

**The Ricoh Group's Corporate Environmental Accounting in Fiscal 2001 (Eco-Balance Environmental Accounting)**

Collected data ● Source: 79 Ricoh Group companies. (See page 2.)  
● Collection period: From April 1, 2001, to March 31, 2002

			Procurement of Materials and Parts	Manufacturing Process			Transportation	Marketing	Use		Maintenance		Disposal and Recycling	Total			
				Production Site		Management			Electric Power	Paper	Maintenance Works	Manufacturing Maintenance Parts					
				Japan	Regions other than Japan												
Input	Energy consumption	Electric power, heavy oil, etc.	[TJ]	4,006	3,391	1,384	567	418	796	12,472	28,037	287	443	46	51,847		
	Resource consumption	Crude oil	[thousands of tons]	21												21	
		Iron ore	[thousands of tons]	53												53	
		Manganese ore	[thousands of tons]	2												2	
		Nickel ore	[thousands of tons]	2												2	
		Chromium ore	[thousands of tons]	1												1	
Coal		[thousands of tons]	30												30		
Water consumption	Tap water/well water/industrial water	[thousands of tons]		3,098	3,290	192							18		4,198		
	Other	[thousands of tons]													6,598		
Output	Chemical substances	Arsenic (As) and its compounds	[t]	0.23											0.23		
		Cadmium (Cd) and its compounds	[t]	0.04												0.04	
		Lead (Pb) and its compounds	[t]	45.04												45.04	
		Trivalent/hexavalent chromium and their compounds	[t]	0.31									0.01			0.32	
		Polyaromatic hydrocarbons	[t]	0.37												0.37	
		Toluene	[t]		271.57	0.46										272.03	
		Dichloromethane	[t]		51.06	25.40										76.46	
		HFC-134A	[t]										4.46			4.46	
		Sulfur hexafluoride	[t]		0.23											0.23	
		Other	[t]		133.60	33.30			46.90					0.02		213.82	
Environmental impact emission	NOx	[t]		34	15	4	58	46	390	6,007	17	3	1		6,575		
	SOx	[t]		18			25	18	310	21,681	7	7			22,066		
	CO2	[thousands of tons]	228	147	170	23	25	44	471	3,460	16	29	1		4,614		
	CH4	[t]	3,039	356	391	35	131			817		72			4,841		
	BOD	[t]		14	44								1		59		
	COD	[t]		22	84								1		11,136		
Environmental accounting	Influence on the environment	Resources	Fossil fuel	4.84E+07	4.10E+07	1.59E+07	7.10E+06	4.64E+06	8.79E+06	1.40E+08	2.11E+08	3.17E+06	4.81E+06	5.12E+05	4.85E+08		
			Mineral resources	3.75E+08												3.75E+08	
			Total	4.24E+08	4.10E+07	1.59E+07	7.10E+06	4.64E+06	8.79E+06	1.40E+08	2.11E+08	3.17E+06	4.81E+06	5.12E+05		8.60E+08	
		Influence on human health	1.88E+08	1.83E+07	1.97E+07	2.64E+06	3.25E+06	4.98E+06	5.55E+07	4.62E+08	2.59E+06	3.25E+06	1.38E+05			7.60E+08	
		Influence on the ecosystem	-3.27E+05	9.28E+07	9.84E+07	5.73E+06	-3.86E+04	-6.83E+04	-7.20E+05	-5.46E+06	-2.34E+04	4.89E+05	-1.89E+03			1.91E+08	
		Influence on biodiversity	4.20E+05	2.28E+05	2.50E+05	3.34E+04	3.83E+04	6.10E+04	6.73E+05	4.15E+06	3.21E+04	4.06E+04	1.71E+03			5.93E+06	
	Costs	Converted amount	Total ELU (Environmental Load Unit)	6.12E+08	1.52E+08	1.34E+08	1.55E+07	7.89E+06	1.38E+07	1.96E+08	6.72E+08	5.78E+06	8.59E+06	6.50E+05		1.82E+09	
			Social cost	[millions of yen]	67,639	16,841	14,851	1,715	872	1,522	21,624	74,294	639	950	72		201,019
		Effects	Percentage		33.65%	8.38%	7.39%	0.85%	0.43%	0.76%	10.76%	36.95%	0.32%	0.47%	0.04%		100.00%
			Resource and energy cost	[millions of yen]	394,642	4,142	1,307	969	197	782	—	—		761	96		402,896
			Environmental conservation cost	[millions of yen]	782	3,586	734	817	140	1,157		932		139	4,627		12,914
			Economic benefits	[millions of yen]	—	614	1,089	12	44	1,989	—	—		17	755		4,520
			Effect on environmental conservation (to reduce social costs)	[millions of yen]	—	1,055	3,861	1,054	644	—	489	—		43	6,688		13,834
Indicators	Environmental effect rate ((Economic benefits + social costs reduced)/environmental conservation costs)		—	0.47	6.74	1.31	4.93	1.72	0.52	—		0.43	1.61		1.42		
	Environmental profit rate (Economic benefits/ environmental conservation costs)		—	0.17	1.48	0.02	0.32	1.72	—	—		0.12	0.16		0.35		
	Sales per social costs (Sales/social costs)									12.91							

\* Upstream and downstream environmental impact is calculated based on the data of a specific product. (Blanks mean almost zero or n/a.)  
\* The figures for influences on environment or converted amount are calculated based on the EPS Indicator Ver. 2000.

**Economic Benefits from the Development of Eco-Friendly Products**

It used to be difficult for the research and development of eco-friendly products to estimate costs and effects. The Ricoh Group calculated the contribution rates of eco-friendly copiers to profit based on a customer satisfaction survey of customers who buy major products in Japan. Special attention was paid to questions asking customers the reason for their purchases. Among

business sites, products are given green points that correspond to the levels they contribute to environmental impact reduction. Contribution rates responding to those green points were calculated by product type. The amount of contribution to gross margin due to a product's eco-friendly functions is calculated from annual performance as contribution rates by product type. The total calculated amount is regarded as an annual economic benefit for research and development.

**Responses to a Customer Satisfaction Survey (Number of samples=138, multiple answers)**

Item	Number of responses	Response rate
1. Functions and performance of copiers are good.	75	54%
2. Time it takes for the machine to warm up is short.	36	26%
3. Time it takes for the machine to turn on from standby is short.	24	17%
4. Machine is small.	18	13%
5. Machine looks user-friendly.	42	30%
6. Machine has the functions I want.	8	6%
7. Machine adopts a low-noise design.	4	3%
8. Machine adopts an energy-saving design.	21	15%
9. Machine is eco-friendly (e.g., the machine is equipped with recyclable toner cartridges, adopts a recyclable design, and reduces environmentally harmful substances).	8	6%
10. Design (color or style) is good.	2	1%
11. Price is reasonable.	32	23%
12. A sales representative recommended the machine.	60	43%
13. Well established maintenance system.	34	25%
14. Patronizing your products for long time	64	46%
15. Other	14	10%

\* The rate of environment-friendly functions contributing to gross margin = 6.56% (the percentage of the total number of responses in items 8 and 9 to the total number of responses)

The table on the right shows the results of a survey of our customers in Japan. Another examination conducted was for contribution rates from the viewpoint of customers' willingness to pay (WTP). The table below shows the results of a conjoint analysis, which is a marketing evaluation method. The WTP for 1 kg of CO2 is ¥1,247.5.

**Green Points of Products and Their Contribution Rates to Gross Margin (Specified products only)**

Product Type	Green Point	Contribution Rate
imagio Neo 350	25	6.56%
Spirio 5000 RM	24	6.30%
Spirio 7010F	18	4.72%
Spirio 7210F RM	26	6.82%
FT 4500FK	16	4.20%
imagio MF4570	19	4.99%
imagio Neo 450	25	6.56%
imagio MF5570	19	4.99%
imagio MF7070	21	5.51%
imagio MF8570	18	4.72%
imagio MF105 Pro	18	4.72%

**Customer's WTP Evaluation Results from a Conjoint Analysis**

Item	Evaluation Weight of Efficiency Index	Evaluation Weight of Product Price Unit
Speed (sheets/minute)	0.0013844 (effect/sheet)	2,567.7 (yen/sheet)
Time to start from standby mode (seconds)	0.0023333 (effect/second)	4,327.7 (yen/second)
Electricity bill (thousands of yen/year)	0.0746933 (effect/thousand yen)	138.5 (yen/yen)
Sound while on standby (dB)	0.0027242 (effect/dB)	5,052.8 (yen/dB)
Greenhouse gas (kg-CO2)	0.0006726 (effect/kg)	1,247.5 (yen/kg)
Price (ten thousands of yen)	0.0053915 (effect/ten thousand yen)	1.0 (yen/yen)

From the results obtained in the table above, it was found that the contribution rate for product types given in the customer satisfaction survey was 7.89%.

The appropriateness of the contribution rate according to the survey is considered verified in terms of WTP.

**New Framework for Internal Environmental Accounting**

In the past, environmental accounting systems were used as a tool to evaluate and disclose environmental impact reduction effects to environmental conservation costs. For the purpose of supporting decision-making processes in sustainable management, it is, however, necessary for this tool

to internally measure and evaluate the profit obtained from business activities and the environmental impact appropriate for a company's business size. It is also necessary to measure and identify the environmental impact generated in all relevant processes (environmental impact potential). The Ricoh Group identifies the environmental impact potential and environmental influences

in each process of the Comet Circle<sup>1</sup> and measures and evaluates the managerial resources appropriately allocated to the environmental influences. The Group also measures and evaluates environmental conservation costs paid by product line and process, whether the costs work toward advancing social effects and corporate profits, and whether the environmental impact of

business activities as a whole suits the company's business size. Thus, the Group is establishing a framework for environmental management accounting<sup>2</sup>. Efficient sustainable management is promoted by identifying the divisions responsible for each product and process as well as measuring and evaluating the effects in those areas.

1. See page 13.  
2. See table above.