

Environmental Performance

4. Green Purchasing

To deliver products to customers, Yokogawa needs to purchase materials and parts as well as subcontract out machining and assembly. Environmental impact must also be minimized in these production activities, so the procurement department has drawn up environmental rules governing the “green” purchasing of paper, stationary, and office equipment.

1) Green Purchasing by Procurement Department

1-1) Vendor Cooperation

The procurement department sent a written request to 24 materials and parts suppliers and 34 machining subcontractors, asking them to cooperate with environmental protection in line with Yokogawa's environmental policy.

1-2) Surveys on Toxic and Harmful Substances

The procurement department then surveyed the use of toxic and harmful substances by a total of 58 materials and parts suppliers and machining subcontractors, and has been encouraging them to reduce use of such substances.

1-3) Vendor Evaluations

Based on the response to the surveys, the procurement department evaluated the vendors and requested them to reduce their impact on the environment, such as by controlling the use of toxic substances, energy efficiency, and recycling.

1-4) Encouragement of Machining Subcontractors

The procurement department visited 7 machining subcontractors and encouraged them to take specific measures for reducing their impact on the environment.

2) Green Purchasing by Every Department

In addition to the procurement department, the following two sets of environmental rules were also drawn up governing the procurement of paper, stationary, and office equipment:

- Paper and Stationary Selection Criteria
- Office Equipment Selection Guideline

These were prepared in line with the following:

- Guideline for Configuring Green Purchase Network (GPN)
- International Energy Star Program Standard
- Musashino-shi Green Purchasing Guideline
- Eco Mark Standard
- Green Mark Standard

According to the rules thus drawn up, 72 items from the total of 117 items of paper, stationary, and office equipment were considered to be subject to ecology considerations, and 29 replaceable items (40%) from those 72 were replaced with eco-goods including reused goods. We will expand the scope of such replacement and endeavor to adhere to our green purchasing policy.

15



Examples of Green Goods Purchase

5. Green Logistics

Yokogawa Logistics Corporation, which handles the logistic work of the Yokogawa group, is actively involved in environmental efforts, even for packing materials.

1) Improvement of Transportation Efficiency

The following four measures are designed to ensure environment-friendly logistics. We are now comparing distances traveled and fuel consumption in order to measure and compare effects on the environment. In our plants, non-polluting electric fork lifts have been used for more than ten years.

1-1) Rational Delivery

- Coordinate delivery routes and times in order to deliver to multiple destinations in one trip.
- Where possible, fill empty trucks for the return journey.

1-2) Reduction of Idling

- Avoid idling for economical driving.

1-3) Vehicle Maintenance

- Keep trucks in good condition (engine maintenance and tire pressure).

1-4) Reduction of Fuel Consumption

- Observe speed limits and drive at economical speeds.
- Avoid quick acceleration and quick braking.



Poster Urging Drivers to "Quit Idling"

2) Use of Environment-friendly Packing Materials

In consideration of environmental protection also for packing materials, Yokogawa Logistics Corporation focuses on the 3 Rs, namely, reduce, reuse, and recycle packing materials.

2-1) Pulp Molds

To promote reuse of used paper and reduction of foam plastic cushioning materials, pulp molds are used. Pulp molds, which are molded from waste paper and used as packing cushions, are easy to treat (by recycling or burning) after use and are not bulky when stacked, thus improving transportation efficiency. Pulp molds are now used for packing products that have standardized dimensions, such as recorders.



Pulp Mold Cushions

2-2) Tote Boxes and Containers

Tote boxes and containers are ideal for transferring materials and parts between and inside plants, and cushioning materials are recycled at the same time, thus reducing waste (disposal) throughout logistic work.



Tote Boxes and Container

Environmental Performance

6. Green Applications

Yokogawa's products not only feature environment-friendly designs, but also incorporate applications that help the customer to protect the environment. We call these applications green applications.

Examples include the DAQSTATION paper-free recorders, the DARWIN recorders that record and control power and temperature, power monitors that monitor power consumption, and the PZ4000 power analyzers that analyze the quality of power.

Moreover, we supply such applications for all types of system, from small-scale systems such as the SG400 CO-O₂ gas analyzer system that curbs the emission of dioxins and other endocrine disruptors from waste incinerators, to large-scale systems such as production control systems that control and optimize the efficiency of iron and petrol refinery plants.

7. Compliance with Legal Controls

Although legal controls exist concerning atmospheric pollution, water pollution, noise and vibration, Yokogawa has set even tougher limits for itself. The following measurements were taken within the Headquarters located in a semi-industrial zone, and within the Kofu and Komine plants located in industrial zones, in fiscal 1998.

17

■ In Headquarters

Atmosphere

[†] ND indicates below the detectable limit.

Facility	Item	Measured Values	Limits		
			Voluntary Limit	Municipal Legal Limit	National Legal Limit
Cooling/heating water generator	NO _x (ppm)	19 to 73	75	—	150
	Smoke and dust (g/Nm ³)	0.0011	0.003	—	0.03
Co-generation gas engine	NO _x (ppm)	123 to 146	160	—	200
	Smoke and dust (g/Nm ³)	0.0019	0.004	—	0.04
Scrubber	HCl (ppm)	0.6 to 0.8	12.5	25	25
	H ₂ SO ₄ (mg/Nm ³)	0.4 to 0.5	0.8	1	1
Cleaning bath	Trichloroethylene (ppm)	2 to 17	80	100	100
	Tetrachloroethylene (ppm)	20 to 30	67	100	100

Water Purity

Item (Toxic Substance)	Measured Values	Limits		
		Voluntary Limit	Municipal Legal Limit	National Legal Limit
Cyanides (mg/liter)	[†] ND	0.5	1	1
Hexahydric chromium (mg/liter)	ND	0.25	0.5	0.5
Trichloroethylene (mg/liter)	ND	0.03	0.3	0.3
Tetrachloroethylene (mg/liter)	0.0008	0.01	0.1	0.1

Noise and Vibration

Item	Measured Values	Limits		
		Voluntary Limit	Municipal Legal Limit	National Legal Limit
Noise (dB)	39 to 59.2	59.7	60	65
Vibration (dB)	26 to 59.3	64.7	65	70



DAQSTATION



DARWIN



SG400



Iron Plant

■ In Kofu Plant

Atmosphere

† ND indicates below the detectable limit.

Facility	Item	Measured Values	Limits		
			Voluntary Limit	Municipal Legal Limit	National Legal Limit
Cooling/heating water generator	NO _x (ppm)	53 to 68	120	150	150
	Smoke and dust (g/Nm ³)	0.002	0.01	0.1	0.1

Water Purity

Item (Toxic Substance)	Measured Values	Limits		
		Voluntary Limit	Municipal Legal Limit	National Legal Limit
Cyanides (mg/liter)	ND	0.05	0.1	1
Hexahydric chromium (mg/liter)	ND	0.025	0.05	0.5
Copper compounds (mg/liter)	0.05 to 0.47	0.5	1	3
Fluorine compounds (mg/liter)	ND	0.5	1	15
All kinds of chromium compounds (mg/liter)	ND	0.25	0.5	2

Noise and Vibration

Item	Measured Values	Limits		
		Voluntary Limit	Municipal Legal Limit	National Legal Limit
Noise (dB)	40 to 52	69	70	70
Vibration (dB)	16 to 29	64	65	70

■ In Komine Plant

Atmosphere

Facility	Item	Measured Values	Limits		
			Voluntary Limit	Municipal Legal Limit	National Legal Limit
Scrubber	HCl (ppm)	ND	12.5	25	25
	HCN (ppm)	ND	5	10	10
Cleaning bath	Trichloroethylene (ppm)	20 to 25	50	100	100
Coating	Total of toluene and xylene (ppm)	17.5 to 22.2	100	200	200

Water Purity: The measured values for waste water are omitted since the Komine plant runs a wastewater treatment facility from which no waste water is discharged.

Noise and Vibration

Item	Measured Values	Limits		
		Voluntary Limit	Municipal Legal Limit	National Legal Limit
Noise (dB)	45 to 69	54 to 69	70	70
Vibration (dB)	30 to 64	59 to 64	65	65

Contribution to Local Communities

1. Harmonious Coexistence with Musashino City

Yokogawa Electric Corporation works together with local communities in various ways.

1) Photovoltaic Power Generation System and Commitment to Help Local Communities in Case of Disaster

As part of a field test in a national project for new power generation systems for public use (NEDO), a 60-kW photovoltaic power system was installed on the roof of a Yokogawa factory in 1996. This was the first such system designed to help private companies in the event of a disaster. Photovoltaic power systems usually supplement power to the plant and are an invaluable independent source of energy in case lifelines are lost in a disaster. Even during the night or on rainy days, the batteries that come with the system can simultaneously:

- provide lighting for 14 hours,
- allow communications for 24 hours,
- permit incoming broadcast for 12 hours, and
- power a storage pump for 1.8 hours (supply 60 tons of water; enough for 20,000 persons assuming 3 liters per person per day).

Yokogawa has signed an agreement with Musashino city that promises: the free use of athletic fields as a refuge center and relay station for relief goods; the dispatch of employees as volunteers; and the use of its medical and welfare facilities, in case of disaster. Yokogawa is thus firmly committed to the local community.



Photovoltaic Power Generation System

2) Participation in Local Activities as Citizens of Musashino City

As one of the major local companies, the Headquarters participate in various committees, such as the Musashino Citizens' Environmental Committee, Musashino Citizens' Waste Committee, and Musashino Town Development Committee of Musashino city, and also contributes to the local community through voluntary activities and so on.

19

2. Harmonious Coexistence with Akiruno City

The environment-friendly Komine plant coexists peacefully with Akiruno city.

The Komine plant is a leading-edge plant constructed on the Komine Industrial Estate in Akiruno city, Tokyo. An environmental audit based on Tokyo's municipal regulations was carried out before construction, the aim being to outperform the municipal requirements.

By incorporating a wastewater treatment system that discharges no waste water, a sewage treatment system that thoroughly cleans sewage, strict control of noise and vibration, consideration to the scenery, and so forth, the Komine plant is indeed environment-friendly and coexists harmoniously with the local community.



Komine Plant

3. Harmonious Coexistence with Yamanashi Prefecture

Yokogawa is a leader of environmental protection activities in Yamanashi prefecture.

1) A Zero-emissions Industrial Estate

To help contribute to the local community, Yokogawa's Kofu plant is leading the recycling-based zero emission activities of a consortium of 22 local companies on the Kokubo industrial estate (in Yamanashi Prefecture), as featured in the environmental report of 1998.

The Study Group for Industrial Waste Disposal at the Kokubo Industrial Estate (chaired by Michio Ishii of Yokogawa) was formed in 1992 to promote environment-friendly industrial waste, and has already implemented recycling systems for used paper, waste plastic, and food waste. In addition, the Government-Industry-Academia Chip Consortium for Promoting Zero Emissions was formed by the group of local companies of the Kokubo industrial estate, Yamanashi University, and Yamanashi Prefecture to address the next step: thermal recycled power generation using a gasifying fusion furnace, production of pulp molds from used paper utilizing the generated power, etc. The overall objective is to create the world's first zero emission industrial estate together with the local community.

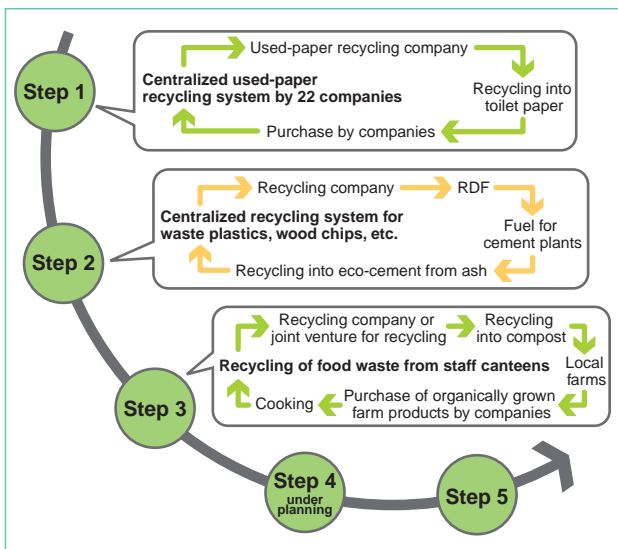
2) Opening of Kofu Plant to Field Trips

Since the zero-emissions activities of the Kokubo Industrial Estate were acclaimed in not only the environmental report of 1998 but also in various environment-related magazines and newspapers, in 1998 more than 900 people from various groups and the press visited Yokogawa's Kofu plant to see for themselves the environmental protection activities.



Segregated Waste Recycling and Collection Car of Kokubo Industrial Estate

Segregated General Waste Recycling by Employees



Recycle System

3) Other Regional Activities

The Kofu plant also participates in the joint waste treatment study group (a joint project of Kamanashi and Kosai Industrial Estates that resulted from the zero-emissions activities in the Kokubo Industrial Estate); the Council for Environmental Protection in Yamanashi Prefecture, a study group set up to consider the future of Yamanashi; as well as various other groups, thus contributing to the regional activities.



Kofu Plant

Environmental Accounting

As a committed environment-friendly enterprise, Yokogawa Electric Corporation employs environmental accounting to determine the balance between the cost and effects of environmental protection activities.

1. Objectives of Environmental Accounting

- (1) To identify the costs spent on environmental protection activities and the effects derived from them, and to consider the balance between cost and effects in decision-making for effective implementation of environmental protection activities in the future.
- (2) To disclose information widely to stockholders, customers, local citizens, the public and other interested parties to show what Yokogawa is doing to protect the environment.

2. Scope

In fiscal 1998, environmental accounting was performed at the Headquarters, the Kofu plant, and the Komine plant (three sites). It will be performed in all consolidated companies in the near future.

3. Basic Policy

- (1) Costs were identified generally in compliance with the Environment Agency's guideline (interim summary) officially announced in March 1999.
- (2) Identified effects were limited to those effects that could be actually gained, such as the profits on valuables sold during recycling activities and the reduction in electric power because of power-saving activities, and whose values could be quantified in monetary terms.

4. Results

The costs, effects, and investments in fiscal 1998 (April 1998 to March 1999) are shown in the table below.

5. Future Tasks

We will:

- (1) Expand the same environmental accounting to all sites of the Yokogawa group that have obtained ISO14001 approval (seven group companies in Japan) in fiscal 1999.
- (2) Review the items of costs and effects and their definitions while determining the policy in accordance with global trends. In particular, we consider the propriety of counting costs that are regarded as avoidable based on an assumption, costs equivalent to effects from environment-friendly product design, and overhead costs for the business itself.
- (3) Establish the process of identifying the costs and effects.

21

Costs, Effects, and Investments in Fiscal 1998 (April 1998 to March 1999)

Costs (including depreciation)	Effects
990 million yen	590 million yen
Direct costs for environmental impact reduction: Costs spent for pollution prevention, waste treatment, recycling Management costs related to environment: Personnel fees related to environmental training, and energy and resource efficiency Costs for obtaining and maintaining ISO14001 approval Costs for energy efficiency Costs for recycling products Costs for research and development related to the environment Social costs related to the environment Other costs	Profits on valuables sold Effect of reduced energy consumption Effect of reduced resource consumption (paper, chemicals, etc.) Effect of reduced costs for waste treatment Other effects

Investments
1,040 million yen
Total amount of investments in 1998 for energy and resource efficiency, and prevention of pollution

A History of Caring for Our Environment

- 1971 Set up a pollution prevention organization.
- July 1974 Constructed wastewater treatment facilities in accordance with municipal bylaws.
- May 1987 Began studying environmental assessments.
- October 1989 Established a chlorofluorocarbon (CFC) reduction committee.
- April 1991 Formed the Global Environmental Protection Promotion Department.
- August 1991 Began the "Protect the Earth" campaign.
- August 1992 Carried out an environmental audit for the Komine factory, Japan.
- February 1993 Assigned the executive director of environmental management.
- July 1993 Established a voluntary environmental plan.
- August 1994 Reported the results of voluntary environmental activities of 1993.
- December 1994 Completed the phasing-out of specific CFCs and trichloroethane for cleaning.
- June 1995 Decided to obtain ISO14001 approval as the first step to becoming an environment-friendly enterprise, and integrated the voluntary environmental plan into the plan to obtain ISO14001 approval.
- October 1995 Formed a corporate global environment committee.
- March 1996 Established corporate rules for environmental protection management.
- May 1996 Formed a global environment committee at each plant site (Headquarters, Kofu plant, and Komine plant) and each site began working to obtain ISO14001 approval.
- April 1997 Started issuing Green Times, a Company journal on global environment issues.
- July 1997 Kofu plant obtained ISO14001 approval.
- February 1998 Headquarters and Komine plants obtained ISO14001 approval.
- May 1998 Suzhou Yokogawa Meter Company in China obtained ISO14001 approval.
- June 1998 Started issuing Yokogawa Environmental Report in Japanese.
- August 1998 Yokogawa Flowtech Co., Ltd. obtained ISO14001 approval.
- October 1998 Yokogawa Electric Asia Pte. Ltd. in Singapore obtained ISO14001 approval.
- January 1999 Kokusai Chart Corporation obtained ISO14001 approval.
- February 1999 Yokogawa Logistics Corporation obtained ISO14001 approval.