

5. Kao Corporation

1. Company Profile

Since the launch of the first-ever high quality domestic facial soap in Japan in 1890, Kao Corporation has been dedicated to developing excellent quality and useful products that meet customers' true needs. Kao's consumer products are marketed globally. Specifically, the Company provides a wide range of consumer products, such as laundry detergent, shampoo, and sanitary products in Asia, and focuses on skin care products in North America and hair care products in Europe. With production bases for chemical products in Asia/Oceania, North America, and Europe, Kao is further expanding chemical products businesses in various industries around the world.

Kao's consolidated Sales and Income (FY 2003 ended March 31, 2004) are 902.6 billion yen = 8,540.3 million dollars and 119.7 billion yen = 1,132.6 million dollars.

To fulfill our mission, we established "*Kao's Business Conduct Guidelines*" outlining our goal to be an honest and exemplary company, guided by sensible and fair actions and driven by a fundamental adherence to ethical principles that go beyond mere compliance with laws in order to earn the true respect of society. We shall not pursue profits at the expense of our ethical principles. Each individual executive and employee will conduct business activities according to "*Kao's Business Conduct Guidelines*". In accordance with our Mission Statement and Basic Principles for Corporate Activities, we strive to contribute to society by promoting "cleanliness, beauty, and health."

2. Environmental Activities

With regard to the environment and safety, we consider the followings:

- (1) We shall contribute to the achievement of a sustainable society by giving thorough consideration to environmental conservation and human safety in every aspect of our operations, including product development, manufacture, distribution, consumption and waste disposal.
- (2) We shall develop and produce products with a minimum impact on the environment, and wherever practicable, in a manner that efficiently uses and recycles natural resources and energy.

3. Objectives

In Environmental Performance Index Guideline (2002) by the Ministry of Environment, Japan, 9 indices are set as core indices in business activities from the view of "material balance" whose aim is the promotion of global warming measures and the establishment of recycling based society. We have been already calculating those 9 core indices and publishing them through our environmental reports. There had been, however, no comprehensive and persuasive evaluation method for these 9 indices.

We found that JEPIX makes it possible to evaluate environmental impacts quantitatively, logically and persuasively, and therefore started our project with the following goals.

- To conduct a comprehensive evaluation of environmental impacts from the production through eco-balance analysis
- To grasp the causal relationship between environmental protection measures and reduction of environmental impact reduction and to create environmental indicators for the decision makings in company policies
- To establish a way of thinking that decisions on environmental protection measures should be made basing on the cost benefit relationships

4. Scope

▼ Scope of application

The project was applied to the environmental impact from the energy use listed in site-balance and core-balance.

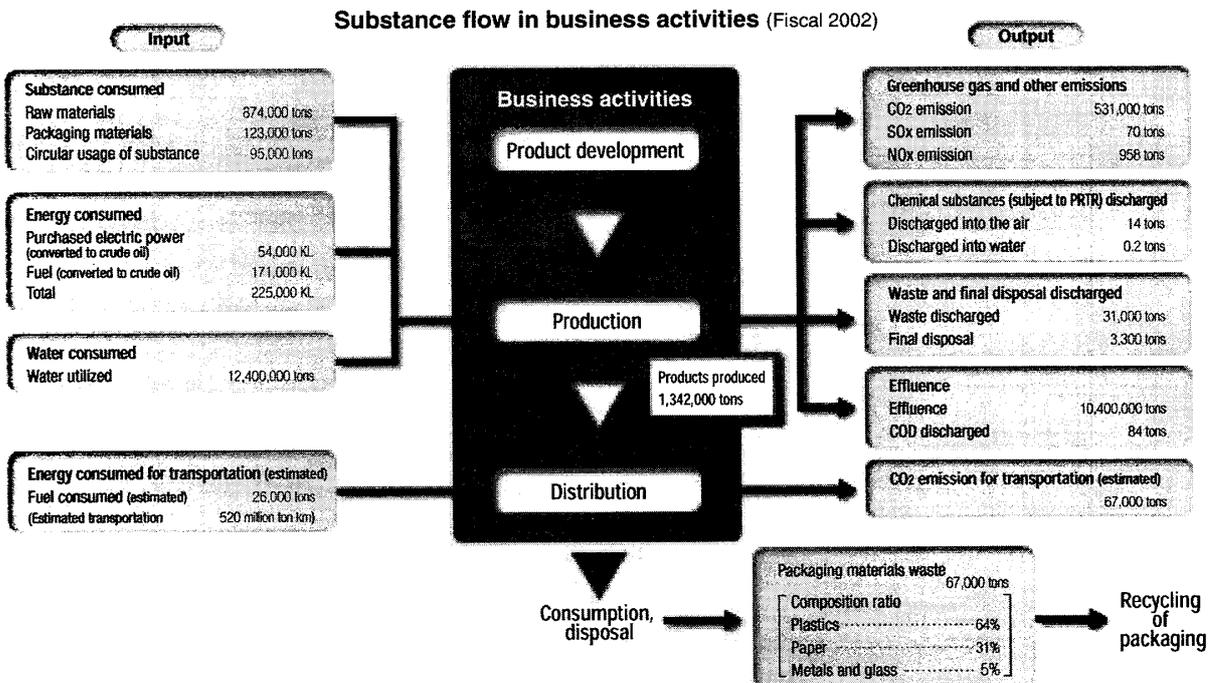


Figure 5.1: Applied area of EcoBalance

5. Conditions

▼ Input data and overview of analysis

- Source of the data is annual data of the year 1990, 2000, 2001 and 2002
- Eco-efficiency is calculated with value added (eco-efficiency = value added / environmental impact points)
- Change and detail of eco-points and eco-efficiency will be calculated and analyzed.

6. Results

▼ Change in eco-points

The change in eco-points of the year 1990 and 2000-2001 is shown in Figure 5.2. Reduction of waste and chemical substances can be clearly seen from the year of 1990 (see Figure 5.3). Also, CO₂ emission has been reduced due to the energy saving program.

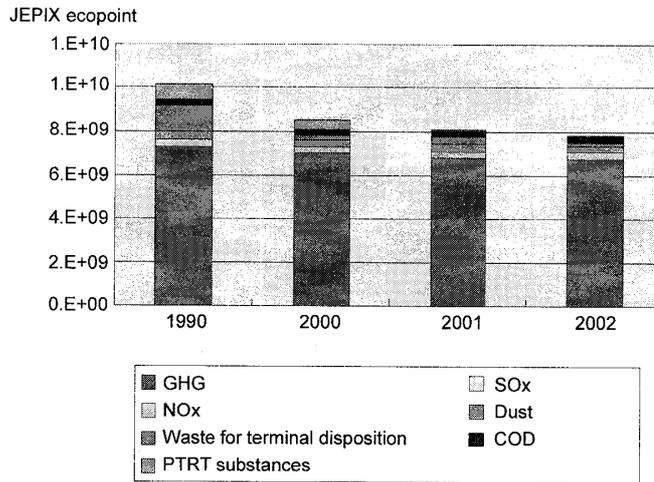


Figure 5.2: Transition of JEPIX eco-point of emission

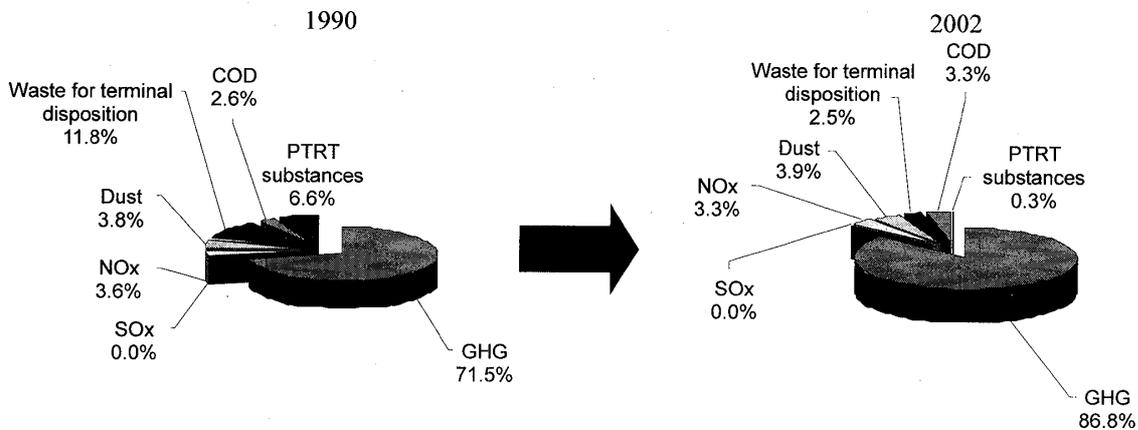


Figure 5.3: Comparison of eco-point of emission items between 1990 and 2002

▼ Change in eco-efficiency

The change in eco-efficiency rate calculated with eco-factor is shown in Figure 5.4 (rate of 1990 is the standard). The eco-efficiency rate which shows the relationship between comprehensive environmental impact and economic value added has improved from 1.5 to 1.7 in years of 2000-02.

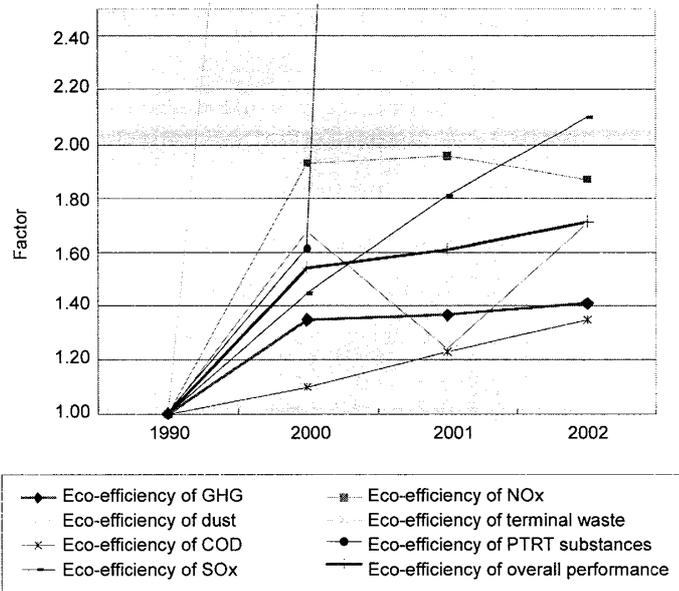


Figure 5.4: JEPIX eco-efficiency and individual eco-efficiency

7. Application of JEPIX to Environmental Accounting

▼ Estimation of external cost with eco-points

The external cost of environmental impact is estimated as following.

We have assumed that “marginal reduction cost per eco-point (yen per EIP) = price of emission certificate (yen per ton) / eco-points of CO₂ (EIP per ton), and the following information can be obtained.

If the price of emission certificate was 3,000 yen / ton, then the marginal cost per eco-point would be 0.234 yen / EIP.

If the price of emission certificate was 12,000 yen / ton, then the marginal cost per eco-point would be 0.938 yen / EIP.

A flow chart of external cost estimation which is based on the marginal reduction cost pro eco-point is shown in Figure 5.5.

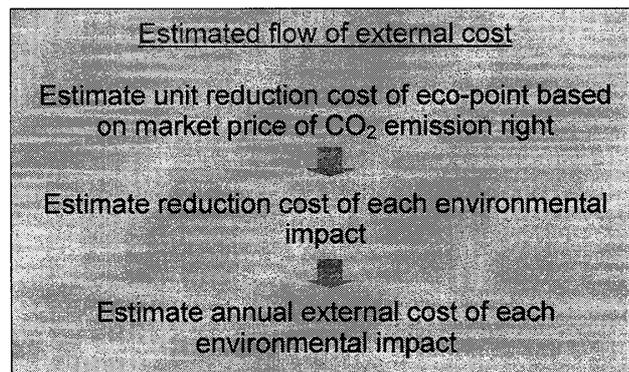


Figure 5.5: Estimated flow of external cost

i.e. the external cost of environmental impact A will be calculated as following:

- Marginal reduction cost of environmental impact A (yen / kg) = EIP / kg × eco-points of CO₂
- The external cost of environmental impact A (yen / year) = annual emission (kg / year) × marginal reduction cost of environmental impact A (yen / kg)

▼ Estimated marginal reduction cost and external cost of environmental impacts

Basing on the method explained above, estimated marginal reduction cost is calculated in Figure 5.6 and external cost of the fiscal year 2002 is shown in Figure 5.7. Here the calculation of marginal CO₂ reduction cost is based on 0.234 yen / EIP which is derived from the price of emission certificate 3,000 yen / ton.

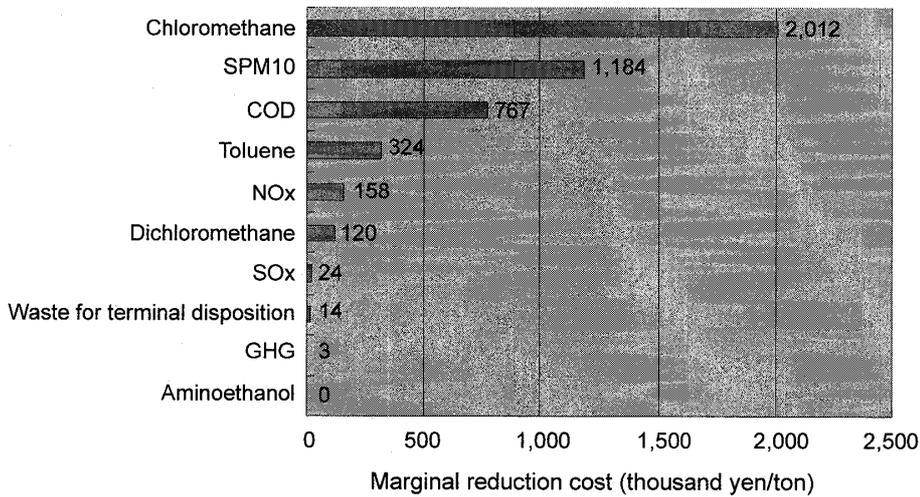


Figure 5.6: Estimated marginal reduction cost of each environmental impact

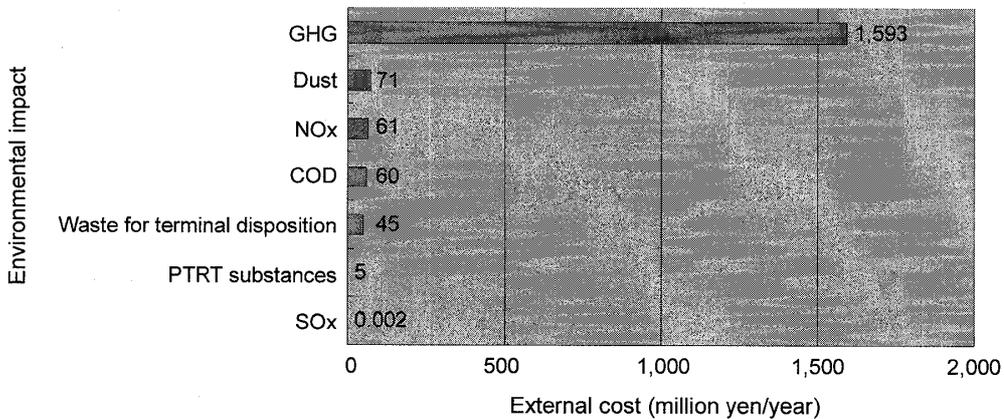


Figure 5.7: Estimated external cost of 2002

▼ Estimation of total cost needed for recovery of the environment

Here we have estimated total cost needed for recovery of the environment destroyed.

Annual environmental recovery cost = total business area cost in environmental conservation (shown in the colored square in Table 5.1) + estimated external cost

Basing on the equation above, three kinds of external costs (reduction cost per eco-point) were calculated and the result is shown in Figure 5.8. The amounts of external cost differ according to the reduction cost per eco-point.

Table 5.1: Costs by business area (excerpts from *Environmental Report*)

Results for fiscal 2002

Environmental conservation costs

Environmental conservation costs			(Unit: ¥million)	
Category	Main activities	Investment	Cost *1	
Costs by business area		2,676	3,987	
Breakdown	① Pollution prevention	Prevention of air and water pollution	1,104	1,865
	② Conservation of the global environment	Energy saving	878	302
	③ Resource circulation	Conservation of resources, processing and disposal of waste	694	1,820
Costs incurred during upstream and downstream production process	Product recycling, packaging recycling, and the manufacture of products in an environmentally responsible manner	702	2,595	
Costs of management activities	Obtainment and maintenance of ISO, disclosure of environmental information, compliance with PRTR law, education	16	846	
Costs of research and development	Development of products in an environmentally responsible manner	52	1,719	
Cost of society activities	Nature conservation in areas surrounding the plants, beautification activities, supporting funds, tree-planting in workplaces	0	58	
Costs of amending environment damage			0	
Total		3,445	9,204	

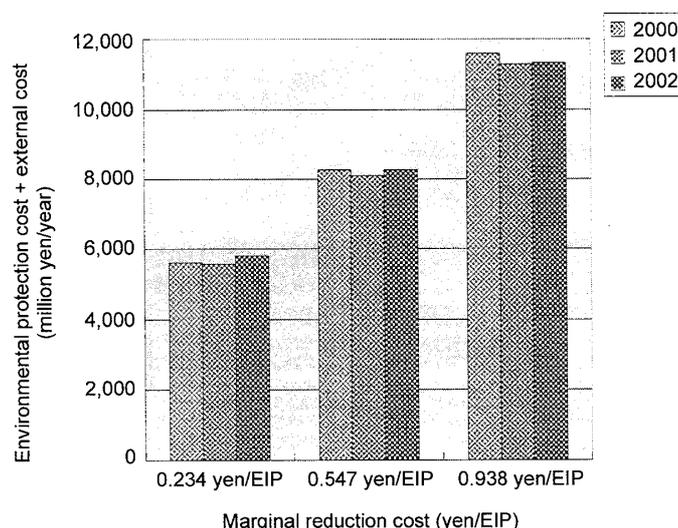


Figure 5.8: Transition of environmental recovery cost (including external cost)

Total area cost and estimated external cost are shown in Figure 61. There is no remarkable difference in them from the year 2000 to 2002.

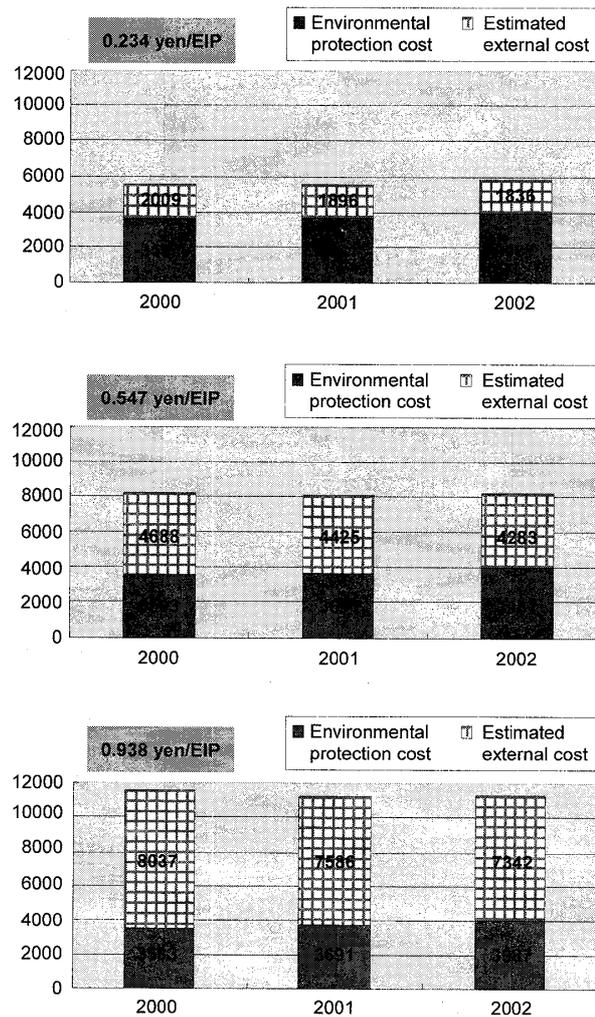


Figure 5.9: Transition of environmental protection cost in business area and estimated external cost

8. Summary

▼ Summary of the results

- The effect of our environmental impact reduction activity in the past 3 years was evaluated with eco-points. As a result, the trend of reducing environmental impact became clear.
- The reduction of PRTR material emission and the amount of waste disposal have a great contribution to the reduction of environmental impact on which we place special emphasis.
- The proportion of GHG in the total eco-points is quite large.
- The environmental conservation cost and external cost are economic indicators for environmental performance improvement to promote the reduction of environmental impact. The total amounts of environmental conservation cost and external cost have not changed remarkably in the past three years.
- Because CO₂ emission has nearly 90 % of total eco-points, the estimation of external cost is dependent on marginal reduction cost or hypothetical emission trade price. When marginal reduction cost or hypothetical emission trade price are high, the external cost will be high as well. The measures which we have conducted are partial internalization of the external cost which will be internalized in the future through international contracts or

policies. Also, reduction of eco-points should be equivalent to the reduction of environmental cost which otherwise would be necessary to be reduced in the future since there is a strong correlation between eco-points and marginal reduction cost according to the research of Mr. Honda of Tokyo University (source: Mr. Oka, environmental economic and policy, September 2002, presentation material).

▼ **Future issues**

- JEPiX is available for decision making in environmental protection measures and policies. From the next year, we would like to use JEPiX in the practice. Also, we think that there is a possibility to apply it to our environmental risk management and we would like to continue our research on it.
- Watching out for the price in emission trade market of GHG, we have to try to reduce our eco-points economically and efficiently.
- Depending on the situation of GHG measure, the eco-factor of GHG will be recalculated and it will possibly be larger than now.