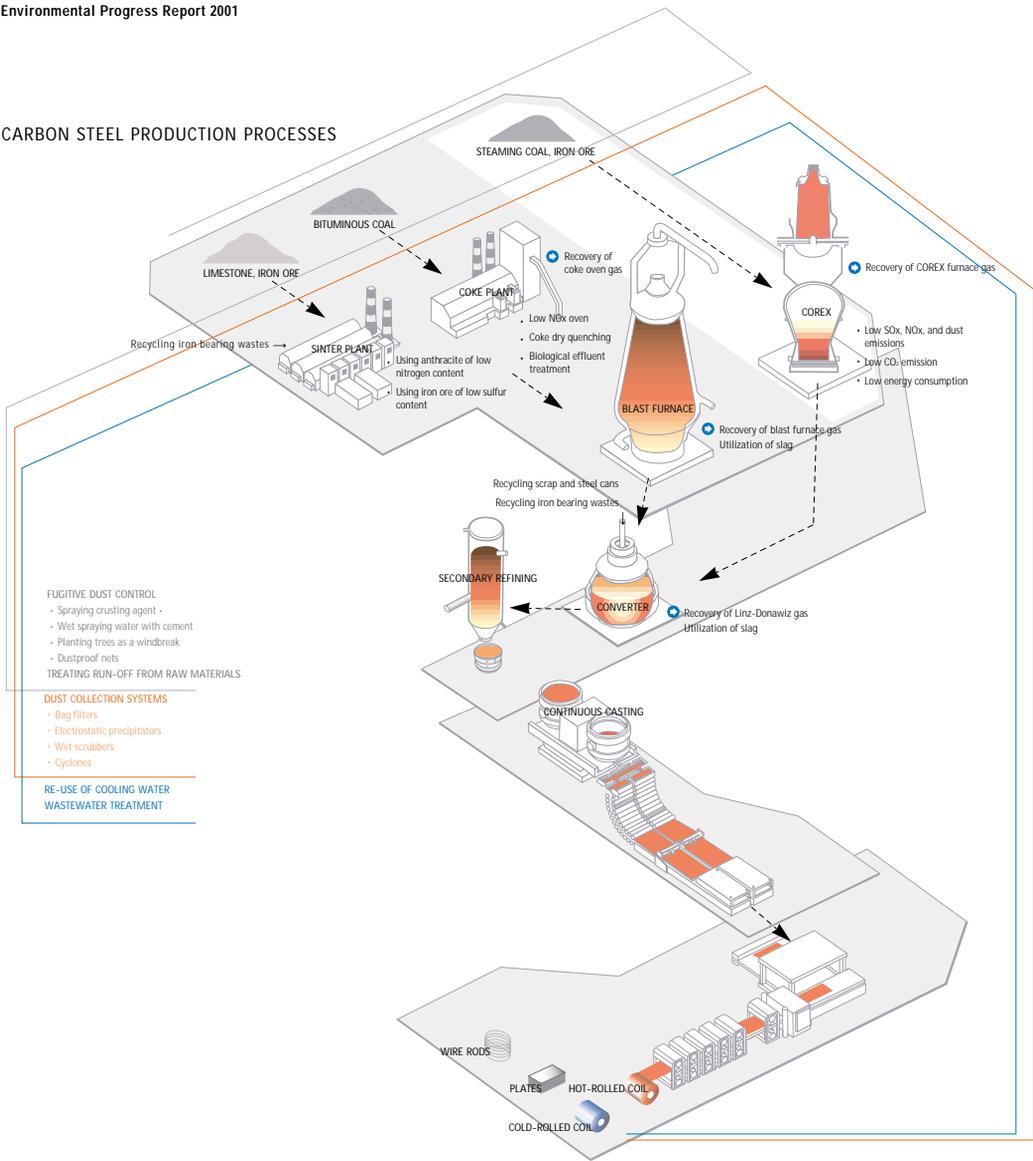
The Pohang Works includes a carbon steel mill that turns out hot-rolled coil, cold-rolled sheet, wire rod and plate, as well as a stainless steel mill. The Kwangyang Works, meanwhile, is equipped with a carbon steel mill for both hot- and cold-rolled products as well as a mini mill for producing hot-rolled products from scrap iron and hot metal.

Both steelworks employ cleaner technology and facilities for reducing environmentally harmful substances at the source during production processes. Moreover, all substances that are generated are treated thoroughly in post-production facilities.

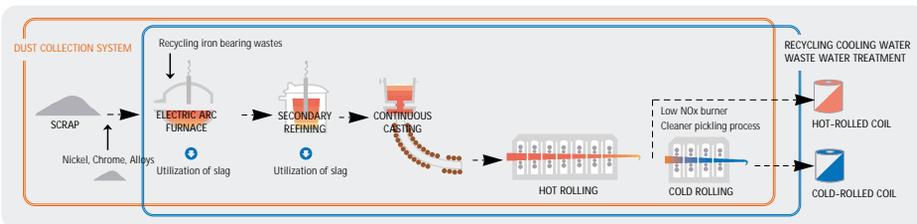
### PRODUCTION BY PRODUCT CATEGORY



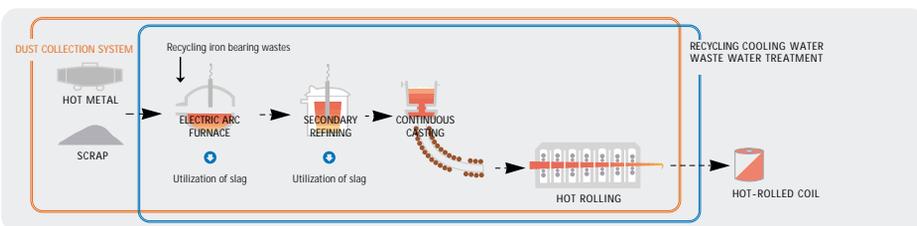
CARBON STEEL PRODUCTION PROCESSES

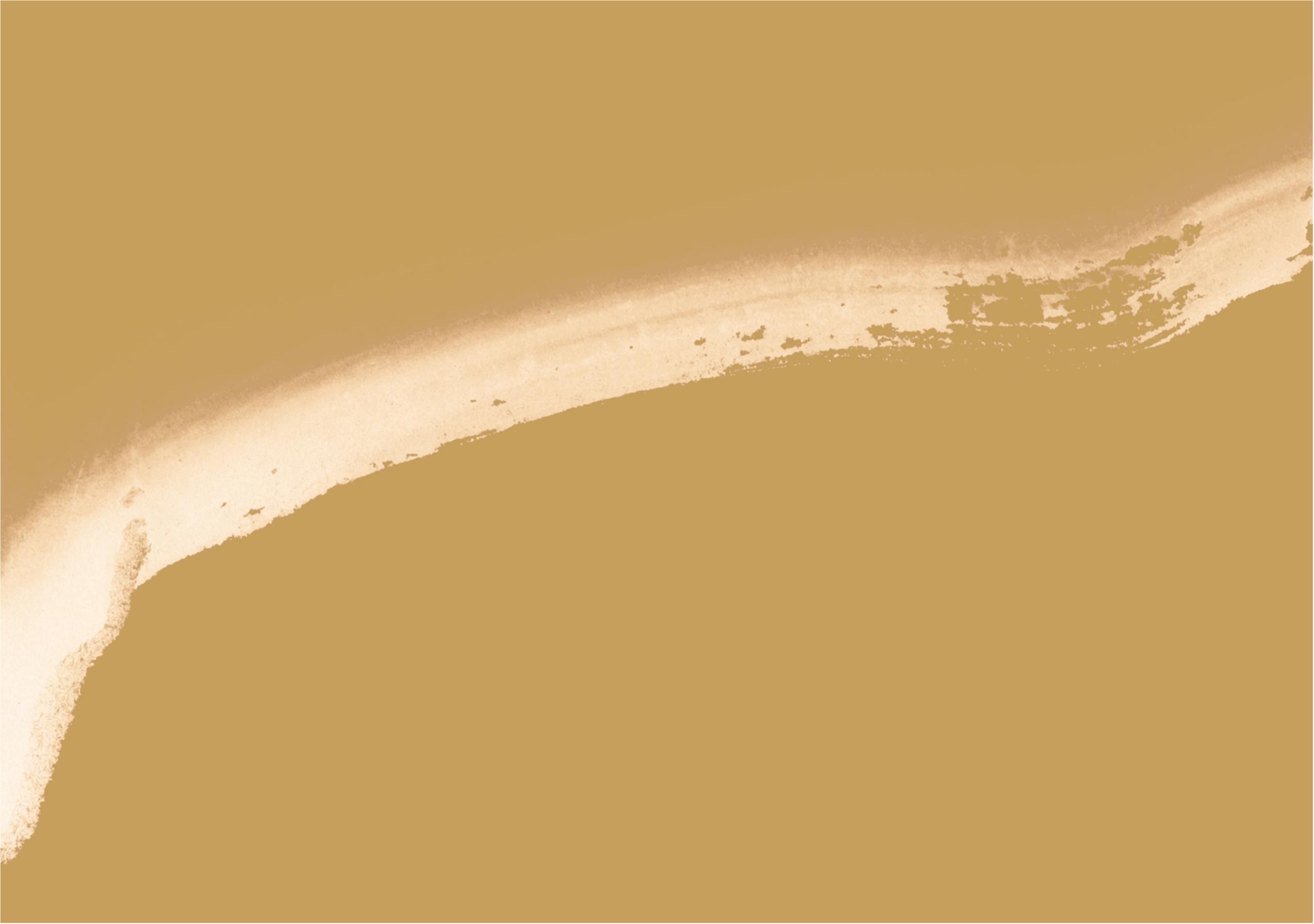


STAINLESS STEEL PRODUCTION PROCESS



MINI MILL PRODUCTION PROCESS





## Environmental Investment & Costs

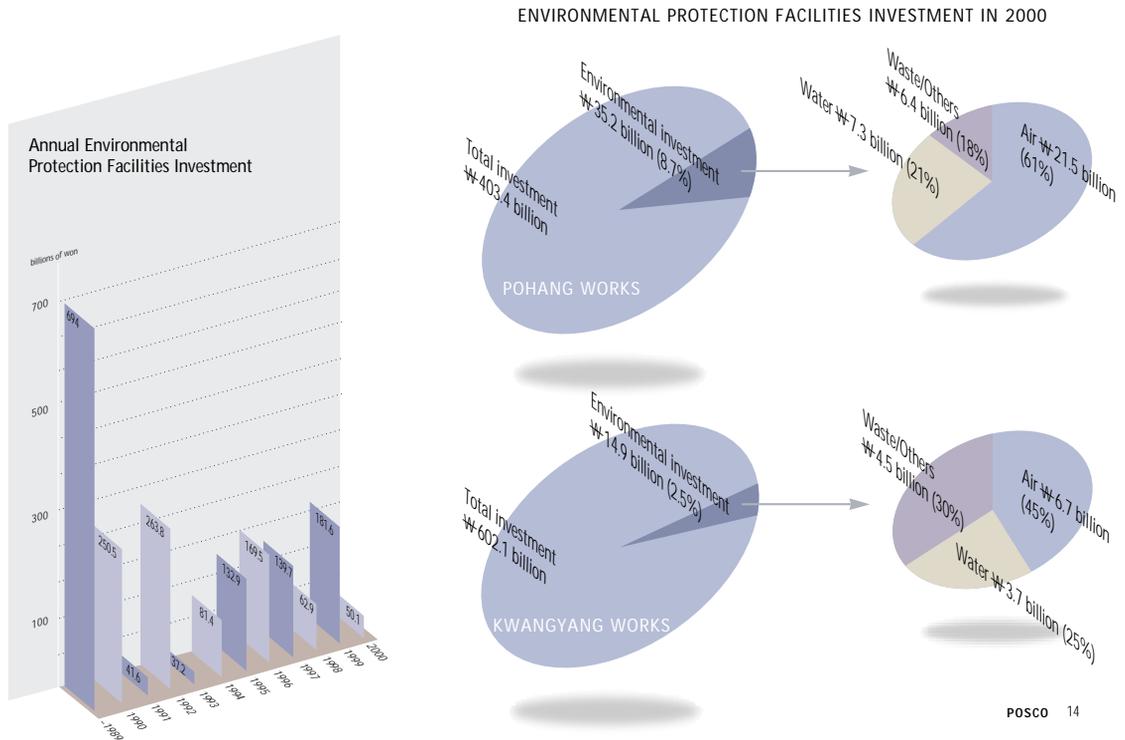
### Environmental Investment & Costs

POSCO's policy regarding investment in environment-related facilities is to block the pollution at the source. The company is going beyond the practice of treating pollutants after they have been generated. Instead, the focus is on preventing pollution generation itself.

Environmental preservation is one of POSCO's core corporate values. The company has spent an aggregate of ₩2.1052 trillion, or 8.9% of all new facilities investment, on improving environmental quality from its establishment through 2000. A total of ₩50.1 billion was spent on new environmental protection facilities in 2000 alone.

Operation and maintenance of these facilities cost ₩471.2 billion in 2000. The greatest portion (47%) of this outlay was on protecting air quality, particularly dust collection systems operation costs such as electric power, materials, labor, maintenance and depreciation. Water pollution prevention (21% of the total) expenditures went for the maintenance and repair of wastewater treatment and re-use facilities. Waste disposal costs (31% of the total) included transport, disposal and re-use.

POSCO has earmarked an additional ₩ 828.3 billion for new environmental facilities over the next five years, coming one step closer to the goal of a pollution-free operation.



## Adopting Advanced Environmental Management Tools

### Process Innovation in the Environmental Sector

POSCO is pursuing process innovation (PI), taking advantage of standardization, data integration and creativity for enhancing operational transparency and efficiency. The company began managerial reform in earnest to stay ahead of a fast-changing business environment by inaugurating the Process Innovation Team on December 31, 1998. The PI project will be launched into full operation all at once on July 1, 2001.

This project is being carried out so that POSCO customers enjoy greater success, doing business with POSCO is facilitated and customers understand POSCO better. The successful implementation of this project will strengthen POSCO as a world leader, providing greater value to investors, employees, customers and the local community alike. As such, interested parties will want to maintain their relationships with POSCO perpetually.

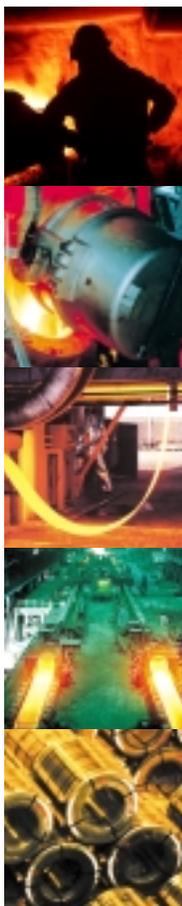
In step with the company-wide PI project and POSCO's traditional concern for environmental preservation, the following revolutionary environmental management approaches will be implemented so that the company can do its part to realize sustainable development:

First, data on the company's environmental management performance will be administered transparently and efficiently. The present automated telemetry system, used to monitor concentrations of pollutants in the air and water, will be expanded. Data collected automatically and manually will be entered into an integrated database for sharing internally. Key performance indicators will also be publicly disclosed on the Internet. Data on all the waste that POSCO generates and disposes of will be managed in the company-wide database to promote recycling and strictly manage waste. The system will support decision making to improve recycling rates and create added value.

Second, money spent on environmental protection will be accurately calculated and appropriately allotted to production costs. The basis for environmental accounting will be established by reflecting environment-related expenses in production costs, thereby ensuring the most effective use of funds.

Third, a company-wide system shares client and server software for effective implementation of Life Cycle Assessment (LCA) and Environment Performance Evaluation (EPE)-advanced tools now being applied to environment management. The company's basic input/output data are automatically received by the existing database. The system will also be applied for developing new products and carrying out LCAs for each product made by the company.

In addition, the POSCO Environment Performance Index has been established as a key performance index that is recorded on a balanced score card (BSC), one of the ERP modules. As such, the Environment Performance Evaluation results will carry much weight when assessing how well the company is performing as a whole.



## Adopting Advanced Environmental Management Tools

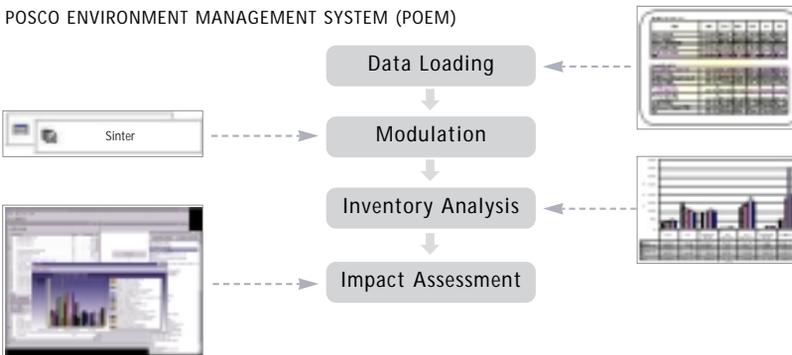
### Life Cycle Assessment

POSCO is applying Life Cycle Assessment to bolster environmental management performance scientifically and systematically; it is the rule for developing and supporting environmental technology. The Korean Ministry of Environment begins "Type III Labeling" in the second half of 2001, and companies will be required to submit LCA data on their products. Therefore, POSCO is preparing to address increased requirements by users as well as to flexibly respond to changing laws.

LCA creates an index for the energy and materials consumed as well as the amount of pollutants generated by any given product. As such, it is a tool for assessing environmental impact and improving upon it. Take the production of one ton of hot-rolled steel for example. The iron ore, coal, limestone and other raw materials must first be extracted from the earth and transported to the steelworks. Then, the materials that are added during the processes at the steelworks and the volumes of emissions generated are all factored in. Interrelationships among the various categories are considered for quantification, and the categories are distributed according to pertinent environmental issues and standardized. They are shown as eco-indicators of environmental impact in general as well as on specific issues. These data can then be used to compare the environmental aspects of each product and process.

POSCO started out by taking part in the LCA program for steel products that is being promoted by the International Iron & Steel Institute. By the end of 2001, operational departments will all have received training on LCA implementation and the program will be in full practice. An automated client and server system is being set up to link the LCA program with the existing database in order to save both time and money.

POSCO ENVIRONMENT MANAGEMENT SYSTEM (POEM)



## Adopting Advanced Environmental Management Tools



Completion of the LCA project will enable more macroscopic, objective and systematic analysis of the amounts of energy and raw materials consumed as well as the volumes of pollutants generated for each product during each steel making process at each facility. The results will be used to formulate programs for systematic improvement of the company's environmental protection effort.

### Environmental Performance Evaluation

POSCO has developed and implemented the POSCO Environmental Performance Index (POSEPI) to assess performance periodically and support top management's decision-making. Taking the specific circumstances of each steelworks into account, POSEPI factors in the environmental conditions, business results and operational performance over a specified period to arrive at a single score. The POSEPI rating is recorded as a key performance indicator on the BSC for the Pohang Works and Kwangyang Works. Regular reports are prepared and used as feedback.

POSEPI takes advantage of the regularity, integration and functionality of an index to support systematic decision-making by top management. It also allows for a comprehensive environmental performance assessment and feedback, and provides interested parties with transparent reporting on environmental performance.

### Green Purchasing

POSCO is now considering a "Green Purchasing" program that would influence procurement decisions based on the environmental performance record of vendors as well as the environment friendliness of raw materials. The POSCO Green Purchasing Policy is now being formulated for implementation in stages. The program will contribute to the manufacture of environment-friendly products and better manage environmental risks both upstream and downstream.



## Developing Environment-friendly Products



Steel products consist of a material that is easy to collect and recycle, and relatively little energy is consumed in steel production as opposed to the production of other items. Steel-framed structures are not only lighter than concrete structures, they are highly energy efficient and stable as well. Steel cans can easily be separated from trash with magnets and then recycled. Development of steel-related technology is also helping to preserve the environment. Automobiles made with high-strength steel sheet require less material. This conserves resources, while making them lighter and more fuel-efficient. Corrosion-resistant steel, meanwhile, lets automobile bodies last longer, helping to conserve resources.

Such value-added steel products may require additional processes than commodity steel, which means more initial energy consumption in LCA terms. On the other hand, users of these steel items can simplify their processes, and the finished products will reduce energy consumption for major energy savings overall.

POSCO is taking advantage of the environment friendliness of steel to develop and supply "eco-products" that satisfy the needs of various buyers.

### POSCO Steel at Incheon International Airport

Steel requires much less energy to be transformed into structures than other materials do. Moreover the costs of maintaining, managing and ultimately disposing of structures made of steel are low. Thus, steel is increasingly being used in large construction projects. Structures made of concrete or stone present disposal problems when they are demolished. However, most steel scrap can be melted down and recycled, and steel can sometimes be re-used as it is. Thus, steel is friendly to the environment in numerous respects.

A total of 396,000 tons of steel went into building the terminal and support facilities for Korea's new Incheon International Airport, which opens in March 2001. Virtually all this steel was produced by POSCO and delivered to the construction companies. This project involved many high-end products such as the Thermo Mechanical Controlled Process (TMPC) steel that was used in the passenger terminal and the high-tensile-strength steel that was used to build the Yeongjong Bridge that leads to the new airport.

Interest in environment-friendly construction is on the rise. Therefore, demand for steel-frame structures is not confined to high-rise office buildings but is also expanding into the government sector for schools, post offices, health centers and other public buildings.

In response, POSCO operates the Technology Association of the Steel Structure Construction to provide technical guidance. Technical data are gathered, published and distributed to government offices, architectural firms and construction companies to encourage the use of effective, environment-friendly construction methods that result in very comfortable interior space.

## Developing Environment-friendly Products

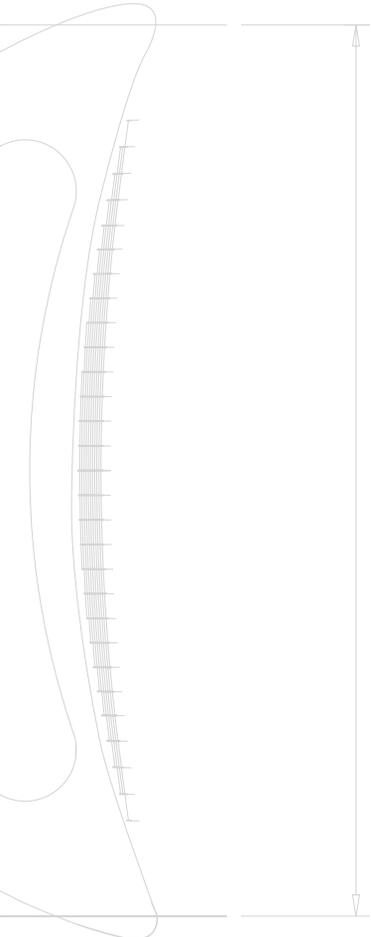
Four model steel-frame schools were built around Korea in 1998, and demand has grown rapidly since then. A total of 14 primary schools, 5 middle & high schools, and 4 university buildings with steel frames have either been completed or are under construction in Korea as of the end of 2000.

One model steel-frame post office was constructed in Seoul and another in Suwon in 1999. Now six of these structures have been built in the Suwon area. The design is also being promoted for public health centers and local government administration offices.



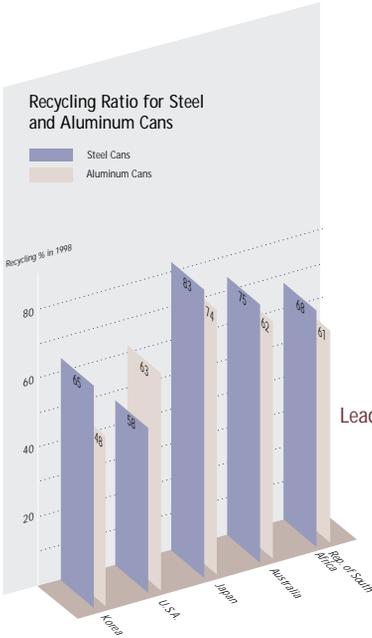
STEEL USED IN THE INCHEON INTERNATIONAL AIRPORT

Classification	Scale of Facility	Volume of Steel Used
Yeongjong Bridge	4.4km twin-level bridge	149,000 tons
New Airport Highway	40.2km stretch, including Bangwha Bridge	60,000 tons
Passenger Terminal	4 stories (1 basement), 357,390m <sup>2</sup> of floor space	120,000 tons
Traffic Center	3 stories (2 basements)	12,000 tons
Others	63 support facility structures	55,000 tons
Total Volume of Steel Used		396,000 tons



## Developing Environment-friendly Products

### Steel Can Recycling



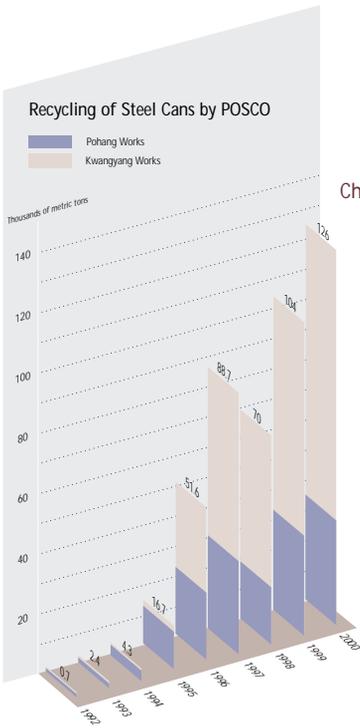
Steel cans can be easily retrieved from trash using magnets. Therefore, the recycling rate for steel cans is much higher than that for containers made of aluminum or other materials, while the recycling cost of is low. Producing a steel can requires 674kcal of energy, which is significantly lower than the 991kcal needed to produce each aluminum can. Furthermore, a recycled steel can only takes one-third the energy to make than one that is produced from iron ore.

POSCO produces tin plate (thin sheet steel with a very thin coating of metallic tin) for steel cans. The company is working to promote the use of steel cans in Korea by jointly developing new technology with domestic can makers.

### Lead-free Steel Plate and Wire Rod

Conventional automotive fuel tanks are made of terne sheet (steel sheet plated with lead and tin) in order to prevent corrosion. Shredder dust with lead content is, however, generated when old automobiles are being dismantled for scrap. POSCO has developed and is now supplying lead-free plated steel sheet for automotive fuel tanks, reducing environmental load and enhancing recyclability. The new product is coated with a liquid resin that contains a special-purpose organic material that takes the place of lead.

Meanwhile, free-cutting steel wire rod, used to produce tools and parts, normally has lead added so that it cuts better. However, POSCO has developed a product that uses bismuth instead of lead and can be recycled.



### Chromium-free, Chemical-treated Galvanized Steel Sheet

Galvanized steel sheet is highly resistant to corrosion, and a solution containing chromium is normally applied during the finishing process to ensure that paint adheres well to the steel. POSCO has developed a specialty chemical solution that does not contain the environmentally hazardous chromium. Galvanized steel sheet that has been treated with the new solution is now being used by major Korean electronics companies.



## Developing Environment-friendly Products

### High-performance Products for Cleaning Automotive Exhaust

Automotive exhaust is highly acidic and contains large quantities of environmentally harmful gases. Equipment for cleaning up the exhaust gas must be highly resistant to corrosion to last for a long time. To satisfy this need, POSCO has developed various steel products with outstanding strength and corrosion resistance.

### Ultralight Steel Automobiles

POSCO is participating in the UltraLight Steel AutoBody (ULSAB) project led by the International Iron & Steel Institute (IISI). The automotive frame for the project was completed in 1998, followed by the doors, hood, trunk and panels, attracting the attention of both the automotive industry and environmental groups.

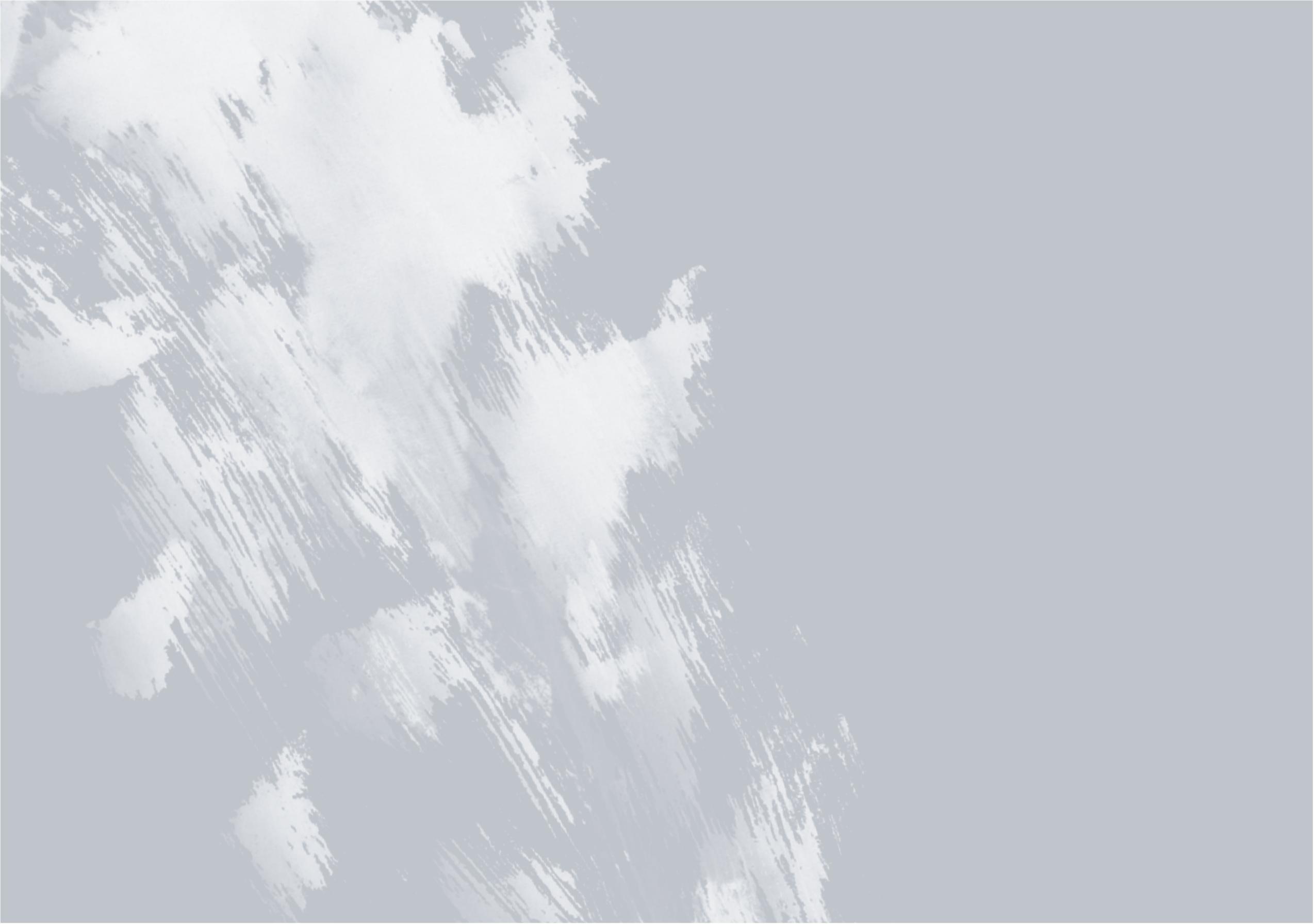
One of the technologies being applied to make automobiles lighter is known as tailor welded blanks. A laser is used to weld two steel plates of differing thickness and then the welded pieces are pressed into panels. Another technique, called hydroforming, uses fluids under pressure to create complex shapes. These revolutionary new methods improve the strength of the doors, trunk and panels while reducing their weight.

The R&D effort is being undertaken by 33 worldwide steelmakers, including POSCO, that belong to the IISI. The work is being carried out at Porsche Engineering Service Ins. (PES) in the US.

Meanwhile, the UltraLight Steel Auto Suspension (ULSAS) consortium of 34 steelmakers, including POSCO, has managed to lighten the springs, shock absorbers and other parts for the automotive suspension system.

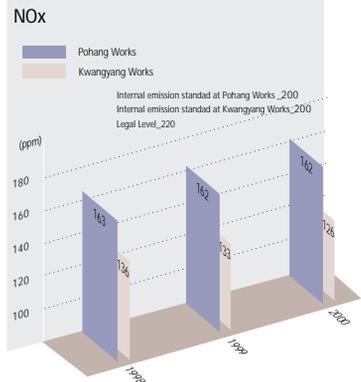
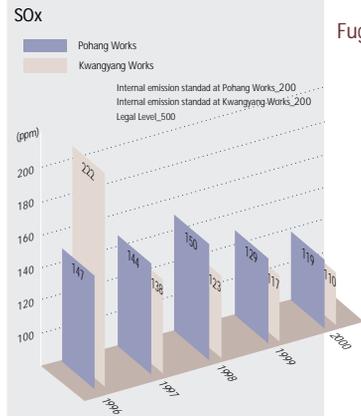
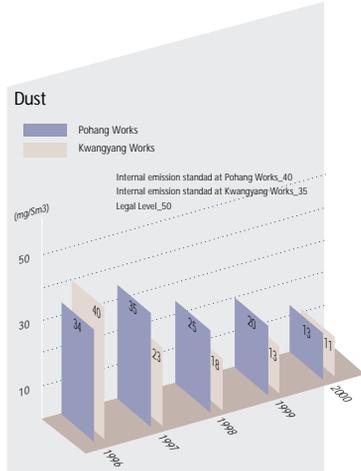
The complete ultralight automobile is scheduled to be ready by the end of 2003. At that time, a mid-sized car that once weighed 1,300kg can be produced weighing just 900kg. Gas mileage will be improved to 34km/l as well. Such an automobile will require less energy and steel to make and consume less fuel.





## Efforts to Improve Air Quality

### MAIN INDICES FOR SINTER PLANTS



POSCO is committed to treating air pollutants that are generated during production processes as well as improving existing processes and developing new ones to reduce the sources of air pollution. This commitment to environmental preservation is carried out irrespective of the government's legal requirements. Internal emission standards have been set and are being met for each steelworks that are far lower than what the law allows. Current emission levels are publicly posted in real time on outdoor electronic billboards.



### Fugitive Dust Reduction

POSCO sprays water and crusting agent on the iron ore and coal stored in the yards to reduce fugitive dust. The Pohang Works has cleaning systems to keep down the amount of dust generated from the iron ore and coal conveyor systems. The sprinkler system has also been expanded to minimize fugitive dust generation.

Idle structures at the works have been removed; a car pool system is in effect; shuttle buses run on site and an integrated parking sub-center is in use. These measures have allowed the company to expand the green areas around the steelworks. All idle areas and even the areas under the conveyor belts are planted with vegetation to prevent dust that has settled from becoming airborne again.

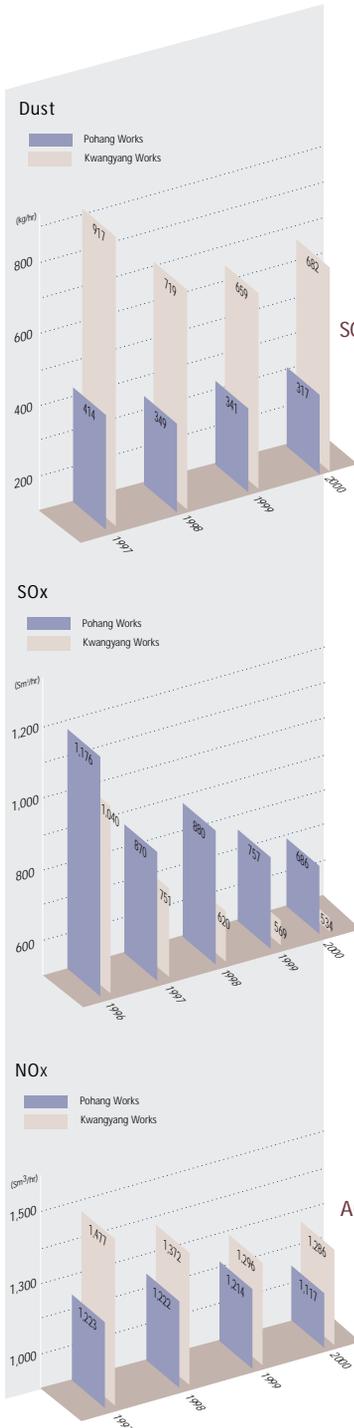
At the Kwangyang Works, a dust-proof net 17 meters high and 2,400 meters long was installed over the outdoor storage yards in 1998.

A sprinkler system installed 20 meters above the conveyor belt frame is activated 5-7 times each day, keeping iron ore dust at the crusher or on the conveyor system from being picked up by the wind. Over 1,000 bag filters, electrostatic precipitators, wet scrubbers and cyclones are in operation to minimize the amount of dust being released into the air from the sinter plants and various other processes. This effort has reduced the amount of airborne dust at the sinter plant some 32% from the 1996 level.

Four coke dry quenching facilities are in operation at the coke making plant at the Pohang Works to curtail one source of dust generation. The extremely hot coke coming

## Efforts to Improve Air Quality

### TOTAL DUST, SO<sub>x</sub> & NO<sub>x</sub> EMISSIONS



out of the coke oven is cooled with nitrogen gas and then sent to the blast furnace. When the nitrogen is circulated, the recovered heat is used to create high-pressure steam that drives turbines to generate electricity.

The Pohang Works is investing ₩51.6 billion in existing facilities to install additional coke dry quenching facilities, which are scheduled for completion in April 2002. Once completed, dust emissions are expected to be cut 35 tons a year, while the works will generate 43,000 less carbon dioxide per annum. At the same time, 54GWh of electrical power and 405,000 tons of steam will also be recovered by the new facilities annually.

### SO<sub>x</sub> & NO<sub>x</sub> Reduction

Use of iron ore with high sulfur content was discontinued in 1996. POSCO stopped recycling powdered slag from steel making in 1997. Use of low-sulfur and low-nitrogen coal of Chinese origin has been on the increase as well. The on-site power plant began using Bunker C with 0.5% or less sulfur from July 1998, and preparations are now being made to reduce the maximum sulfur content further to 0.3%. These efforts are significantly lowering the concentrations and volume of SO<sub>x</sub> gases being released.

The company has also been developing gas treatment technology that uses low temperature plasma to eliminate SO<sub>x</sub>, NO<sub>x</sub> and volatile organic compounds from gas emissions in a single process. The high reactivity of active radicals produced in a plasma state destroys pollutants in the waste gas. This next-generation environmental technology is receiving much attention because of the numerous benefits it offers.

Unlike conventional methods, the low temperature plasma gas treatment technology can remove all the harmful air pollutants simultaneously. This is a dry processes, so secondary wastewater treatment is unnecessary. Moreover, initial investment cost and required space for facilities are small. Finally, the subsequent waste treatment is simple.

A pilot plant capable of treating 5,000 Nm<sup>3</sup>/hr of waste gas was installed at the Pohang Works sinter plant in 1997. POSCO is now applying the experience and know-how gained from operating the pilot plant to design and install a full-scale (50,000 Nm<sup>3</sup>/hr capacity) facility at the Kwangyang Works. The new facility is scheduled to be operational in October 2001.

### Automated Stack Monitoring

POSCO is carefully monitoring emissions in the stacks. Since 1990, the company has installed 30 automated telemetry stations on stacks (sinter plant, etc.) and at other locations around the Pohang Works. A total of 72 of these stations are also in place at the Kwangyang Works.

## Efforts to Improve Air Quality

The system monitors concentrations of dust, SO<sub>x</sub>, NO<sub>x</sub> and other pollutants in real time. The company's efforts to better protect the environment have lowered the emission levels by at least 80% since the telemetry systems were first installed. The automated stations have also been upgraded continuously so that their data are increasingly reliable.

### Digital Environmental Monitoring Center

POSCO operates the Environmental Monitoring Center, equipped with a digital system, at the Pohang Works to ensure that the air is kept clear and clean. The Center is placed atop a 75m tower overlooking the entire complex and can be used to immediately confirm the presence of smoke and dust with the naked eye. At the same time, the digital monitoring system and surveillance cameras are in place to measure and analyze environmental conditions everywhere on the site 24 hours a day.

At the same time, automated telemetry stations in the vicinity near the steelworks send in data that are displayed on a digital screen. A status board is used to compare data on air and water pollution with the legal allowable limits in real time.

These measured results are compiled as an environmental bulletin and transmitted along with a report on current and forecasted weather conditions to the steelworks so that operations can be carried out in consideration of environmental concerns. When a potential environmental problem arises, a warning system is used to instruct operational units and quickly address the problem. These efforts help to suppress the generation of pollutants as much as possible.

The Kwangyang Works also operates an environmental control system that systematically monitors the entire worksite as well as the surrounding community. Five persons are assigned to operate this system 24 hours a day, while five surveillance cameras are used to detect visible pollution in real time. This way, any sign of abnormal air quality can be discovered and addressed immediately.



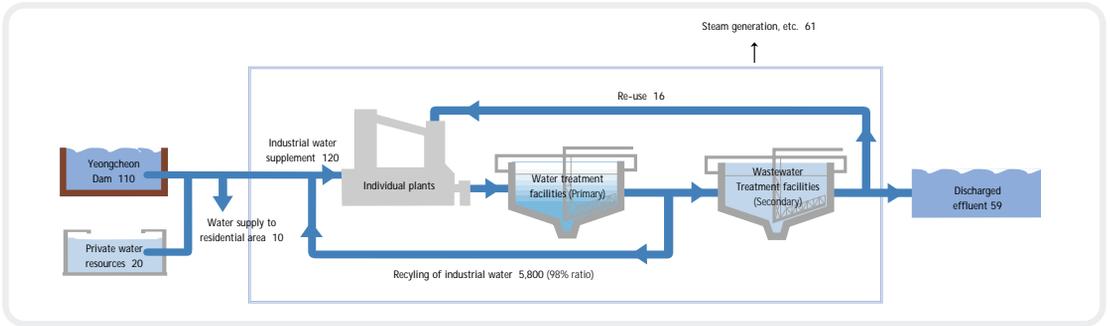
## Efforts to Improve Water Quality



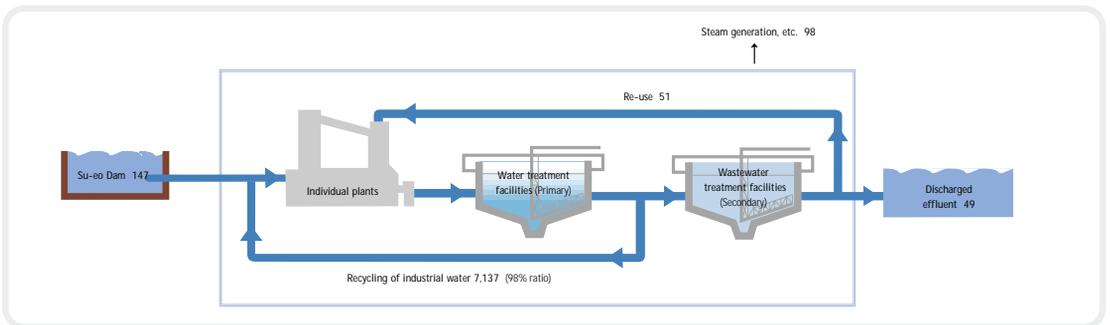
If industrial water is not re-circulated, over 100 tons of water would have to be consumed to produce each ton of crude steel. However, most steelworks use no more than 10 tons of water per ton of crude steel produced because they re-use industrial water. POSCO continues to work at reducing the volume of industrial water used by increasing the amount of effluent being re-used and optimizing processes so that industrial water is re-circulated better. Currently, the company requires just 3.6 tons of water supply per each ton of crude steel produced.

Wastewater generated at the steelworks is subjected to over 140 stages of primary treatment, allowing at least 97% of it to be recycled as industrial water. The effluent of water recycled in production receives secondary treatment. It is then is sprayed on the iron ore and coal stored in the yards to control dust or discharged after going through a final treatment process.

POHANG WORKS (AVERAGE IN 2000, 1,000 TONS / DAY)



KWANGYANG WORKS (AVERAGE IN 2000, 1,000 TONS / DAY)

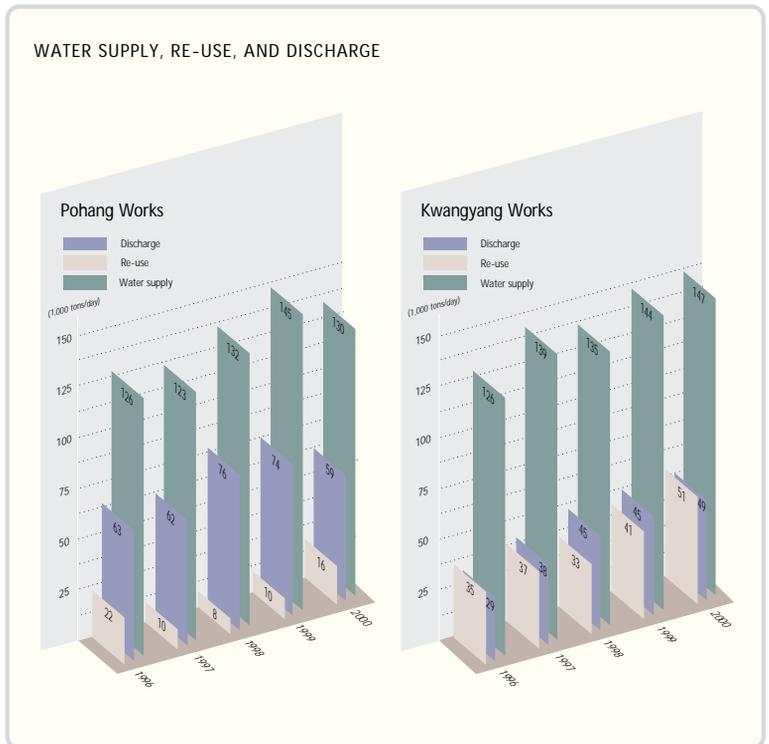
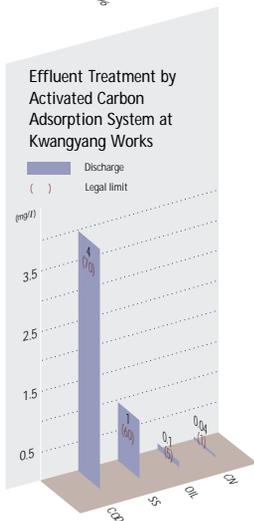
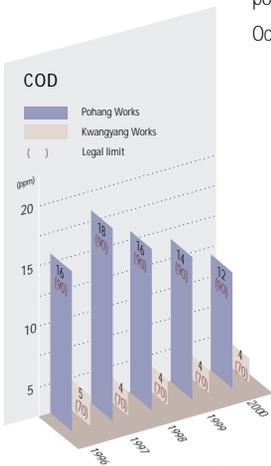


## Efforts to Improve Water Quality

### Re-using Sewage & Rainwater

Rainwater and water used for non-industrial purposes is collected in tanks separate from the used industrial water. It is sent through a water purification facility that includes sedimentation and filtration processes. Once treated, it is re-used as industrial water, reducing the daily volume of discharged effluent by around 5,000 tons. The Pohang Works has continued to reduce the amount of industrial water usage and to increase the amount being re-used. This effort has reduced the volume of water required from the Yeongcheon Dam from 170,000 tons in 1993 to just 110,000 tons in 2000.

The Kwangyang Works, meanwhile, has a final treatment facility with an activated carbon adsorption system, which is normally used to purify tap water, to ensure that Kwangyang Bay remains as clean as possible. A similar system is being installed at the Pohang Works and is scheduled for completion in October 2002.



## By-product Management

POSCO has established mid- and long-term plans for utilizing by-products of iron & steel making processes. Production processes are being improved to reduce byproduct generation, while technology is being developed to add value to the by-products.

### Recycling of By-products

POSCO generated 16.9 million tons of by-products in 2000. This amount breaks down as 49% blast furnace slag, and 27% steel making slag. Thus, slag accounts for 76% of all the by-products generated, while dust and sludge each contribute 7% of the total.

The recycling ratio of by-products has been increased from 77% in 1997 to more than 96% in 2000. This increase represents 15% fewer materials being disposed of in 2000 than in 1997. The change is due mainly to using more basic oxygen furnace slag in civil works and more sludge as a raw material for cement.

### Converting By-products into Usable Resources

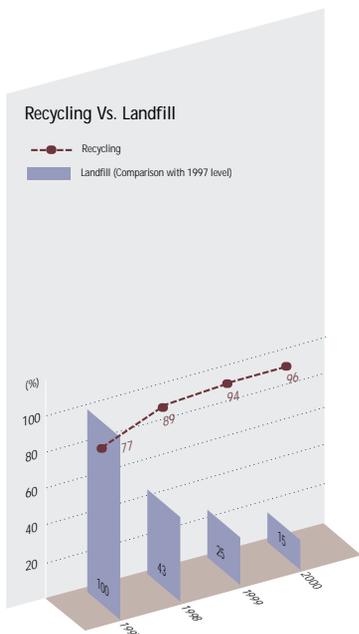
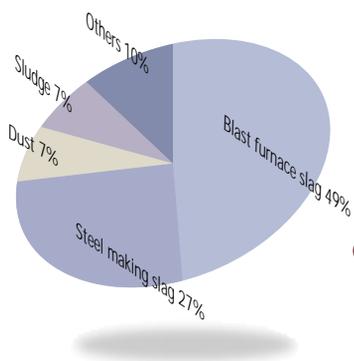
#### BLAST FURNACE SLAG

Iron ore and limestone are placed in the blast furnace along with coke, used as a reduction material, to produce hot metal. Carbon generated from the combustion of the coke reduces the iron ore into molten metal. Blast furnace slag is a byproduct that is created in the process.

Blast furnace slag is produced in two types, depending upon how it is cooled. Air-cooled slag that is cooled slowly in a dry pit will crystallize into hard lumps, which are subsequently crushed and separated according to piece size. Granulated slag, which is cooled quickly in a water quenching facility, forms non-crystalline granules.

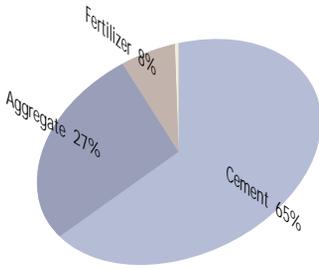
All of the blast furnace slag is being recycled. Most of the granulated slag is put into cement production. The increase of granulated slag generation means that less air-cooled slag is being produced. Air-cooled slag is mostly used for roadbed material, while the remaining blast furnace slag is used in fertilizer or as a building material.

BY-PRODUCTS FROM IRON & STEEL MAKING PROCESSES

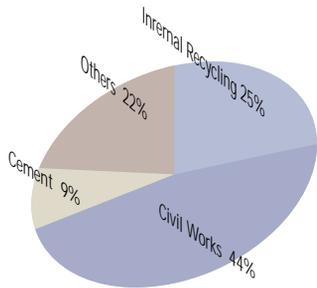


## By-product Management

### SLAG UTILIZATION



[BLAST FURNACE SLAG]



[STEEL MAKING SLAG]

### STEEL MAKING SLAG

Steel making slag is generated during the refining of molten pig iron. Converter slag is generated when hot metal from the blast furnace is placed in the converter along with scrap and flux and high pressure oxygen is added to produce steel ingots. Electric arc furnace slag is generated while scrap is refined in a mini mill.

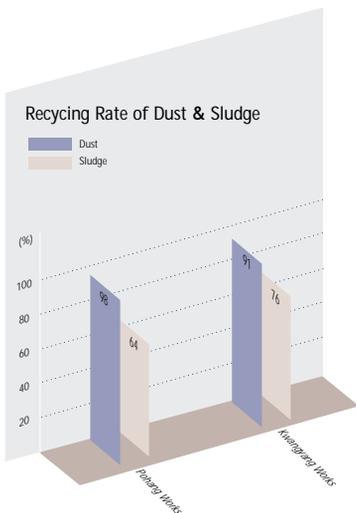
Steel making slag is normally transported to a cooling yard while still in a molten state. It is cooled and hardened by the air and by water that is sprayed on it. The hardened slag is crushed and screened. During screening, magnets are used to retrieve residual iron for recycling. Steel making slag is made up mostly of limestone, oxidized silicon and oxidized iron, similar to natural rock. The fine particles of steel making slag are mostly used in cement, while the larger pieces are used as aggregate in roads, harbors and other civil works.

All the steel making slag is recycled; POSCO is now researching ways to use this material for greater added value.

### DUST & SLUDGE

Dust and sludge are generated by overall processes such as coke making, sintering, lime calcining, blast furnaces, steel making, steel rods, hot rolling, cold rolling and wastewater treatment. These materials are difficult to recycle entirely because of their diverse physical forms and chemical compositions.

Limestone and steel making sludge are pelletized and used in place of raw limestone or employed as a coolant. Dust and sludge from the sinter oven or blast furnace are blended and then used as a raw material in sinter plants.



POSCO continues to utilize more of its dust and sludge, with 82% being recycled in 2000. The Pohang Works utilizes 98% of the dust, while the figure shows 91% at the Kwangyang Works. Sludge recycling ratios are currently 64% at Pohang and 76% at Kwangyang, and these numbers are rising as increasing amounts are used in cement and other applications both inside and outside the steelworks. While more sludge is being re-used, less is being generated due to upgraded dewatering facilities and new equipment for removing impurities from sludge.

## By-product Management



### Efforts to Recycle By-products

POSCO is determined to address the problems of resource depletion and environmental pollution. Processes continue to be upgraded to reduce waste generation and to re-use all waste both internally and externally. To this end, POSCO tries to apply the most suitable technology, based on material type, composition, form, shape and treatment facilities. Performance improvement is being pursued under the following systematic activities:

First, constantly upgrade processes, thereby reducing by-products at the sources. Technology development activities have been stepped up to reduce amount of slag generated per ton of steel produced, increase recycling within processes, and improve sludge dewatering.

Second, constantly increase the volume of waste being recycled by operating in an environment-friendly manner and most effectively using resources.

Uses for sludge are being expanded inside and outside the company so that more and more of the waste is turned into a reusable resource. New uses are also being developed for waste that has until now been unusable.

Third, systematically develop technology for adding value to by-products that are being recycled. The amount of granulated blast furnace slag is increasing and new uses for steel making slag as composite roadbed and ground stabilizing materials are being created through technology development.

The importance of developing environment-friendly recycling technology and suppressing the generation of both waste and by-products will continue to grow in the future. POSCO will continue to reduce the amount of waste generated and increase recycling more effectively in the interest of conserving resources and protecting the environment. As such the company is committed to playing a leading role helping society and nature co-exist in harmony, with resources being constantly re-circulated.



Composite slag for roadbed material



Artificial reef made of slag



Railway roadbed material



Sediment capping material

## Preventing Global Warming

POSCO is taking part in the worldwide effort to prevent global warming by suppressing the production of carbon dioxide and other greenhouse gases. Reductions of fossil fuel use and other conservation measures are helping to reduce carbon dioxide output, and technology is being developed to retrieve carbon dioxide from gas emissions and re-use it.

From its earliest days, POSCO has always worked to develop new technology, invested in new facilities and upgraded processes to lower energy consumption. At the end of 1998, the company signed an voluntary agreement with the Korean government to achieve energy savings of 5.9%, based on the energy consumption in 1997, by 2003.

Energy reduction measures have been devised for the Pohang Works and the Kwangyang Works, and factors for cutting energy consumption have continued to be uncovered. In fact, our goal is to achieve an energy saving of 10% between 1999 and 2005. Individual production departments have set energy reduction targets for each process under their control. Troubleshooting of energy-related facilities is being improved and efforts are being made to recover and re-use more of the heat being generated during production.

In 2000, regenerative burners and heat exchangers were installed at the Pohang Works, while a uniform heating system was put into the mini mill electric arc furnaces at the Kwangyang Works. These new facilities alone brought energy consumption down 2.8% from the 1997 level. At the same time, cleaner-burning fuels such as LNG are increasingly being used, and the average ratio of heavy oil being used in the total fuel mix has gone down from 2.7% to 1.7% at Pohang and from 7.8% to 4.3% at Kwangyang.

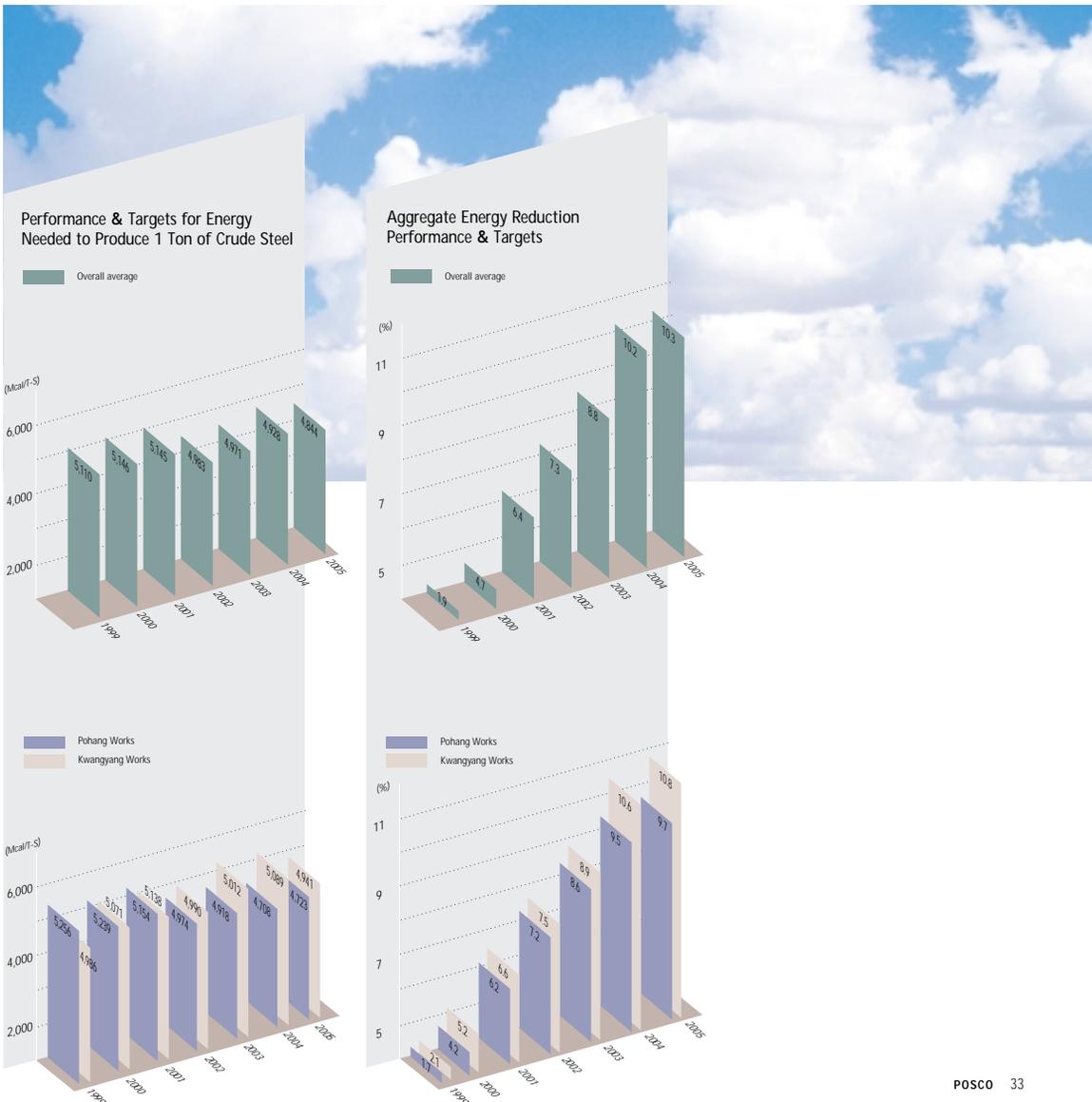
The Energy Management Committee for each department at the two steelworks convenes once a month to devise ways to meet energy reduction targets. Each quarter, the steelworks chief presides over an energy management conference, where reduction targets for each division and each process are reviewed and ways are constantly sought for lowering consumption even more. The company-level Environment & Energy Committee also meets regularly to assess the progress of energy reduction efforts and discuss mid-term measures in this regard.

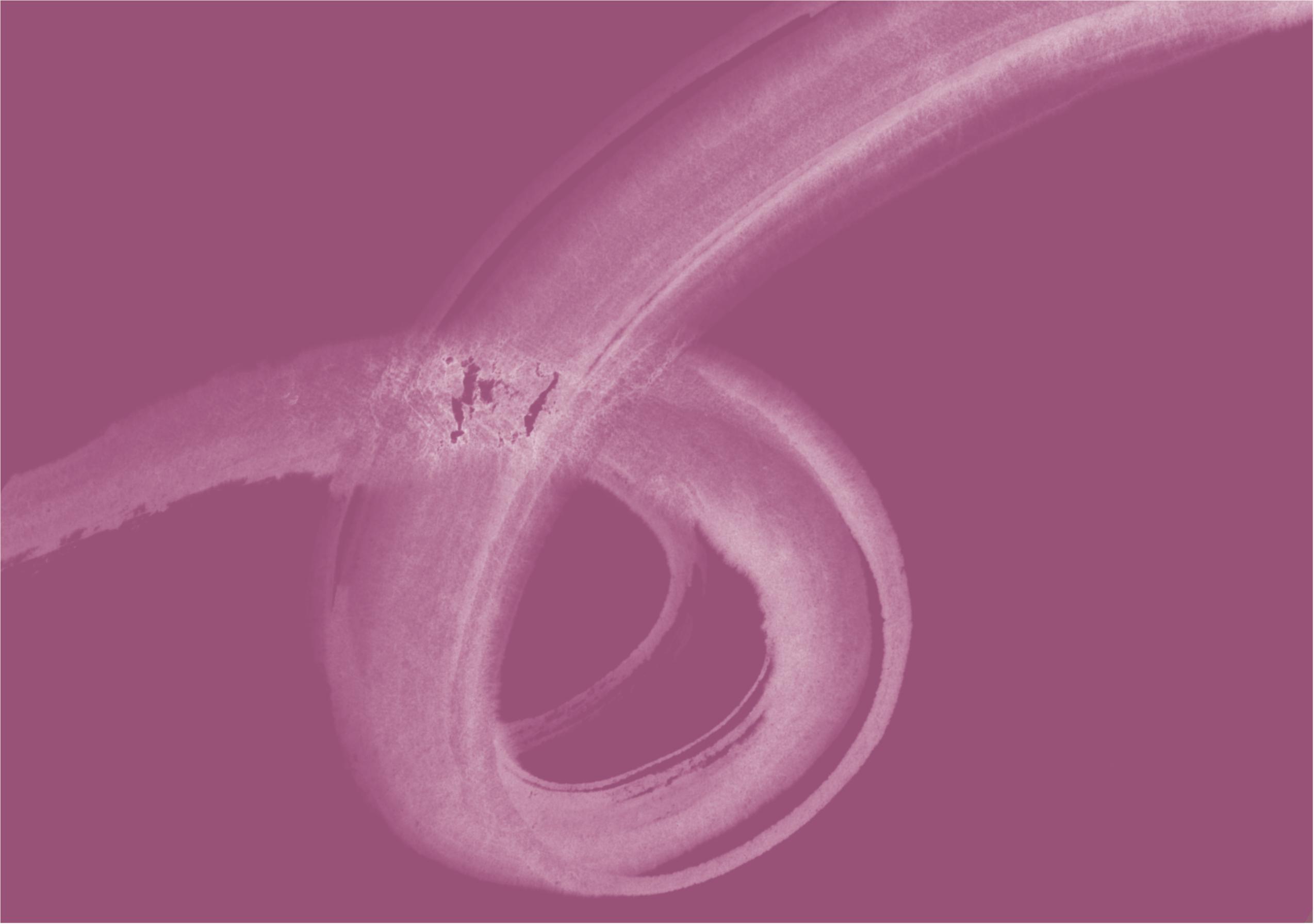


## Preventing Global Warming

By 2005, the 4th coke plant at Pohang and the 2nd at Kwangyang will be outfitted with dry quenching facilities. The company will continue to invest in other energy saving equipment, improve processes and acquire new technology for conserving energy.

POSCO is also involved in the Korean government's effort to establish technical strategies and policies to help prevent global warming. The company takes part in the Study Group on CO<sub>2</sub> Separation and Utilization Technologies led by Korea Energy Management Co. Since 1993, POSCO is jointly researching the CO<sub>2</sub> separation by the pressure swing adsorption (PSA) method with RIST and POSTECH. A pilot plant is now being built at the Kwangyang Works to separate 500 tons of CO<sub>2</sub> yearly.





## Clean & Green Steel Works



POSCO encourages employees to car pool as part of efforts to reduce energy consumption and ease traffic congestion during rush hour. The employees have enthusiastically embraced the system, with 71.6% sharing rides regularly.

The unused parking space resulting from the car pool program has been converted into green areas to improve the work atmosphere at the steelworks. Use of a single, integrated parking facility has been promoted since early 1999, and employees have voluntarily complied in spite of minor inconveniences for the sake of the greater environmental good. A total of 21 separate parking lots have been integrated into one, with spaces for 2,800 automobiles. At the same time, the company has removed structures from the site that are no longer needed, and gardening has been performed in areas where spilled coal and iron ore collected. As a result, an additional 273,900 square meters (68 acres) of area inside the steelworks have been turned into green belt. Now, approximately 2.2 million square meters (550 acres), or 25% of the Pohang Works, is afforested or vegetated.

New green areas and scenery have been created around newly installed facilities at the Kwangyang Works, including four cold rolling mills, the Dong-Ho seashore and the LNG co-generation power plant. Trees have been planted around the slab yard perimeter as a cover. A total of 17,551 trees were planted in four locations on the Kwangyang Works site during 2000, and 56,500m<sup>2</sup> (14 acres) of grassy area were either transplanted or sown. The company plans to extend the green area in 2001 to the sides of main roads, and around the lime calcining plant, sintering plant, blast furnaces, coking making plant, and storage yards.

## Environmental Preservation in the Local Community

POSCO has installed dust-proof nets and organizes periodic cleanup drives to help ensure that people in the community living near the steelworks enjoy a pleasant environment. Studies are conducted regularly to analyze environmental quality and calculate how much each pollution source is impacting the local environment. The company is also involved in environmental preservation efforts at the national level by taking part in drives organized by non-government organizations and by supporting research projects.

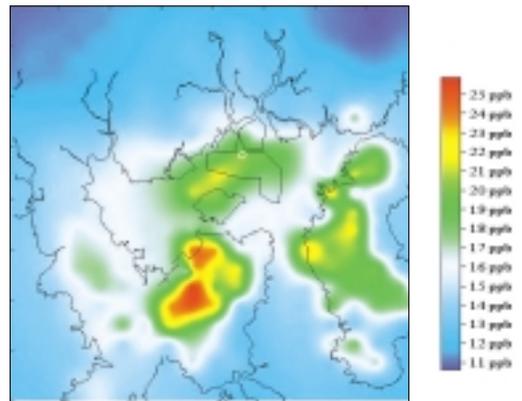
### Comprehensive Environmental Assessment

POSCO carries out comprehensive studies on the air quality water quality and eco-systems in the vicinity of the steelworks. Pollution indices are established for both inside and outside the works. These data are linked with data on weather, ocean currents, topography and other factors to provide a thorough environmental analysis.

The comprehensive pollution studies allow quantitative analysis of pollutants in any given area so predictions can be made on the changes in pollution levels from changes in existing emissions or the introduction of new emission sources. The studies also cover changes in the coastal region or the soil eco-system and trace amounts of pollutants. Basic data are collected to pinpoint the pollution sources or unusual phenomena as part of a concerted effort to scientifically manage the environment. Between January 1999 and August 2000, POSCO completed a comprehensive environmental assessment in the Kwangyang region and a similar study has been undertaken in the Pohang area since December 2000.



3D KWANGYANG REGIONAL MAP USED TO PREDICT AIR QUALITY



MAP OF AVERAGE ANNUAL NO<sub>2</sub> CONCENTRATIONS IN THE KWANGYANG AREA

## Environmental Preservation in the Local Community



### Dust-proof Nets at Raw-material Storage Yards

The outdoor yards for storing coal and iron ore at the Kwangyang Works are covered with nets that are 17 meters high and 2,400 meters long to reduce windblown dust. Since their installation in May 1999, the average wind velocity in the yards has been reduced from 3.9 m/sec to just 1.9 m/sec, lowering the volume of fugitive dust at least 80% to 0.16 mg/Sm<sup>3</sup>. This is only one-third the legal limit of 0.5 mg/Sm<sup>3</sup>.

### Cleanup Drives in the Local Community

POSCO organizes periodic cleanup drives to help keep the local environment in its natural state. On World Water Day (March 22), the Pohang Works employees collect garbage that has accumulated on the Hyeongsan River breakwater. The event helps to remind people of how important water is to them. Various other cleanup drives are also sponsored by the Pohang Works.

The Kwangyang Works, meanwhile, takes part in the Green Kwangyang 21 event sponsored by the city of Kwangyang. The steelworks employees thoroughly clean up the coastline near the site complex.

### Support for NGOs

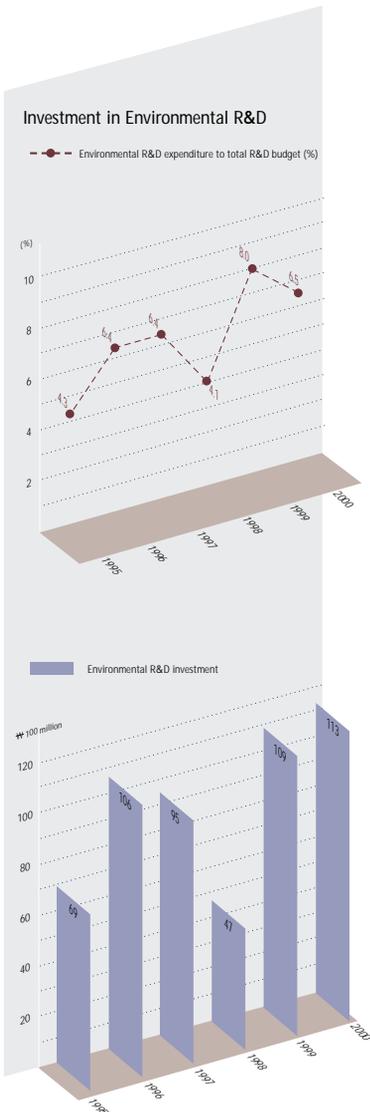
POSCO cooperates with non-government organizations in their environmental protection activities. The company also supports the Citizens' Movement for Environmental Justice (CMEJ) research on establishing government policy for efficiently managing water resource demand in the 21st century and on water quality management for South Korea's five major river basins. The study views water pollution as the main cause of water shortages, and NGOs have taken on the task of surveying pollution levels in the major river basins and investigating what is currently being done to manage water quality. Then, the group will propose ways to alleviate water shortages.

The company has also cooperated with local NGOs on a study aimed at saving the Hyeongsan River, which flows through Pohang.



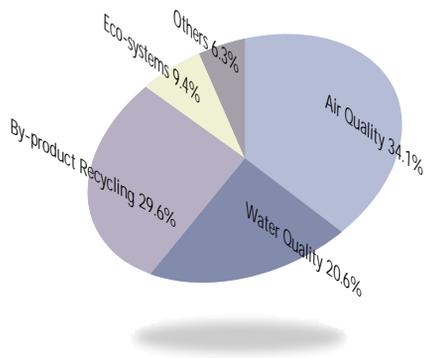
## Environmental R & D

POSCO remains committed to reducing the generation of pollutants and developing technology that will improve the effectiveness of treating pollutants once they have been created. The company invests an average of ₩9 billion a year in research on such diverse areas as preserving air and water quality, turning waste into resources, protecting ecosystems and managing the environment. As such, POSCO is truly a leader in environmental research in Korea.



Field	Applied Technology	Place of Application
Air Quality	Optimization of dust collection systems through pipe layout analysis	Coke making No.2, Pohang Works
	Bag filter monitoring and control	Coke making No.2, Pohang Works
	High-performance scrubber	Lime Calcining, Pohang Works
Water Quality	Alternative for the highly toxic solvent used to find defects in billets	Wire rod No.1, Pohang Works
	Use of gas emissions as an alternative to chemicals for treating wastewater	Final wastewater treatment of iron & steel making, Pohang Works
	High-efficient sludge treatment using a centrifuge	Final wastewater treatment of rolling processes, Pohang Works
	High-efficient active sludge treatment	Coke making No.2, Pohang Works
	Elimination of plate-type heat exchanger scale in steel making process	Steel making No.1, Pohang Works
Waste Recycling	Composite slag for roadbed material	Pohang city, Kwangyang city
	Improvement of weak soil using slag	Container wharf in Kwangyang city
	Artificial reef made of slag	Seas off Keomun Island

BREAKDOWN OF ENVIRONMENTAL R&D INVESTMENT IN 2000



## Environmental R&D

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Special technology is used to monitor and analyze in real time the main factors and variables affecting the operation and dust collection performance of bag filters under diverse on-site conditions. This bag filter monitoring and control technology, which troubleshoots and optimizes dust collection system operation, is being applied at the Pohang Works steel making plants. It has enabled the company to operate the dust collection systems more effectively while lowering operation and investment costs.

Carbon dioxide can be retrieved from gas emissions and used instead of chemicals to neutralize alkaline wastewater. This technique is now being employed at the final wastewater treatment facility of iron & steel making at the Pohang Works and at the lime calcining plant at the Kwangyang Works. The method achieves a more stable pH adjustment than neutralizing the wastewater with sulfuric acid. The work environment is also safer and the use of chemicals can be reduced. Finally, some 20,000 tons less CO<sub>2</sub> is released into the atmosphere each year.

POSCO has also used slag to build artificial reefs that can support the propagation of seaweed and shellfish such as abalone. The devices are now being tested in the waters off Keomun Island, south of Yeosu. Seaweed attaches far more readily to slag than to concrete, and plankton inhabit the slag reefs in far greater numbers. The iron element involved in the slag is one of the major nutrients needed for the seaweed's photosynthesis and protein synthesis.

## Cooperating with External Organizations

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POSCO is cooperating with external organizations in areas related to environmental management. Technology exchanges are carried out regularly with leading steelmakers in Japan, Europe and China. The Korea Steel Association also meets twice a year to exchange environmental technology and discuss issues of mutual interest.

POSCO is a regular member of the Environmental Subcommittee of the International Iron & Steel Institute (IISI), International Stainless Steel Forum (ISSF), and Southeast Asia Steel Association (SEAISI). As such, the company can quickly get the latest international trends related to environmental technology.

Meanwhile, the company is involved in activities with research centers, environment-related academic societies and non-government organizations at home and abroad. Cooperation among companies, universities and research institutes is also being planned to address environmental problems.

## Awards & Training

### Pohang Works Cited for Excellence in Water Conservation

The Ministry of Environment and the Headquarters of the Nationwide Citizens' Movement to Conserve Water introduced case studies of water conservation efforts in 2000, and the Pohang Works was selected as the best example and was given the Minister of Environment Prize.

Virtually every year, drought causes the steelworks to experience industrial water shortages and Pohang residents to have trouble in getting enough potable water. Therefore, the company organizes water conservation campaigns, reduces the amount of effluent it discharges works to expand water re-use. Water usage volumes are now managed on a daily, rather than monthly, basis. The water conservation campaign is promoted to employees via the internal website and electronic billboards to build consensus.

### Environmental Award from N. Geongsang Province

The Environment & Energy Department, Pohang Works was given the North Geongsang Province Environmental Award for 2000. Each year since 1996, individual citizens, organizations and companies are selected for the award, in recognition of exemplary efforts to protect and improve the environment. POSCO has worked hard to achieve a "clean & green" steelworks, improved facilities, and installed dust collection systems to minimize slopping and dust generation. A 75-meter-high Environmental Monitoring Center is now in operation to bolster efforts to eliminate pollution at the source. The company also invites residents of the local community to come on-site and witness the company's environmental management efforts for themselves.



POSCO is involved in activities promoted by the environmental protection organization Green Pohang 21, and the company organizes regular cleanup drives for the Hyeongsan River, coastline at Doguri and valley in Jukjang-myeon. POSCO has also dredged the sewage ditch in Haedo 1-dong, a district in Pohang that is often flooded.

### Iron Tower Industrial Medal

The Kwangyang Works chief was presented the Iron Tower Industrial Medal at the 22nd annual Energy Conservation Promotion Convention. The Kwangyang Works has voluntarily entered into an agreement to reduce energy consumption and has established mid-term energy conservation plans. In 1998, the first year of this effort, 16,940 TOE\* were saved, and energy costs were cut by ₩2.8 billion. A total of 22 energy conservation projects were undertaken in 1999, saving an additional 95,960 TOE, worth ₩16.9 billion.

\*Ton of Equivalent (TOE) refers to the number of calories contained in one ton of oil. One TOE equals 10 million kilocalories, enough energy to produce 4,000 kilowatt-hours of electricity.

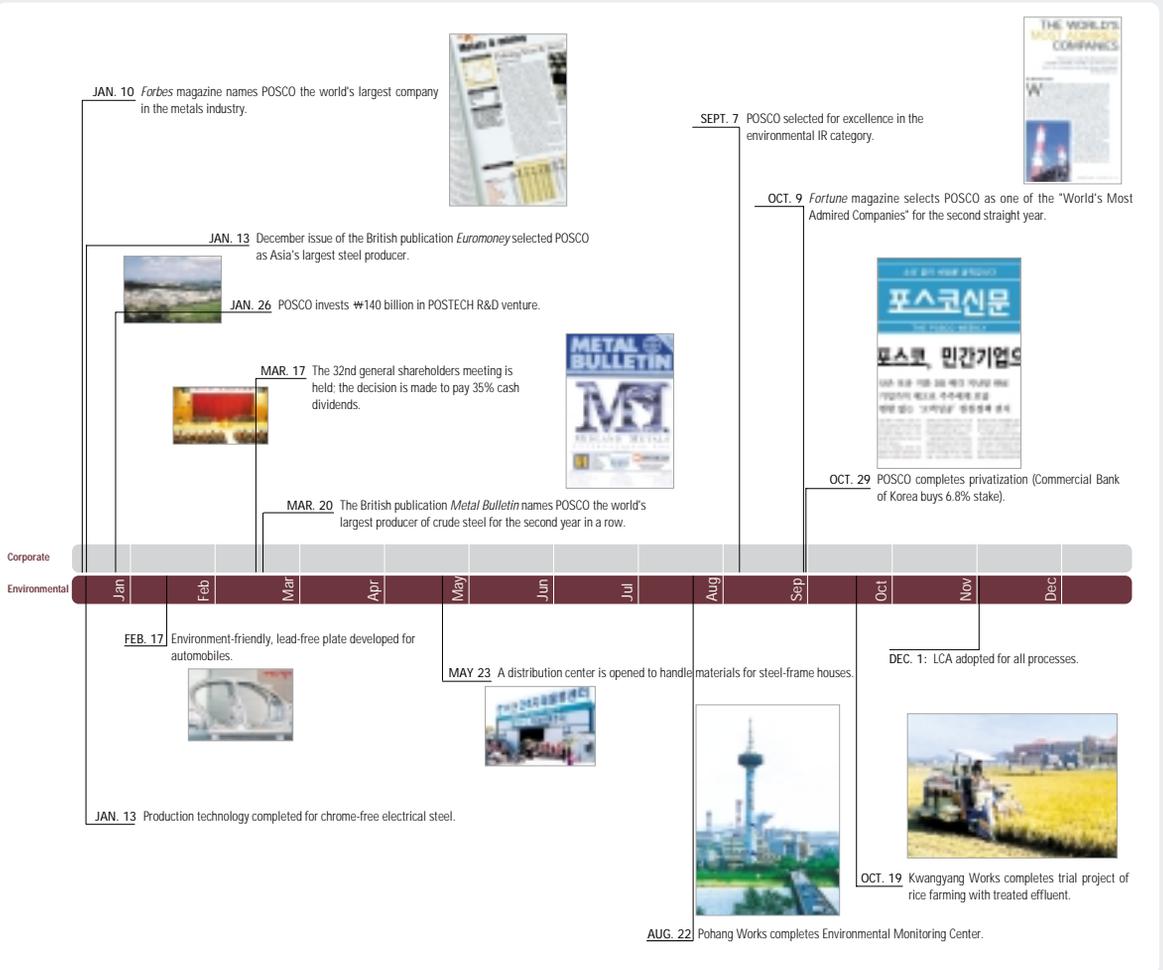
### Environmental Education Program

Several times each year, the Pohang Works invites experts on environmental issues to lecture employees tasked with environmental management. Subjects covered include introductions to air, industrial water and wastewater issues; types of pollution prevention facilities and their principles of operation; and advanced environmental preservation technology.

# POSCO Today

In just 30 years, POSCO has grown into a world-class steel company that turns out some 28 million tons of crude steel annually. The company contributes to national economic development through its operation. POSCO today stands as one of the world's most competitive steelmakers, thanks to ongoing efforts to add value to products as well as rationalize and upgrade facilities.

## KEY DEVELOPMENTS IN 2000



### VITAL STATISTICS

Establishment: April 1, 1968  
 Total assets: ₩17.767 trillion  
 Shareholders' equity to assets: ₩943 billion (53.1%)  
 Employees: 19,275  
 '00 Sales: ₩11.692 trillion  
 '00 Net income: ₩1.637 trillion  
 '00 Crude steel output: 27,735,000 tons

### ISO 14001 CERTIFICATION



### PRODUCTION & SALES VOLUMES



## POSCO's Global Network



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