

◆ Environmental Management Activities

Overview of Environmental Impact

We integrated the energy balance and material balance charts into one and drew up an “eco-balance” diagram that illustrates all of the inputs and emissions. This eco-balance provides basic data to quantitatively assess the environmental impact and effectiveness of environmental protection activities.

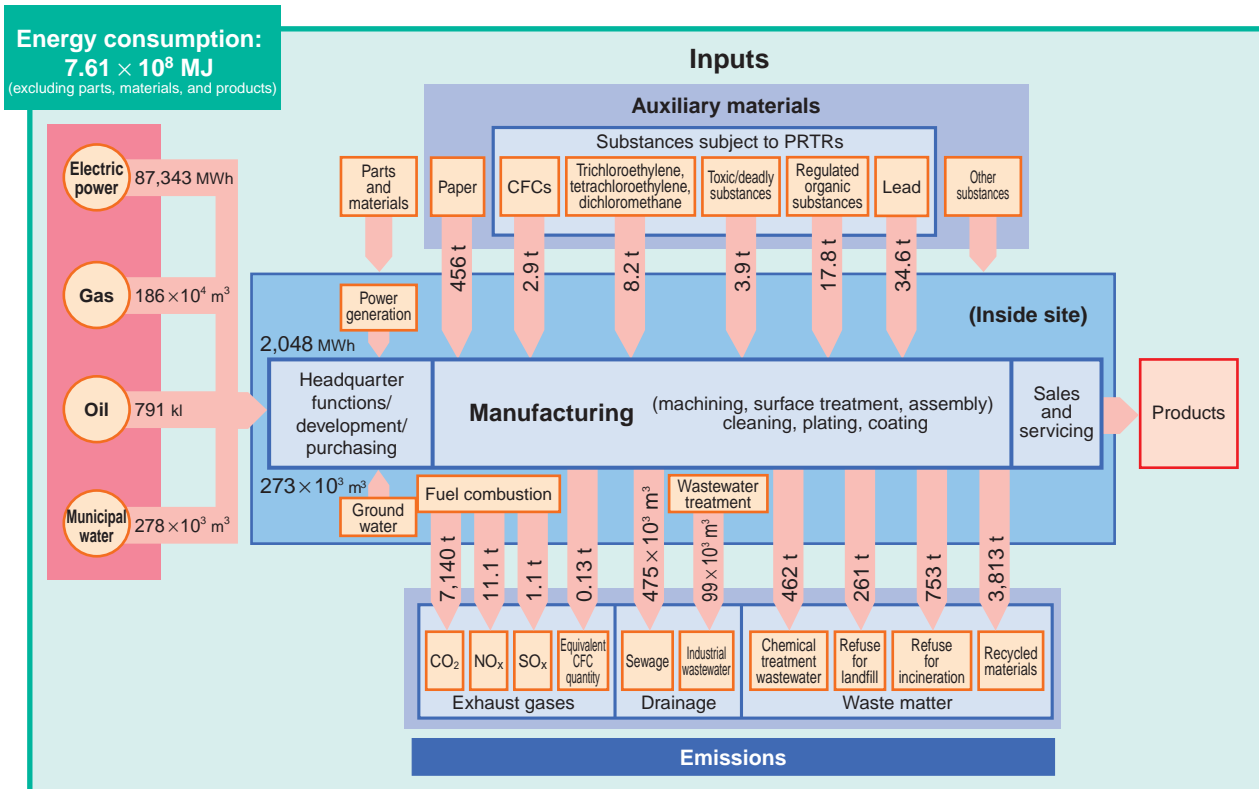
1. Overview of Environmental Impact

The diagram below shows the annual balance of inputs (consumption) and emissions of energies and resources excluding parts, materials, and products, hereinafter referred to as eco-balance, for 18 sites. Parts and materials are not shown as numerical data here since they exist in many different kinds and it is difficult to ascertain their mass (tons).

2. How to Assess Environmental Protection Activities

Using the eco-balance as basic data, the Group quantitatively assesses the environmental impact (burden) of its business activities, determines efficient measures for reducing it, and then assesses the results of implementing those measures. In this process, the integrated environmental burden indicator described later, Eco Point, is calculated.

By using quantitative figures where possible, the Group can evaluate and select measures based on objective data. The integrated environmental burden indicator for inputs and emissions of energy and materials (excluding parts, materials, and products) in fiscal 2001 was calculated as 36,729 EP.



Eco-Balance for Fiscal 2001 Covering 18 Sites



Eco Point Method

1. What is Eco Point?

Organizations are increasingly focusing on the life-cycle assessment (LCA)* of individual products, but assessments of the environmental burden of an entire site such as a plant are very rare. Eco points* (EP) is an environmental burden indicator which is calculated by comprehensively analyzing and quantifying the environmental burden of the entire site. The higher the indicator, the greater the impact on the environment.

The Yokogawa Group recognizes the importance of this approach. We employed EP in fiscal 2000 as a trial, and in fiscal 2001, we used a new, refined eco point method that takes the impact of toxic substances and pollution of waste into account. We are now using this new method to quantitatively assess the burden on the environment of our sites and to design environmental protection activities accordingly.

* Life-cycle assessment: LCA is an assessment which comprehensively evaluates the impact of a specific product on the environment throughout its lifecycle, from material purchase, manufacture, and distribution to its use and disposal.

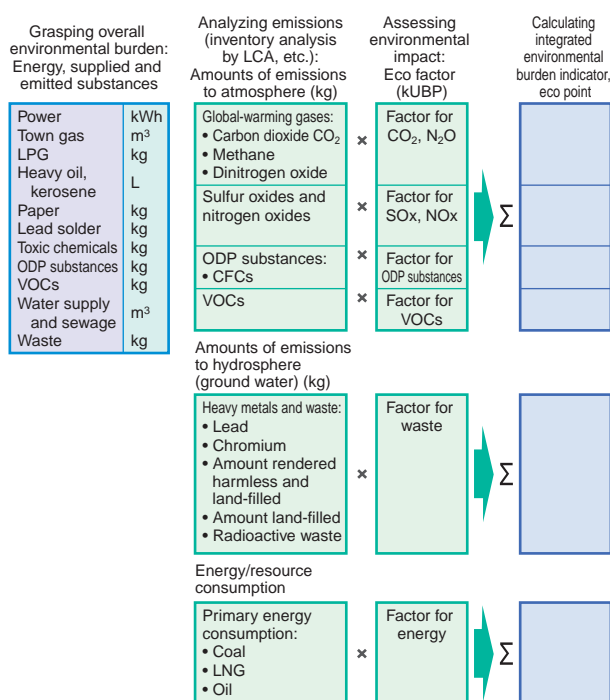
2. Eco Point Calculation Process

The figure on the right illustrates the flow of calculating eco point. First, an overview of the environmental burden is grasped. Next, emissions (inventory analysis*) are analyzed by means of LCAs or the like to obtain the amounts of resources consumed and emissions into the earth's atmosphere and hydrosphere (ground water), which are then multiplied by the respective predefined weighing factors called "eco factors"*** to normalize their degree of impact. Finally, the normalized and weighted indicators are summed up to obtain the environmental burden indicator, the eco point (EP). Emissions are analyzed based on the LCA data of the Institute of Resources and Environment Technology in Japan. For the eco factors, the values proposed by the Federal Department for Environment, Transport, Energy and Communication of Switzerland are used, and the following equation is used to obtain the integrated indicator:

$$\text{Eco point (EP)} = \sum(\text{LCA inventory analysis result} \times \text{eco factor})$$

* Inventory analysis: A technique to analyze emissions, in which the supplied power, town gas, water, paper, and chemicals, and emissions (lead solder, volatile organic compounds [VOCs], waste materials) are analyzed by LCA or the like to calculate the primary energy consumption and the amounts emitted to the earth's atmosphere and hydrosphere (ground water) as individual types of waste such as carbon dioxide, nitrogen oxides, VOCs, and heavy metals. Namely, an inventory analysis calculates the emission amounts (inventory) for the individual impact categories (global-warming gases, acidification gases, ozone-depleting potential [ODP] substances, substances toxic to humans, etc.).

** Eco factors: Weighing factors to be applied to the emission amounts in individual categories obtained by an inventory analysis, taking the degree of impact on the environment by emissions in each category into account.



Calculating Integrated Environmental Burden Indicator Using Eco Point Methods

The calculation of environmental burden of individual substances in 18 sites for fiscal 2001 shows that power and solder have relatively larger EP scores, so the Group is working to reduce the environmental burden produced by these factors.

These quantification techniques are still evolving. The effects on the environment may be overly simplified in some areas and the eco factors are taken from existing data proposed by Switzerland and so do not necessarily suit the conditions in Japan. However, the Yokogawa Group is continuously assessing environmental protection activities and taking action based on data.

Comparison of Results versus Targets

Based on the Basic Environmental Management Rules for the Yokogawa Group, each firm of the Group defines targets in line with its scope of business and local characteristics, and conducts environmental protection activities accordingly. The Headquarters, Kofu plant, and Akiruno plant are model sites* that drive the environmental protection efforts of the entire Group.

The Yokogawa Group places special emphasis on establishing, implementing, and refining its environmental management system. In fiscal 2001, an internal audit was conducted for each ISO14001-certified workplace, specific issues pointed out, and refinements made.

In September 2001, the Headquarters of Yokogawa Electric Corporation, its Kofu plant, and Akiruno plant of Yokogawa Electronics Manufacturing Corporation (three

sites) were the first to obtain comprehensive ISO14001 certification in the Group. Comprehensive certification is designed to improve the quality of the Group's environmental protection activities and to consolidate the work of administering environmental protection. Regarding ISO14001 certification which has been ongoing since 1995, Yokogawa Engineering Asia Pte. Ltd. in Singapore newly acquired certification. And regarding individual environmental protection activities, there has been steady progress in expanding the approaches of model sites to other sites and sharing information.

For risk management, the Group issued a Soil Survey and Control Standard for the Yokogawa Group. Each site will conduct soil surveys and formulate countermeasures against potential risks in accordance with this standard.

In terms of environmentally friendly product development, we have issued the new Environmentally

Environmental Policy of Yokogawa Group		
	Commitment	Category
Environmental management system implementation, maintenance, and improvement	Establish an environmental management system to promote and improve environmental protection activities. For this, accurately grasp the impact of business activities on the environment, draw up environmental targets which are technically and economically feasible, and address them while conducting environmental audits to maintain and improve the system.	Environmental business operations audits Establishment of environmental information management system
Implementation of environmental education	Provide all employees with environmental education to make them understand the Environmental Policy, improve their environmental awareness, and make them act with care for environmental protection in all aspects of corporate and civil activities under their own initiative.	Implementation of basic environmental education Implementation of specific environmental education
Legal compliance	Comply with all legislation, directives, regulations, agreements, and industrial guidelines pertaining to the environment and address protection of the global environment.	Enactment of Group's standard for compliance control
Promotion of recycling-based management	Address effective use of resources and energy throughout the corporate activities, reduce the amount of waste, and boost reuse and recycling, with the aim of achieving zero emissions.	Energy efficiency Resource efficiency Zero emissions
Reduction of environmental contaminants	Reduce the use of substances which adversely affect the environment such as toxic, global warming, and ozone-depleting substances by adopting substitute techniques to avoid environmental risks.	Phase-out of HCFCs Phase-out of trichloroethylene Phase-out of dichloromethane Control of toxic chemicals Establishment of lead-free soldering process
Environmentally friendly product development	Develop and manufacture products whose impact on the environment throughout their lifecycle from material purchase, manufacture, and distribution, to use and disposal has been well considered, to supply products that generate minimal environmental burden.	Improvement of design criteria New product development Reduction of packing materials and improvement of product packing Enhancement of "green" purchasing and procurement
Environmental solution supply	Based on measurement, control, and information technologies, contribute to global environmental protection by supplying value-added products and services.	Establishment and popularization of business models
Contributions to society	Encourage employees' participation in global environmental protection activities and their voluntary activities, and strive to coexist harmoniously in partnership with local communities.	Promotion of activities to contribute to local communities
Transparency of environmental information	Put the environmental policy and information of global environmental protection activities on public display to broaden communications with society.	Enhancement of Environmental Report

Friendly Material Selection Criteria and added two new products to ISO14021 Eco Label (Type II)-compliant products. Regarding the target to “reduce carbon dioxide emissions of newly developed products by 25%,” the development of 14 models which meet this target has finished and the scope of application of the lifecycle assessment standard was widened.

In terms of using energy effectively, targets to reduce carbon dioxide emissions were attained by making extensive improvements at each workplace, and we will continue to manage energy efficiency under a unified approach for all sites.

Regarding the amount of waste, the ultimate goal is to achieve zero emissions (defined as recycling 99% or more of total waste produced). The first step, which is “zero refuse for landfill,” was achieved by the two sites which had set it as a target for fiscal 2001. These two sites are now embarking on the next step, which is to increase the recycling ratio towards “zero refuse for incineration.”

For phasing-out of toxic substances such as hydrochlorofluorocarbons (HCFCs, freon substitutes), the targets for fiscal 2001 were attained. However, these substances are still used in some sites, and we are now checking quality assurance and working to eliminate the use of all toxic substances as quickly as possible.

For “green” purchasing, the Green Purchasing Guideline for the Yokogawa Group was enacted, enabling the “green” purchasing ratio to be ascertained.

The Yokogawa Group has mapped out an environmental target program up to fiscal 2005. Although the hurdles are high, the Group will achieve the targets by utilizing the same technical strengths and development skills that have been contributing to the measurement, control, and information industries, and by making continuous refinements.

* Throughout this report, the term “three model sites” or “model sites” indicates the Headquarters and Kofu plant of Yokogawa Electric Corporation, and the Akiruno plant of Yokogawa Electronics Manufacturing Corporation.

2001			Self-evaluation	Targets for 2002	Ref. Pages
Targets	Results				
<ul style="list-style-type: none"> Acquire a single ISO14001 registration for the entire site at Headquarters, Kofu plant, and Akiruno plant 	<ul style="list-style-type: none"> In September 2001, the three sites as a whole obtained comprehensive ISO14001 certification. Yokogawa Engineering Asia obtained ISO14001 certification. 	○	<ul style="list-style-type: none"> Conduct environmental business operations audits for the integrated four sites. 	10, 11	
<ul style="list-style-type: none"> Provide basic environmental education to 100% of employees. Provide specific environmental education to 100% of employees. 	<ul style="list-style-type: none"> Done for 100% of employees. Done for 100% of employees. The environmental education program was reviewed. 	○	<ul style="list-style-type: none"> Provide basic environmental education to 100% of employees. Provide specific environmental education to 100% of employees. 	28	
<ul style="list-style-type: none"> Enact a standard for soil control. 	<ul style="list-style-type: none"> Soil Survey and Control Standard for Yokogawa Group was issued. 	○	<ul style="list-style-type: none"> Issue a standard for wastewater and emission control for the Yokogawa Group. 		
<ul style="list-style-type: none"> Reduce carbon dioxide emissions produced by energy consumption, by 7.6% from the level in 1990. Reduce the amount of waste by 58.6% from the level in 1995. At the Kofu and Akiruno plants, achieve “zero refuse for landfill.” 	<ul style="list-style-type: none"> Reduced by 15%. Reduced by 60.3%. Done. 	○	<ul style="list-style-type: none"> Reduce carbon dioxide emissions produced by energy consumption, by 11.1% from the level in 1990. Reduce the amount of waste by 67.7% from the level in 1995. 	16, 17 20, 21	
<ul style="list-style-type: none"> Phase out HCFCs at Headquarters and the Kofu plant. Phase out trichloroethylene and tetrachloroethylene at the Mie plant and reduce them by 80% from the level in 1998 at the Nagano plant. Establish a system for registration and assessment of chemicals. Establish a lead-free flow soldering system for double-sided re-flow printed boards. 	<ul style="list-style-type: none"> Completely removed at Headquarters and the Kofu plant. Completely removed at the Mie plant and reduced by 93% at the Nagano plant. Done. Done. 	○	<ul style="list-style-type: none"> Phase out HCFCs at the Akiruno plant. Phase out dichloromethane Headquarters, the Kofu plant, and Akiruno plant. Establishment of elemental technology for lead-free soldering 	18 19 23	
<ul style="list-style-type: none"> Identify developed products on which the Environmental Assessment Standard for Product Design and the lifecycle assessment should be enforced in order to improve development and design of products. Establish criteria for selecting recyclable materials. Review the green purchasing criteria to expand “green” goods purchased. 	<ul style="list-style-type: none"> Done for 14 models. Added 2 products to models with Type II Eco-label. Enacted Environmentally Friendly Material Selection Criteria. Developed Green Purchasing Guideline for Yokogawa Group. 	○	<ul style="list-style-type: none"> Identify developed products on which the Environmental Assessment Standard for Product Design and the lifecycle assessment should be enforced in order to improve development and design of products. Develop a guideline for energy-efficient design. Increase the ratio of “green” goods purchased, to 80% at the three model sites. 	22, 24, 25 24 15	
<ul style="list-style-type: none"> Propose systems, products, and services addressing a specific environmental issue. 	<ul style="list-style-type: none"> Eco base monitoring system Soil and ground water purification support service 	○	<ul style="list-style-type: none"> Propose systems, products, and services addressing a specific environmental issue. 	26, 27	
<ul style="list-style-type: none"> Participate in social and regional activities. 	<ul style="list-style-type: none"> Woodworking workshop utilizing scrap lumber Participated in a tree planting campaign. 	○	<ul style="list-style-type: none"> Participate in social and regional activities. 	30	
<ul style="list-style-type: none"> Expand the data sources. 	<ul style="list-style-type: none"> Expanded the scope to 18 sites. The Group corporations in Suzhou and Sichuan, People’s Republic of China each published an environmental report. 	○	<ul style="list-style-type: none"> Expand the data sources. 	29	

Management System

Environmental management systems must be properly designed and implemented to protect the global environment and achieve a sustainable society. The Yokogawa Group drew up and is operating such a system that embodies its Environmental Philosophy, Environmental Policy, and Code of Conduct for Environmental Protection based on the Corporate Philosophy.

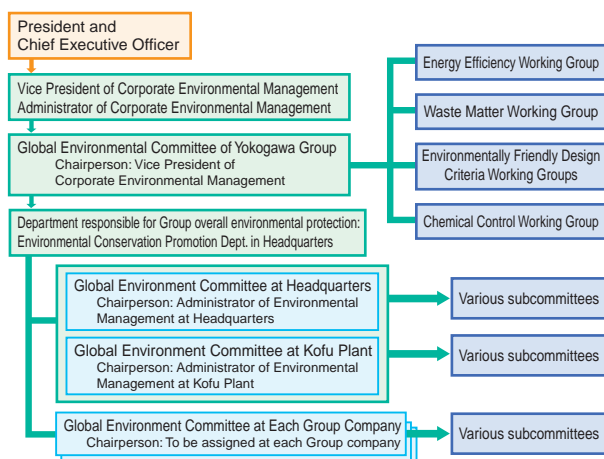
1. Environmental Management System Configuration

To define environmental targets, attain them, and set higher targets, the environmental management system must be firmly based on a Plan-Do-Check-Action cycle where “Plan” means environmental planning, “Do” means implementation, “Check” means checking and correcting, and “Action” means review by the management. We are therefore encouraging individual sites to obtain ISO14001 certification or to define a simplified environmental management system according to the scope and scale of their business. As of March 2002, 18 sites (12 in Japan and 6 in other countries) have obtained ISO14001 certification, accounting for 63% of all employees of the Group.

* For the detailed status of accreditation for ISO14001 certification, see www.yokogawa.com/environment/iso.htm.

2. Organization

The vice president of environmental management, who oversees environmental protection activities on behalf of

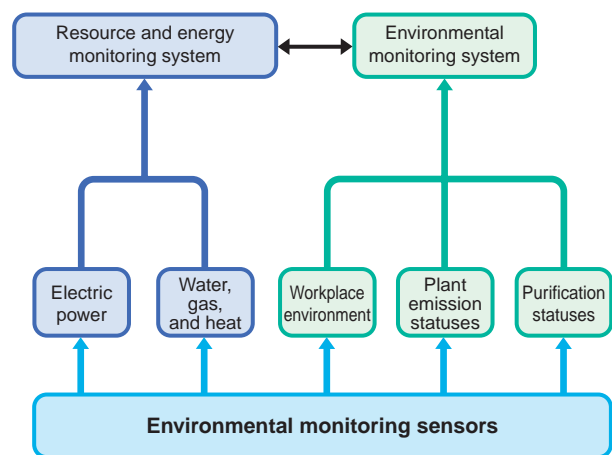


Environmental Management Organization

the president and CEO, has full responsibility for planning, adjustment, and administration of the Group’s overall management system. The vice president appoints an Administrator of Corporate Environmental Management (the General Manager of the Environmental Conservation Promotion Dept. within the Legal and Corporate Quality Assurance Dept. in Yokogawa Electric Corporation) who is responsible for enforcement and continual improvement. At each site, a Global Environment Committee is formed, and environmental protection activities are carried out in line with the Group policy but taking local factors into consideration. In addition to various working groups for studying themes common throughout the Group, various subcommittees are formed with participation by all employees as the basis of environmental protection activities at each site.

3. Capitalization of Energy and Environmental Monitoring Systems

To follow a Plan-Do-Check-Action cycle for environmental management, the current environmental burden must be accurately assessed. Yokogawa’s own measurement, control, information technologies are built into the energy and environmental monitoring systems needed to grasp the current statuses, so by using these systems we can reduce costs and risks while protecting the environment. At the Kofu plant where these systems went into full-scale operation in fiscal 2001, 21 productive suggestions have been made.



Energy and Environmental Monitoring Systems

Legal Compliance, Risk Management, and Environmental Audits

It is important to identify risks that could significantly damage operations, reduce those risks, and establish a crisis response system in case the risks materialize. The Yokogawa Group has a department on standby for crisis management and continually reviews risk management even in ordinary times in preparation for a crisis.

1. Legal Compliance

In the last fiscal year, no administrative guidance or improvement directives were issued, and no fines were applied due to legal noncompliance. For the compliance data of each Japanese site that possesses a specific facility requiring air and water quality control, see www.yokogawa.com/environment/.

2. Risk Management

In October 2001, the Crisis Management Office was established. This Office performs public relations for risks via an Internet homepage and provides instructions and advice to the individual departments and committees (such as the Safety Committee, Hygiene Committee, and Hazardous Material Control Committee) that handle risks. These departments and committees periodically check the respective workplaces and institute risk-prevention measures.

3. Contingency Drills

A contingency drill was conducted at Headquarters and the Kofu plant, to demonstrate that the contingency plan can be practiced as defined in the environment manuals. These drills involved not only the relevant departments but also the regional fire department, and the fire brigade and clinic of the site. The drill at Headquarters was carried out on the assumption that a pump had broken and caused a spill of 500 liters of concentrated hydrochloric acid and that one operator had fallen unconscious after breathing in hydrochloric acid gas. The drill revealed problems in information transmission, the wearing of gas masks, and makeshift actions, and appropriate corrective measures were drawn up.



A Contingency Drill

4. Completion of Purification of Soil at Site of Old Factories

In a 1999 land survey at a site following the tearing down of old factories in the Headquarter premises, soil

pollution by volatile organic compounds (VOCs) and heavy metals was found, and soil purification measures have been taken continuously. The heavy metal-contaminated soil finished being purified and rendered harmless in June 2000. For the VOC-contaminated soil, purification by soil gas suction was started in August 2000 and completed for all areas by December 2001.

5. Audits

At each site that has obtained ISO14001 certification (an international standard for environmental management systems), internal audits (first-party audits) and environmental business operations audits (second-party audits) are carried out for periodic review in addition to periodic audits by an authorized organization for ISO14001 accreditation (third-party audits).

(1) Periodic Audits

In line with the third-year audit for the Kofu plant scheduled in July 2000, Headquarters, the Kofu plant, and the Akiruno plant as a whole had geared up to obtain a comprehensive ISO14001 certification, and an ISO14001 certificate for these three sites was issued in September 2000.

(2) Internal Audits

An internal environmental audit is carried out at least once every year to assess three issues: the environmental management system, legal compliance, and performance. The table below shows the assessment items in each category.

(3) Business Operations Audits

An environmental business operations audit assesses a total of 287 check items in four categories, the same three categories as in an internal audit, with the addition of "environmental strategy." Environmental business operations audits are conducted by members of the Environmental Conservation Promotion Dept. in Headquarters, who evaluate the findings and feed back the results. In fiscal 2001, this audit was carried out for Headquarters, the Kofu plant, Akiruno plant, and Ome plant.

Assessment Items of Environmental Audits

Environmental Business Operations Audit		Internal Audits
Environmental Business Operations Audit	Environmental management system audit	Checks the statuses of organization, target-result management, training, operations control, and corrective actions, to assess whether the system is implemented effectively.
	Legal compliance audit	Checks the statuses of operation and monitoring of substances against legally regulated values (qualifications, reports, and measured data), to assess whether legal regulations or other requirements are followed.
	Performance audit	Checks the statuses of the results against targets, data of legally regulated values, etc. to assess whether voluntarily rules are being followed.
	Environmental strategy audit	Checks the contribution to a sustainable society, reduction of pollutants, supply of environmentally friendly products, supply of solutions, contributions to local communities, transparency of information to the public, etc. to assess whether the environmental strategy is effectively enforced.

Environmental Accounting

The Yokogawa Group started applying environmental accounting in fiscal 1998 as a trial. From fiscal 2000, in extending the scope of coverage of environmental accounting to cover 16 sites including those overseas, the Group has introduced the concept of "eco points" (EP) as an integrated environmental burden indicator, and attempted to quantify indicators of environmental efficiency. In fiscal 2001, the scope of coverage was further extended to 18 sites and the method of calculating eco points was reviewed.

1. Yokogawa Group's Basic Policy of Environmental Accounting

In principle, the environmental accounting policy complies with Environmental Reporting Guidelines (Fiscal Year 2002 Version) published by the Ministry of the Environment of Japan, and is supplemented by the following.

(1) Environmental Protection Costs

Use the straight-line method to calculate depreciation in each term without taking the residual or scrap value into account. Regardless of the period over which returns from the investment may be gained, the depreciation of an investment can be declared as a cost for a maximum of five years after the year in which the investment was made.

(2) Environmental Protection Effects

a. For costs to be totaled, determine the quantity of a

limited or avoided environmental impact as an effect of environmental protection activities. In principle, determine the annual rates of reduction by comparing to the case where the respective environmental protection activities were not carried out. If this is difficult, declare the annual rates of reduction by comparing to a specified reference year.

- b. The effects (returns) from an investment in plant or equipment must correspond to the declarations of the corresponding expenditures and hence cannot be declared for more than five years from the year when the investment was made.
- c. Life-cycle assessments showed that environmentally friendly products produce significantly less carbon dioxide during usage than the corresponding, prior models. Hence, regarding the effect of an environmentally friendly product on environmental protection, declare the total reduction of carbon dioxide emissions during usage over its life-cycle in comparison to that of the prior model.
- d. Clarify the environmental protection effects as physical quantities of environmental impact and declare the reduction in the environmental burden indicator EP.

(3) Economic Results from Environmental Protection Activities

- a. The results to be totaled should be the incomes and reductions in expenditures that were actually gained, and the monetary values for environmental risks that were avoided.

Environmental Protection Costs

(Millions of yen)

Category	Major Measure	Investment	Expenditure
1. Environmental protection costs for preventing environmental burden caused within own operation area by production and service activities			
Item (1) Pollution prevention costs	Cleaning with substitutes for toxic substances, air/water/soil pollution prevention	60	230
(2) Global environmental protection costs	Efficient use of energy (energy-efficient buildings/equipment, co-generation, solar power generation), cleaning with substitutes for HCFCs	88	103
(3) Resource efficiency costs	Reduction of paper used (computerization of documents), expansion of recycling, reduction of waste disposal, waste treatment	8	173
	Subtotal	156	506
2. Costs for limiting environmental impact occurring downstream or upstream of the operation area by production and service activities	"Green" purchasing	0	8
3. Environmental protection costs in management activities	Configuration and implementation of EMS, environmental education	0	503
4. Environmental protection costs in research and development activities	Development of environmentally friendly products, lead-free soldering process, and cleaning method using safe substitutes for toxic substances	0	40
5. Environmental protection costs in social activities	Promotion of nature preserves and "greening," measures for harmony with local community, disclosure of information	1	54
6. Costs of environmental damages	Investigation and restoration of polluted soil	16	8
	Total	173	1,119

Investment in Plant & Equipment and Research & Development Cost

(Millions of yen)

Item	Details	Amount
Total investment for term in question	Total investment in plant and equipment including investments not related to the environment	14,251
Total research and development cost for term in question	Total research and development including costs not related to the environment	19,158

- b. The returns from investments in plants or equipment must correspond to the declarations of the corresponding expenditures, and so cannot be declared for more than five years from the year when the investment was made.
- c. For the reduction in expenditures actually gained by environmental protection measures other than investments in plant and equipment, declare the annual rates (monetary values) of the reduction in comparison to the case where the respective environmental protection measures were not put into practice, as an economic result of the current term; however, these can be declared for only one year from the year when a measure is taken, in principle.

2. Environmental Accounting Data for Fiscal 2001

The tables below show the accounting for 18 sites for fiscal 2001.

As shown, the investment and expenditure in the environmental protection costs were 173 million and 1,119 million yen, respectively, and the economic results from environmental protection was 1,192 million yen. As the environmental protection effects summing up the reductions in environmentally burdening substances, the reduction in environmental burden indicator EP was 4,850 EP. (Note that the environmental protection effects occurring within the own operation area are declared.)

Although both the investment and expenditure were

lower than last year, the environmental protection effects and economic results from environmental protection were higher due to the accumulated returns from past investment and development of environmentally friendly products.

3. Environmental Indicators

The Yokogawa Group has been considering indicators that account for both environmental accounting and economic activities. The following indicators for setting targets for environmental management are under study.

- Environmental burden efficiency = gross profit on sales / environmental burden indicator EP
- Environmental improvement efficiency = EP reduction / environmental maintenance costs
- Eco-efficiency = economic results / environmental maintenance costs

In fiscal 2001, the environmental burden efficiency was 1.8 million yen per EP, the environmental improvement efficiency was 4.3 EP per million yen, and the eco-efficiency was 107%. For reference, last year's equivalent figures were 2 million yen per EP, 3.7 EP per million yen, and 93%.

* Where it was impossible to subjectively calculate the monetary value of avoiding risk and compliance with regulations, the monetary value equivalent to the environmental monitoring and measuring costs and the depreciation cost for the corresponding investment in plant and equipment was considered to be the economic result.
 ** The monetary value of the reduction in the material fees per product from those for the prior model, multiplied by the annual number of new products sold, in the accounting for the same fiscal year as when the product was developed, was declared as the economic result from an environmentally friendly product. In addition, the monetary value equivalent to the development cost was declared as the added value of investment in research and development.
 *** The monetary value equivalent to the education cost and to the reduction in outside lectures and consultant fees was declared as the added value of environmental education.

Environmental Protection Effects		Economic Results from Environmental Protection Activities (Millions of yen)	
Details of Effect	Environmental Burden Indicator (Performance)	Details of Effect	Monetary Value
1. Environmental Protection Effects Occurring within Operation Area	Environmental burden indicator: Reduced by 4,850 EP		
<ul style="list-style-type: none"> • Reduction in amounts of toxic substances used • Reduction in environment polluting substances used 	Reduction in trichloroethylene, tetrachloroethylene, etc. by 48.1 tons	Reduction in toxic substances used and from avoiding risk	247
<ul style="list-style-type: none"> • Reduction in carbon dioxide emissions by efficient use of energy • Reduction in HCFCs used 	Reduction in carbon dioxide emissions by 4,027 tons (from power consumption of 11,362 MWh, offsetting an increase in consumption of city gas)	Energy efficiency and reduction in HCFCs used	261
<ul style="list-style-type: none"> • Reduction in paper used • Reduction in waste • Expansion of recycling 	Reduction in paper by 189 tons Reduction in waste by 1,142 tons (by resource circulation, etc.)	Reduction in paper/water used, and waste; income from sale of valuable goods	96
		Subtotal	604
2. Environmental Protection Effects Occurring Upstream and Downstream	Reduction in carbon dioxide emissions by 6,950 tons (emitted over the service life of an environmentally friendly product)	Reduction of costs by reuse of packing materials	18
<ul style="list-style-type: none"> • Reduction in carbon dioxide emissions resulting from energy-efficient, environmentally friendly products • Improvement of packing 	Reduction of packing materials by 10 tons		
3. Other Environmental Protection Effects	Reduction in carbon dioxide emissions by 256 tons (by efficient use of materials in manufacturing of environmentally friendly products)	Reduction in material fees because of development of environmentally friendly products, and effects from research and development	**412
<ul style="list-style-type: none"> • Reduction in carbon dioxide emissions resulting from resource-efficient, environmentally friendly products • Social activities • Activities for local communities 	2,054 people visited (Kofu plant) to observe environmental protection activities Promotion of "zero emissions" activities (at Kokubo industrial park in Kofu)	Effects from education and reduction in education expenditures	***141
		Reduction in expenditures from avoiding risk	*17
		Subtotal	570
Total	Environmental burden indicator: Reduced by 4,850 EP	Total	1,192

Sales of Environmental Business Products and Total Sales		(Millions of yen)
Item	Details	Amount (percent)
Sales of environmental business products	Sale of products and systems (for the period in question) that exclusively contribute to reduction of social and environmental burden, including those products from the environment business (for water purity improvement systems, preservation of the atmosphere, waste treatment systems, etc.)	20,883 (8.7%)
Total sales for term in question	Grand total	241,391 (100%)

Environmental Project Evaluation

For global environmental protection activities to be effective, decision-making must be based on comprehensive quantitative data including numerical values (costs and effects) and eco points (see page 7) derived from environmental accounting. The Yokogawa Group uses this technique to optimize its environmental management.

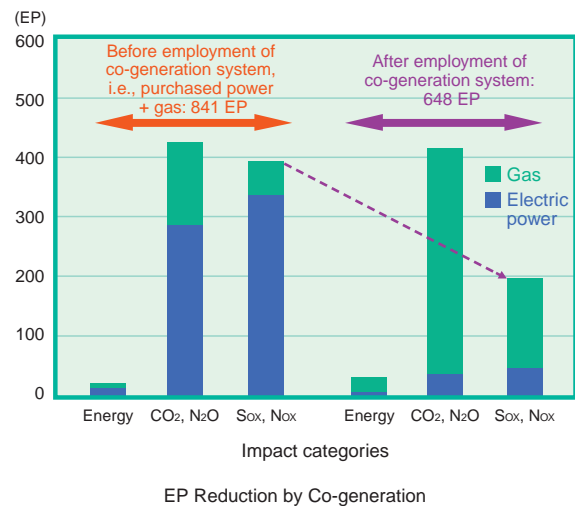
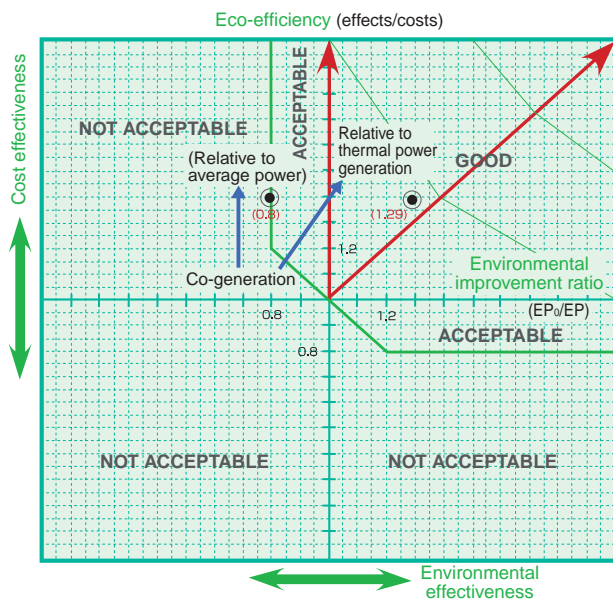
1. Objectives of Environmental Project Evaluation

When making decisions concerning environmental protection activities, the cost performance of various environmental investments must be considered, priorities determined, and effects evaluated. An environmental project evaluation assesses these factors quantitatively. The Yokogawa Group applies project-independent environmental accounting and evaluation to each environmental project, assessing each environmental project or activity at each site. The results of individual projects are summarized to produce environmental accounts for a site. Each environmental project is

assessed using a graph with two axes: one representing the eco-efficiency and the other representing the environmental improvement ratio ($EP_0/EP = EP$ before improvement / EP after improvement). If the eco-efficiency is equal to or greater than 1 and the environmental improvement ratio is also equal to or greater than 1, then the project should be funded. If only one of the factors is greater than 1 but the other is less than 1, then the project should be funded on a trial basis, but improvements should be made. If both are less than 1, then the project should not be funded and alternatives should be considered.

2. Evaluation for a Co-generation System

The following shows the evaluation for installing a co-generation system, for example. The eco-efficiency of this project would be 1.39. The increase in eco points would be 125 EP in comparison to the Japanese average electric power, resulting in an environmental improvement ratio of 0.8; however, in comparison to thermal power generation, the eco points would decrease by 193, resulting in an environmental improvement ratio of 1.29, so the system should be installed.



Investment decision criteria for an environmental project:
 Eco-efficiency × environmental improvement ratio ≥ 1.0 [Returns from investment ≤ 5 years]
GOOD: Should be actively funded 3 years
ACCEPTABLE: Should be funded on a trial basis improvements required. 5 years
NOT ACCEPTABLE: Should not be funded consider alternatives. Legally prescribed period
 Note: A different evaluation method is used for a project that cannot be evaluated in terms of EP.

Environmental Project Evaluation Chart

