

3 Environmental Accounting

The term “environmental accounting” has emerged only recently, and an explicit definition or standard has not yet been established. Nevertheless, the Yokogawa Group was quick to grasp its importance, and after much study, started applying it in 1998.

1. Environmental Accounting of Yokogawa Group

From fiscal 2000, in extending the scope of coverage of environmental accounting to cover 16 sites including overseas sites, the Yokogawa Group has complied with Developing an Environmental Accounting System (Year 2000 Report) published by the Environment Agency of Japan. We have introduced the concept of “eco points” (EP) as an integrated environmental burden indicator, and attempted to quantify environmental improvement ratio and eco-efficiency as indicators of environmental efficiency. The Yokogawa Group’s concept of environmental burden indicator, EP, and its environmental accounting policy which supplements the Guideline from the Environment Agency of Japan, are shown in sections 4 and 5 below, respectively.

2. Environmental Accounting Data for Fiscal Year 2000

- (1) The tables on the right page show the settlement of accounting for 16 sites for fiscal 2000.
- (2) The reduction in *environmental burden indicator EP* was 915 EP and the *environmental maintenance costs* were 1,174 million yen, hence the *environmental improvement*

ratio (EP reduction / environmental maintenance costs) as an indicator of environmental efficiency was 0.78 EP per million yen. The monetary value of *economic benefits* accruing from environmental protection activities totaled 1,095 million yen, resulting in an *eco-efficiency* (economic results / environmental maintenance costs) of 93%.

3. Future Tasks

We will:

- (1) Extend the same method of environmental accounting to other sites.
- (2) Upgrade the policy and processing methods reflecting the Yokogawa Group’s characteristics while complying with the Guideline published by the Environment Agency of Japan. In particular, we will assess the suitability of counting the environmental economic efficiency, costs that are regarded as avoidable based on assumptions (by legal compliance, risk avoidance, etc.), and environmental protection results from the environmental business.
- (3) Strive to build an environmental information system that can supply fundamental data to environmental accounting.

4. Yokogawa Group's Concept of Environmental Burden Indicator, Eco Point (EP)

- (1) Calculate the environmental burdens within each site and calculate the amounts of emissions from materials (carbon dioxide [CO₂], methane [CH₄], sulfur oxides [SO_x], nitrogen oxides [NO_x], chlorofluorocarbon [CFC], chemical oxygen demand [COD], phosphorus, heavy metals, etc.).
- (2) Classify the compiled emissions into impact categories (global-warming gases, acidification gases, ozone-depleting substances, substances which cause eutrophication, substances toxic to humans, etc.), and obtain category indicators according to the properties of the respective substances.
- (3) For integration, divide the individual category indicators by the respective total emissions in the world to normalize them (to enable comparison), and then multiply by the respective, Yokogawa Group-defined weighting factors (1.14 × 10⁹ for global warming, 1.00 × 10⁹ for acidification, and 1.54 × 10⁹ for ozone layer depletion).
- (4) Sum up the normalized and weighted indicators to obtain the environmental burden indicator, the eco point (EP).

Note: At present, the EP is given as the integrated environmental burden indicator for the categories of global warming, acidification, and ozone layer depletion, representing the burdens occurring within the sites and affecting the global-scale environment. The Group, however, intends to integrate the indicators for the categories of eutrophication and toxicity to humans into this EP, including those burdens produced by parts and materials.

Note: The database for this concept of EP is based on the NIRE-LCA of the Institute of Resources and Environment Technology in Japan.

5. Yokogawa Group's Basic Policy of Environmental Accounting

In principle, the environmental accounting policy complies with Developing an Environmental Accounting System (Year 2000 Report) published by the Environment Agency of Japan.

1) Environmental Protection Costs

a. Costs to be totaled:

An environmental protection cost must be judged, in principle, by whether it is an expenditure for the purpose of environmental protection. The judgment may also take the effect into account where necessary.

b. Classification of investments and expenditures:

In principle, must comply with the classification in financial accounting.

c. Calculation of depreciation on investments:

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. The depreciation retroactive to the previous fiscal year is included in the depreciation of the current term.

d. Costs of mixed purposes:

Declare any difference that additionally resulted from including environmental protection in the purposes of a cost, as an environmental cost. If it is difficult to determine the difference, divide the cost in proportion to the ratio of the purpose of environmental protection to all purposes.

e. Calculation of personnel expenses:

As environmental protection costs, declare all

personnel expenses occurring within a unit (department, section, etc.) that was formed mainly for the purpose of environmental protection, as well as the personnel expenses of those employees who are deemed as working exclusively in environmental protection even if they belong to a department whose main objective is not environmental protection. For the environmental protection activities of personnel other than the above, multiply the total activity time (in hours) by the specified rate and declare the result as environmental protection costs.

2) Environmental Protection Effects

a. Effects to be totaled:

Determine the quantity of a limited, avoided, or improved environmental impact as an effect of environmental protection activities.

b. Units of measurements:

Clarify the effects on environmental protection as physical quantities of environmental impact. Only an item that cannot be grasped quantitatively may be evaluated qualitatively.

c. 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.

d. Calculation of effects:

In principle, determine the annual rates of reduction by making a comparison to the case where the respective environmental protection activities were not carried out. If this method is difficult to apply, declare the annual rates of reduction by making a comparison

to a specified reference year.

e. Effects resulting from environmentally friendly products:

Life-cycle assessments showed that Yokogawa Group’s products exhibit significantly higher levels for carbon dioxide emissions than other environmental impact factors. Hence, as the effect of an environmentally friendly product on environmental protection, declare the total amount of the reduction of carbon dioxide emissions during usage over its life-cycle in comparison to that of the prior model.

3) Economic Results from Environmental Protection Activities

a. Results to be totaled:

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

b. 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. Calculation of reduction in expenditures actually gained by environmental protection measures other than investments in plants or 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.



Environmental Protection Costs

(including maintenance and operation expenses such as the depreciation of investments in plant and equipment, and personnel expenses)

(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	Subtotal	391	452
	(1) Pollution prevention costs	Cleaning with substitutes for toxic substances, air/water/soil pollution prevention	318	186
	(2) Global environmental protection costs	Efficient use of energy (energy-efficient buildings/equipment, co-generation, solar power generation), cleaning with substitutes for HCFCs	63	84
	(3) Resource recycling costs	Reduction of paper used (computerization of documents), expansion of recycling, reduction of waste disposal, waste treatment	10	182
2.	Costs for limiting environmental impact occurring downstream or upstream of the operation area by production and service activities	"Green" purchasing	0	11
3.	Environmental protection costs in management activities	Configuration and implementation of EMS, environmental education	0	543
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	20	101
5.	Environmental protection costs in social activities	Promotion of nature preserves and "greening," measures for harmony with local community, disclosure of information	0	60
6.	Costs of environmental damages	Investigation and restoration of polluted soil	25	8
Total			436	1,175

Investment in Plant and Equipment and Research-and-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	17,860
Total research and development cost for term in question	Total research and development including costs not related to the environment	18,400

Environmental Protection Effects (Quantities)

Item	Details of Effect	Environmental Burden Indicator (Performance)
1.	Environmental Protection Effects Occurring within Operation Area	Environmental burden indicator: Reduced by 915 EP
	• Reduction in amounts of toxic substances used	Reduction in trichloroethylene, tetrachloroethylene by 41.5 tons
	• Reduction in environment polluting substances used	
	• Reduction in carbon dioxide emissions by efficient use of energy	Reduction in carbon dioxide emissions by 2,790 tons (from power consumption of 10,350 MWh, offsetting an increase in consumption of city gas)
2.	Environmental Protection Effects Occurring Upstream and Downstream	Reduction in carbon dioxide emissions by 3,100 tons (emitted over the service life of an environmentally friendly product)
	• Reduction in carbon dioxide emissions resulting from energy-efficient, environmentally friendly products	
	• Improvement of packing	Reduction of packing materials by 26 tons
	• Reduction in HCFCs used	Reduction in HCFCs by 3.85 tons
3.	Other Environmental Protection Effects	Reduction in carbon dioxide emissions by 230 tons (by efficient use of materials in manufacturing of environmentally friendly products)
	• Reduction in carbon dioxide emissions resulting from resource-efficient, environmentally friendly products	
	• Social activities	2,520 people visited (Kofu plant) to observe environmental protection activities
	• Activities for local communities	Promotion of "zero emissions" activities (at Kokubo industrial park in Kofu)
Total		Environmental burden indicator: Reduced by 915 EP

Economic Results from Environmental Protection

(Millions of yen)

Item	Details of Effect	Monetary Value
Subtotal - reduction in expenditures because of:	Reduction in toxic substances used and from avoiding risk	500
	Energy efficiency and reduction in HCFCs used	*208
	Reduction in paper/water used, and waste; income from sale of valuable goods	206
	Reduction of costs by reuse of packing materials	86
Subtotal		14
	Reduction in material fees because of development of environmentally friendly products, and effects from research and development	581
	Effects from education and reduction in education expenditures	**416
	Reduction in expenditures from avoiding risk	***140
	Total	***25
Total		1,095

* 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 deemed as being the economic result and declared as such.

** 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.

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, environmental burden, including those products from the environment business (for water purity improvement systems, preservation of the atmosphere, waste treatment systems, etc.)	26,770 (9.5%)
Total sales for term in question	Grand total	281,390 (100%)