Environmental Accounting

Corporate Environmental Accounting of the Ricoh Group for Fiscal 1999

Item	Costs		Economic benefits			Effect on
	Environmental costs	Main costs	Monetary effects	Category	Item	Environmental impact reduction (t)
Business area costs	¥1,670 million	Environment-related facility depreciation and maintenance costs	¥960 million	a	Energy savings and improved waste processing efficiency	CO_2 ……11,317
			¥5,090 million	b	Contribution to value-added production	
			¥700 million	c	Avoidance of risk in restoring polluted environment and avoidance of lawsuits	NO_x…… 2.006
Upstream/ downstream costs	¥2,410 million	Costs for collection and reassembly for recycling used products	¥580 million	a	Sales of recycled products, etc.	SO_x……7.404
Managerial activity costs	¥1,790 million	Costs for the division in charge of environmental measures; costs to establish and maintain the environmental management system	¥200 million	b	Improved efficiency in environmental education and establishment of the environmental management system	BOD……1.726
Research and development costs	¥1,660 million	Research and development costs for environmental impact reduction	¥50 million	a	Cost reduction through eco-packaging	Final waste disposal amount……3,458
			¥2,040 million	b	Contribution to value-added research and development	
Social activity costs	¥390 million	Costs for preparation of environmental reports and advertisements	¥70 million	b	Environmental advertisement, etc.	PRTR substances (178 substances, including toluene and dichloromethane)
Environmental restoration costs	¥130 million	Costs for restoration of soil pollution and environment-related reconciliation		–	None	
Other costs	¥50 million	Other costs for environmental conservation				
Total	¥8,100 million		¥9,690 million			

a=Substantial effect (actual gains from cost and energy reduction as well as sales of property, plant, and equipment) b=Expected effect (amount to which the environmental measures contributed)
c=Incidental effect (amount of additional costs avoided stemming from such problems as pollution and lawsuits)
1. Eco-efficiency (EE) value (unit: ton/¥100 million)=Environmental impact reduction amount/total amount of environmental costs
2. EE index=Total converted quantity of environmental impact reduction/total environmental costs (thousands of yen)
3. Eco-ratio (unit: ¥100 million/ton)=Total sales profit/total environmental impact amount
4. Eco-index=Total sales profit/total converted value of environmental impact reduction
5. Conversion coefficient is based upon literature related to LCA impact evaluations. For final waste disposal amounts and PRTR substances, the converted coefficient is set according to

◎Basic Concept for Environmental Accounting

To reduce environmental impact effectively, continuous efforts toward high-level environmental activities are indispensable. Moreover, to survive economically while upholding higher corporate values we must carry out environmental management in such a way that economic value is created through environmental activities. For this purpose, we need tools that are capable of evaluating the investment efficiency of environmental activities to aid in decision making. The Ricoh Group is in the process of creating an environmental accounting system that will be an important tool in realizing environmental management. However, because there are no general criteria set for environmental accounting like there are for managerial or financial accounting, this system is not yet ready to be used as a tool for managerial decision making nor for the comparison or evaluation of corporate values in society. Aiming at creating an environmental accounting system that can be used as a decision-making tool for environmental management, we had to set the original standards for environmental accounting. We identify the workings of our activities according to these standards and publish our achievements. Furthermore, we encourage cooperation with society in the areas of research and study in order to make environmental accounting common throughout the world.

◎Corporate Environmental Accounting

The Ricoh Group's environmental accounting system involves distinctively two different kinds of accounting: corporate environmental accounting and segment environmental accounting. Corporate environmental accounting aims at identifying all environmental impact reduction effects and economic benefits in each investment area. It is used as a decision-making tool in identifying and publicizing the Group's achievements as well as in making effective environmental investment. The inclusion of weighted eco-efficiency values and eco-ratios makes the Group's annual reporting on the effects and economic benefits of environmental impact reduction easier to understand.

Although we gave the environmental accounting results of only Ricoh in our 1999 environmental report, we have compiled the results of the entire Ricoh Group for the 2000 report. We have added a line item for PRTR substances to "environmental impact," and environmental impact made by water is now under biochemical oxygen demand (BOD).
* See pages 33 and 34.

●Calculation of Substantial Effects, Expected Effects, and Incidental Effects

For environmental accounting to be an effective tool for management, it is, first of all, important to understand the comprehensive cost efficiency of all environmental activities. The Ricoh Group calculates all the relevant environmental costs of direct environmental investments, from preventive investments

●Data collection points: Ricoh and 12 domestic and overseas production bases and manufacturing subsidiaries (See page 5.)
●Data collection period: from April 1, 1999, to March 31, 2000 (for costs and total environmental impact)
Environmental impact reduction shows the difference of the fiscal 1999 performance from the fiscal 1998 performance.

environmental conservation			Environmental impact	Eco-ratio[3] (¥100 million/t)	Converted value of reduction	Conversion coefficient[5]
Reduction rate	EE value[1]	Converted quantity of reduction	Total (t)			
4.1%	139.7	11,317	CO_2 ····· 262,053	0.0105	262,053	(1.0)
2.9%	0.0248	12.44	NO_x ····· 67.11	40.95	416.1	(6.2)
33.7%	0.0914	6.663	SO_x ····· 14.53	189.1	13.08	(0.9)
4.5%	0.0213	0.1726	BOD ····· 36.61	75.05	3.561	(0.1)
34.6%	42.69	359,632	Final waste disposal amount ····· 6,538	0.4203	679,952	(104.0)
		47,120	PRTR substances (178 substances, including toluene and dichloromethane) *See page 54.		250,683	(Ricoh standards per substance)
		418,088			1,193,121	
		0.0516			230.3	
		EE index[2]			Eco-index[4]	

Ricoh's internal standards.

through indirect investments, as well as all economic benefits, even setting premises for items in which economic benefits are difficult to identify. Furthermore, we categorize the economic benefits into substantial, expected, and incidental effects for better understanding. Thus, all stakeholders, no matter what value standards they have, are able to objectively judge the Ricoh Group's activities and corporate values.

●Introducing the Probability of Incidental Effects

The probability of incidental effects of risk-avoiding investments are not 100%. To obtain more realistic figures, we calculate incidental effects using an occurrence coefficient, taking the frequency of risk occurrence and the area influenced into consideration.

●Eco-Efficiency and Eco-Ratio

To identify the environmental impact reduction effects per item, such as CO_2 and waste, the Ricoh Group uses an eco-efficiency (EE) value, which is calculated by dividing the environmental impact reduction amount in a given year by the total amount of environmental costs for that same year. The value can clarify how much environmental impact is being reduced with a given amount of cost. However, the more that environmental issues are improved, the more value will be reduced, so it is difficult to measure environmental management efficiency using the EE value. Therefore, the Ricoh Group uses an eco-ratio, which is an index calculated by dividing total sales profit by the total environmental impact amount. The ratio can clarify how much added-value is produced for every ton of environmental impact substance emitted. A higher eco-ratio means that higher economically efficient activities can be realized with lower environmental impact.

●Annually Identifying Impact Effects and Economic Benefits of Environmental Activities Using the EE Index and Eco-Index

It is also important for effective environmental investment and project management to annually identify and compare environmental impact reduction effects and economic benefits for the entire environmental investment. The EE index and eco-index are calculated using weighted EE values and eco-ratios for each environmental impact item. We can judge how efficiently environmental impact was reduced by using the EE index and how efficiently profits were made in terms of less environmental impact by using the eco-index.

For the conversion coefficient for environmental impact items, social standards for CO_2, NO_x, SO_x, and BOD were adopted. However, for final waste disposal amounts and PRTR substances, for which no standards are set, the Ricoh Group set its own standards for conservation. For the purpose of continual examination and improvement, we gladly welcome any public opinion regarding conversion coefficient standards.

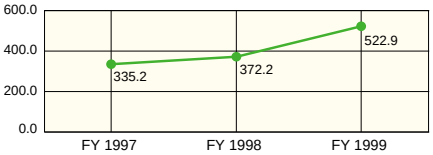
Conversion Coefficient for Environmental Impact Items

CO_2	1 (Standard)
NO_x	6.2
SO_x	0.9
BOD	0.1
Final waste disposal amount	104
PRTR substances*	Weighted value per substance according to Ricoh internal standards

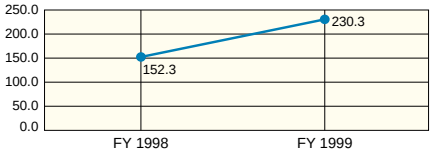
*See page 54.

Changes in Eco-Index

Ricoh



The Ricoh Group (including 12 domestic and overseas production bases and manufacturing subsidiaries)



Changes in Ricoh's Environmental Accounting

FY	Environmental costs	Economic benefits	EE index	Eco-index
1998	¥4,660 million	¥5,140 million	0.0236	372.2
1999	¥5,890 million	¥6,340 million	0.0196	522.9

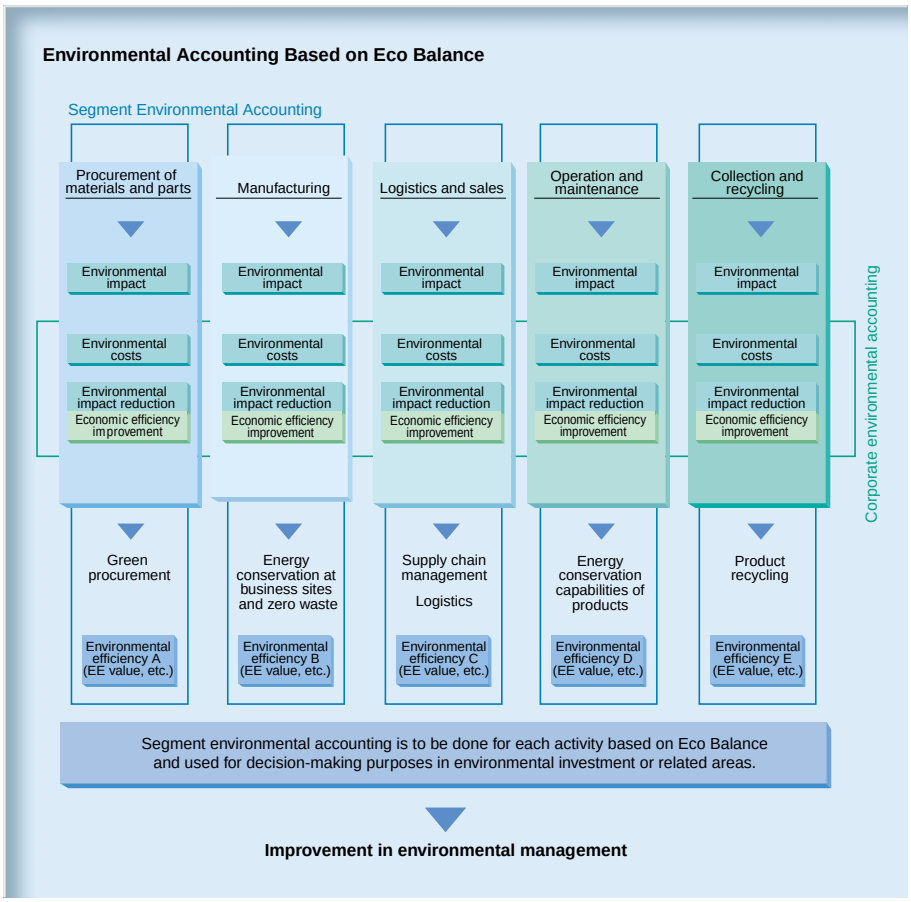
Visit our Web site at http://www.ricoh.co.jp/ecology for details.

◎Segment Environmental Accounting

Segment environmental accounting is the Ricoh Group's unique internal environmental accounting system used to estimate the investment efficiency of environmental facility investments into business sites or new projects. Although it is important for all companies to engage in environmental conservation activities, it would be difficult for them to survive if they did so at the expense of economic efficiency. Therefore, estimating the environmental impact reduction effects and economic benefits of a proposed energy-conservation system and identifying the effectiveness of the system is of utmost importance. Despite arguments that the effectiveness of environmental accounting is only in assessing and measuring the effects of large-scale investments, segment environmental accounting is effective in evaluating small-scale investments, such as investments into divisional facilities. To facilitate decision making, the Ricoh Group shall conduct segment environmental accounting prior to any environment-related investment or project.

●Segment Environmental Accounting (1) Estimates for Effects of an Energy-Conservation System (Table 1)

Ricoh Numazu examined two types of cogeneration systems: one that used "A" heavy oil and one that used town gas. It was discovered that the "A" heavy oil system would reduce costs significantly but at an increased CO_2 emission level. The town gas system, on the other hand, would work at a significantly lower CO_2 emission level but would not reduce cost much. It would require five years to recover investments made in the latter system. Ricoh Numazu eventually decided to use the town gas cogeneration system, taking both environmental impact reduction effects and economic efficiency into consideration. According to a detailed examination of cost efficiency gains after the introduction of the co-



(Table 1) Segment Environmental Accounting (1) Estimates for Effects of an Energy-Conservation System

Cost			Effects		
Item	Main costs	Amount (millions of yen)	Economic benefits	Environmental conservation effects	EE value
Business costs	Facility investment	430	Reduced lighting and heating expenses ¥1,053 million*	Reduced CO_2 emissions 34,651 t*	6,618 t/¥100 million*
	Personnel, maintenance, etc.*	93.6*			

*Over the depreciable life of cogeneration system statutory depreciation years

(Table 2) Segment Environmental Accounting (2) Effects of a Wastewater Disposal System

Cost			Effects	
Item	Main costs	Amount (millions of yen)	Economic benefits	Environmental conservation effects
Business costs	Facility investment	464	Reduced wastewater disposal expenses ¥1,271 million*	Reduced quantity of wastewater disposed 41,092 t*
	Personnel, maintenance, etc.	170*		

*Accumulated from 1994

(Table 3) Segment Environmental Accounting (3) Effects of Green Partnership

Cost			Effects	
Item	Main costs	Amount (millions of yen)	Economic benefits	Environmental conservation effects
Upstream/ Downstream costs	Personnel	3,492[1]	Reduced expenses in establishing an economic management system ¥78 million[2]	Reduced CO_2 emissions 282 t[2] Final waste disposal amount reduced 133 t[2]

1. Net time required for Ricoh to carry out environmental auditing and give advice to suppliers is translated into personnel expenses
2. Total amount for 13 suppliers certified by Ricoh as adhering to Ricoh guidelines

generation system, cost will be reduced approximately ¥1.05 billion and CO_2 emissions will be lowered about 35 thousand tons over a statutory depreciation period.

●Segment Environmental Accounting (2) Effects of a Wastewater Disposal System (Table 2)

The Ricoh Yashiro Plant developed a closed system for industrial water usage. The introduction of a wastewater disposal system in 1993 helped Ricoh Yashiro reduce its environmental impact and wastewater disposal costs. According to cost effectiveness analysis, this disposal system produced approximately ¥1.27 billion in economic benefits as of fiscal 1999, and about ¥630 million in costs will be collected in 2.5 years.

●Segment Environmental Accounting (3) Effects of Green Partnership* (Table 3)

The Ricoh Group considers suppliers who sell materials and parts that have less environmental impact as green partners and continues to support them in constructing their own environmental management systems. Free environmental auditing and advice given by Ricoh to suppliers can be translated into approximately ¥3.492 million in personnel expenses. In other words, Ricoh and its suppliers saved more than ¥74 million by not having external consultants help them construct their environmental management systems. This result would then be followed by economic benefits gained from energy conservation and other measures. The implementation of environmental management effectively cut 282 tons of CO_2 and 133 tons of waste.

*See pages 21–22.

Environmental Facility Investment (FY 1999) (millions of yen)

	Total facility investment	Environmental facility investment
Ricoh	17,800	1,480
Ricoh Group	24,544	1,959

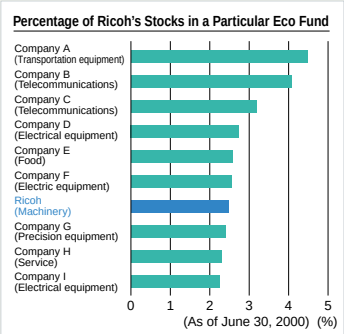
Penalties and Fines against Ineffective Environmental Conservation Activities (Ricoh Group)

	FY 1997	FY 1998	FY 1999
Number of cases	2	2	1
Amount (US$)	5,000	4,171	5,187

Environmental Accounting and Corporate Values

Eco Funds and Stock Price Fluctuations

Following the United States and European countries, “eco funds”, which are to be used for investments into highly environment-oriented companies, were made available in Japan. The eco fund market has expanded to more than ¥200 billion in the six months since it began. Ricoh’s stocks are incorporated in a number of such eco funds, some of which even require “environmental accounting be introduced” before Ricoh stocks can be incorporated. Environmental accounting is thought to improve corporate values. However, eco funds are currently being criticized as being “merely high-technology information stocks”, and they, in fact, sometimes focus on financial screening rather than on environmental screening. We have found that Ricoh’s stock prices fluctuate in response to media reports on the company’s performance. Even if the company was favorably evaluated in environmental management surveys and corporate surveys on social contribution, there were no noticeable trends in the market. Environmental activities or social contributions have not yet become major factors in increasing corporate values in Japan.



Marketing and Sales

How are the people who are engaged in the daily buying and selling of commodities responding to all this? There are increasingly more cases in which governmental authorities and big companies require products to be environment friendly before being eligible for bidding as well as cases in which companies are being asked to explain their environmental measures before proposing certain products or systems. A potential customer once came to us and said he would like to know about our environmental activities and environmental accounting. After our explanation, he purchased our products. We enjoy anticipating future market trends.

Aiming at Establishing Environmental Accounting

At present, financial statements and annual reports are the principal tools in measuring corporate value. In the future, environmental accounting and environmental reports will likely play major roles in evaluating companies. However, nothing specific has been set in environmental accounting. Ricoh’s environmental accounting is still under development as well. We are working towards establishing our own set of standards and conducting our own environmental accounting based on these standards. We would like to improve the accuracy of the tools that are used in environmental management using our revised standards and to earn society’s trust through the voluntary disclosure of our environmental accounting information.