

4. Sekisui Chemical Co., Ltd.

1. Company Profile

Sekisui Chemical Co., Ltd. Was founded in March 3, 1947, and the net sales of 2003 was 799,709 millions yen. Sekisui has three main “Companies” in it as follows:

Housing Company

(Net sales 410.9 billion yen)

Housing business (newly-built houses and apartments)

Living environment (refurbishing, real estate and others)

Urban Infrastructure and Environmental

(Net sales 192.3 billion yen)

Pipe business (water supply piping, plumbing equipment, construction equipment, sewage pipes, electricity pipes, gas pipes and others)

Building materials and housing equipment

Environmental solution businesses (aged pipe restoration, water supply infrastructure-related and recycle engineered wood)

High Performance Plastics

(Net sales 181.8 billion yen)

IT-related

Automotive materials

Medical products

Functional materials

2. Environmental management

Sekisui Chemical positioned the environment as a high-priority area for management at an early stage. Since then, aiming to become an environmentally creative organization that is welcome in each region and community, we have aggressively pursued activities to protect the environment and conserve nature. To strengthen our environmental activities, in fiscal year 2003 we adopted the concept of environmental corporate management and set up the Environmental Management Department to promote it. Environmental corporate management is our approach to maintaining environmentally responsible growth as a company by achieving equilibrium between ecological goals (consideration for and coexistence with the global environment) and economic goals (maximizing economic value for customers and ourselves).

The basic policies of environmental corporate management:

1) Create business opportunities by reorganizing existing businesses and technologies based on the concept of contribution to the environment, and by creating next-generation environment-related businesses by leveraging cutting-edge technologies.

- 2) Reform our corporate culture by raising the awareness of all Group employees and reorganizing the entire Group's management system.
- 3) Reduce costs by further strengthening environmental protection and by boosting the efficiency of environment-focused business activities.
- 4) Enrich social contribution activities such as nature conservation and regional contribution activities.

3. Objectives

We are currently in search for an adequate evaluation index of environmental management. Our business comprises three areas of business: housing business, urban infrastructure & environmental products business, and high performance plastic business. Their environmental impacts vary due to differences in business areas. An adequate evaluation index of environmental management should be an integrated index which enables a comparison among the three areas of business.

The followings are main environmental impacts of each area of business.

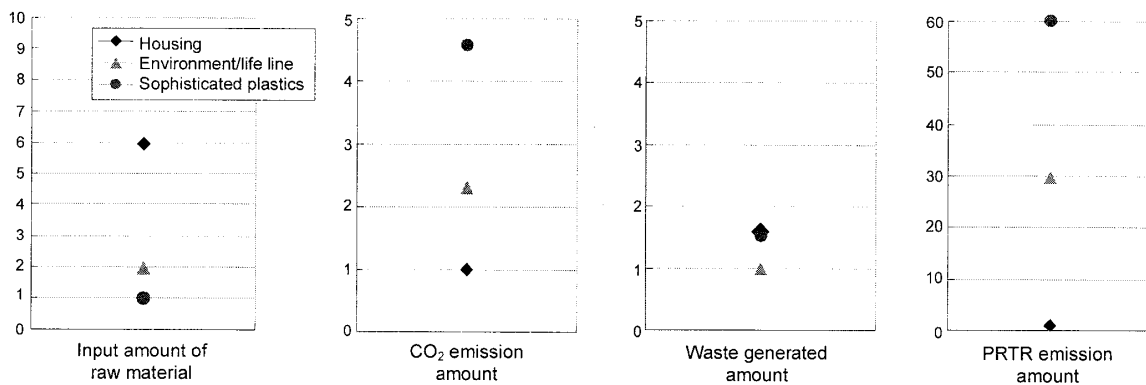


Figure 4.1: Comparison of major environmental impact of each company

We have been so far working on an evaluation index of environmental management, and will introduce some of our efforts to make clear our need of an integrated index.

The first one is the introduction of an environmental accounting. Based on the guidelines published by the Ministry of Environment, we have made three sorts of different environmental accounting descriptions for each area of business.

● Environmental protection cost

■表1 環境保全コスト

分類	主な取り組み内容	単位(百万円)							
		住宅カンパニー(1社)		環境・ライフラインカンパニー		高機能プラスチックカンパニー		合計(12社)	
		費用額	投資額	費用額	投資額	費用額	投資額	費用額	投資額
1)事業エリア内コスト	大気、水質、騒音等の公害防止	370	54	150	35	361	46	1,068	166
	地球温暖化防止(省エネ)対策等	18	3	9	21	80	9	115	33
	廃棄物削減、リサイクル、処理等	1,010	22	433	26	475	186	1,886	276
2)上・下流コスト	容器包装の低炭素化、グリーン購入に伴う差額など	1	0	45	0	42	0	123	0
3)管理活動コスト	環境教育費、EMS維持、環境対策設備維持費、情報開示など	303	0	237	0	300	0	1,689	0
4)研究開発コスト	環境安全に関する研究開発	98	23	643	129	344	202	1,385	458
5)社会活動コスト	社会貢献等	14	0	18	0	22	0	85	0
6)環境整備コスト	自然修復等	28	0	0	0	160	0	188	0
合計		1,842	102	1,535	211	1,724	443	6,639	933
項目		住宅カンパニー(1社)		環境・ライフラインカンパニー		高機能プラスチックカンパニー		合計(12社)	
		費用額	投資額	費用額	投資額	費用額	投資額	費用額	投資額
	当該期間の研究開発費及び投資の総額(百万円)	5,290(注3)	1,489	5,409(注3)	4,735	7,670(注3)	6,503	23,403(注3)	13,338
	総額に対する環境保全活動対応比率(%)	1.8	7.0	11.9	4.5	4.5	6.8	5.9	7.0

● Environmental protection effect [physical unit]

■表2 環境保全効果 [物量面]

効果の内容	環境保全効果を示す指標(前年より増減)						環境パフォーマンス指標:生産売上高係数						
	指標の分類	単位	注	1998	1999	2000	管理項目	単位	01年度	02年度			
事業エリア内効果	投入資源に関する効果	①電気使用量	kWh	-6	3	-11	-15	18	①エネルギー消費量係数単位(電力+燃料):注4)	kWh/万円	0.392	0.421	*
		②燃料使用量	千kg	0	0	-3	-3	18					
	環境負荷及び廃棄物に関する効果	③CO ₂ 排出量(注5)	千トン	-5	1	-17	-23	18	②CO ₂ 排出量係数単位(注6)	トン/万円	0.768(注7)	0.795	*
		④廃棄物発生量(注8)	トン	-20	-34	-135	-189	20	③環境汚染物発生量係数単位	トン/万円	0.0024	0.0022	○
		⑤廃棄物処理量(注9)	千トン	-4	-3	-1	-8	16	④廃棄物処理係数単位	トン/万円	0.150	0.141	○
	⑥外部委託処理量(注10)	千トン	0	-5	0	-6	16	⑤外部委託処理係数単位	トン/万円	0.015	0.001	○	
上・下流効果	対・サービスに関する効果	太陽光発電などによるCO ₂ 削減量	トン	12,192	—	—	12,192	33	太陽光発電などによるCO ₂ 削減量	累計トン	30,301	42,493	○
その他の環境保全効果	ISO14001 新規取得	件	5	0	0	6	10						
	ISO14001 認証更新	件	0	4	5	11	—		ISO14001認証取得事業所	累計件数	76	80(注11)	○
	ゼロエミッション達成事業所(注12)	件	22(注13)	2	5	29	17		ゼロエミッション達成事業所(注12)	累計件数	26	55	○

● Economic Effect by environmental protection measures [monetary unit]

■表3 環境保全対策に伴う経済効果 [貨幣単位]

効果の内容	金額(百万円)				考 入 方
	総額	環境・ライフライン	高機能・オゾンフリー	その他	
収益					
① 省資源効果	2	11	37	51	分別・リサイクル推進による省資源としての売却益
② 省電力効果	1	9	3	14	
費用削減					
③ 省エネルギー活動によるコスト削減	38	22	352	413	
④ 廃棄物削減活動等によるコスト削減	13	109	1,016	1,138	省資源活動含む
小 計 (費用削減効果)	54	151	1,408	1,616	
⑤ 環境保全活動貢献分(注15)	268	1,847	2,369	4,484	事業所の付加価値に対する環境保全活動貢献分(注14)
⑥ 研究開発による環境配慮新製品貢献分(注15)	1,825	461	330	2,616	環境配慮製品売上高×環境利便研究費割合
小 計 (増進効果)	2,093	2,308	2,699	7,100	
合 計	2,147	2,459	4,107	8,716	

Figure 4.2: Environmental accounting of each company

Since the year 2003, we have applied eco-efficiency and calculated produced sales amounts per CO₂ emission, waste generation and environmental pollutants emission.

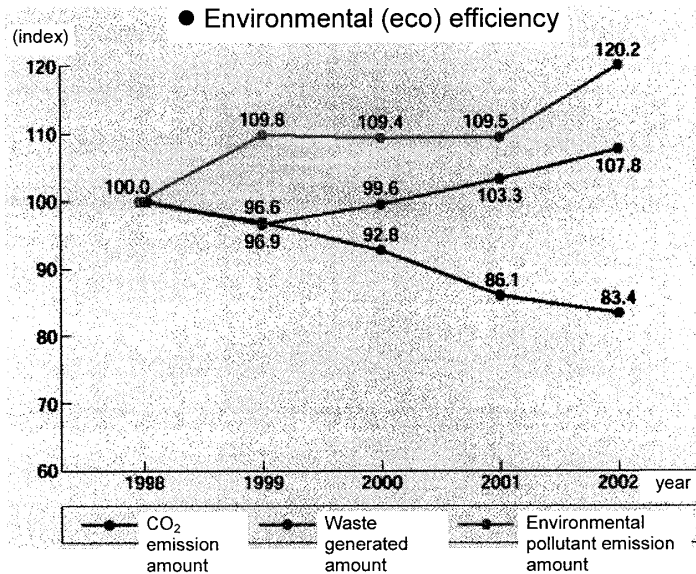


Figure 4.3: Environmental (eco) efficiency index

In addition, we have been doing an environmental performance management from various viewpoints such as every kind of environmental impacts, company-wide, business-wide, and secular change.

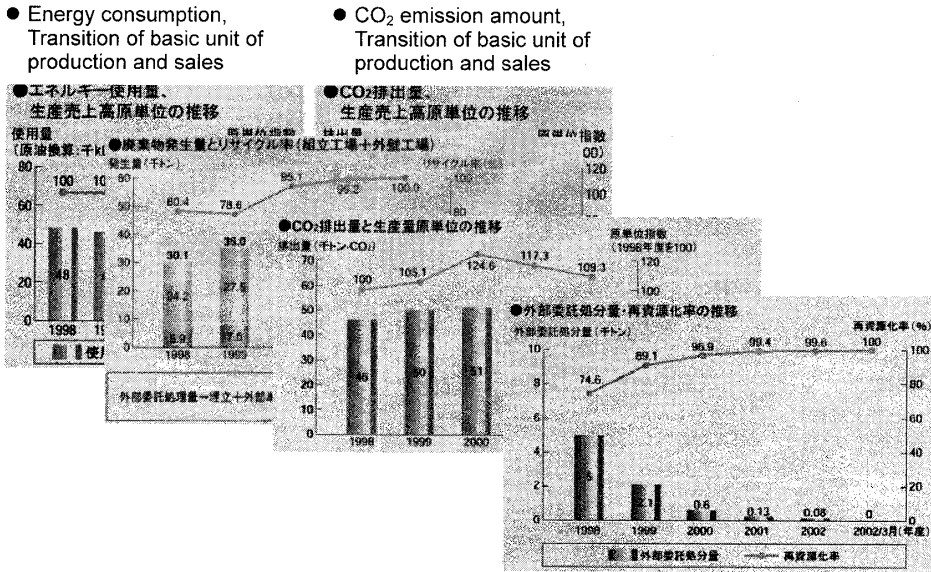


Figure 4.4: Environmental performance management

In an effort to calculate eco-efficiency, it has become too complicated by varied management indices. Our need to integrate management indices to compare three areas of businesses for a simpler interpretation has triggered us to participate in this benchmarking project of JEPIX.

4. Scope

▼ System boundary

The following Figure 4.5 shows the system boundary: environmental impacts in the production process of raw materials, production and use of energy, main environmental impacts, and wastes are taken into consideration.

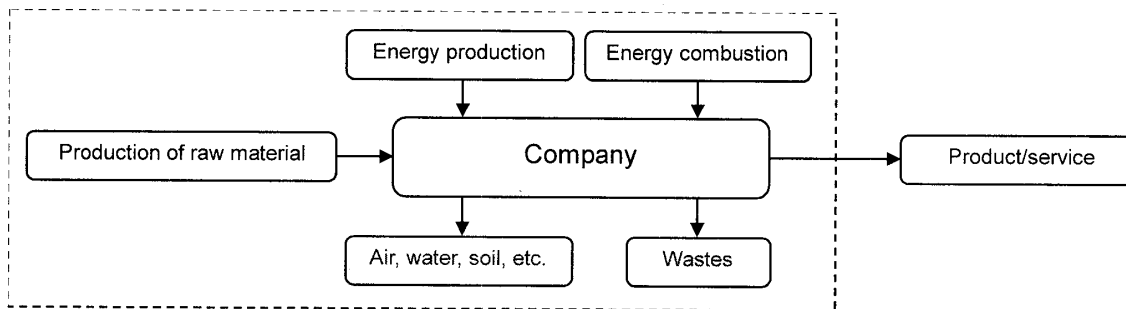


Figure 4.5: System boundary

5. Condition

▼ Input data

Annual data (from the year 2000 to the year 2002) of each area of business, which are bordered in Figure 4.6.

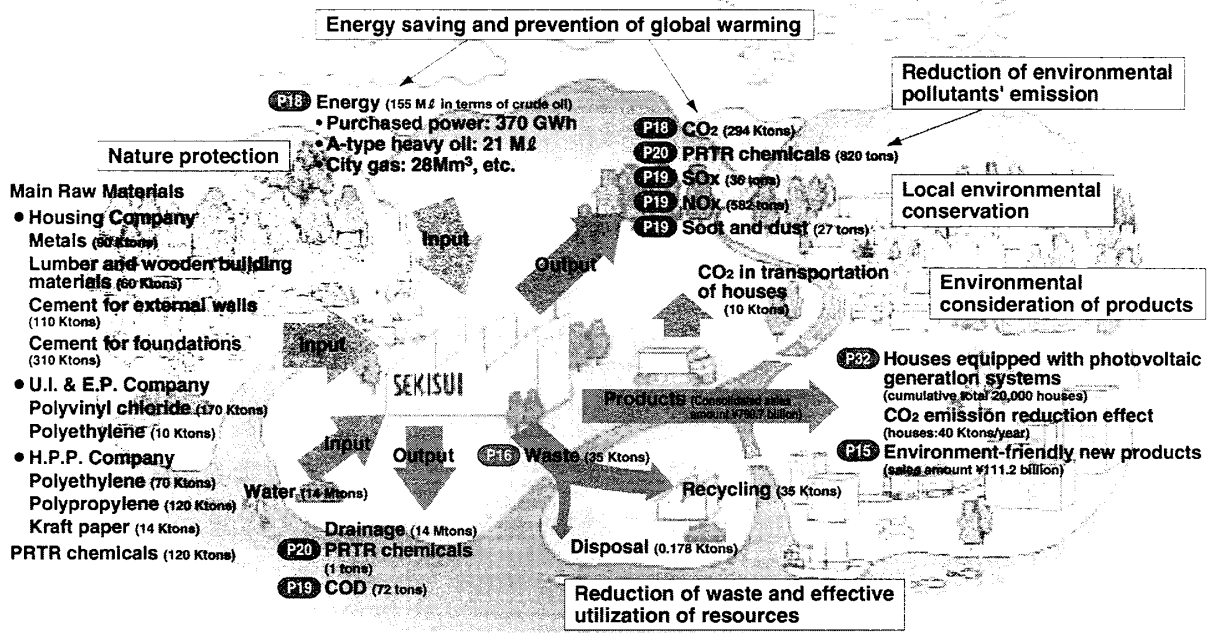


Figure 4.6: Input data (environmental report 2003, p.4)

6. Results

▼ Eco-efficiency analysis

Figure 4.7 shows a change of eco-efficiency values which cover all three areas of business. Total environmental impact points have decreased in the course of this time, while eco-efficiency values have been on the gradual decrease. Figure 4.8 shows a transition of eco-efficiency values in each area of business. The three areas of business signal a different trend: in 2002, the value of the housing business increases, that of urban infrastructure & environmental products business levels out, and that of high performance plastic business decreases.

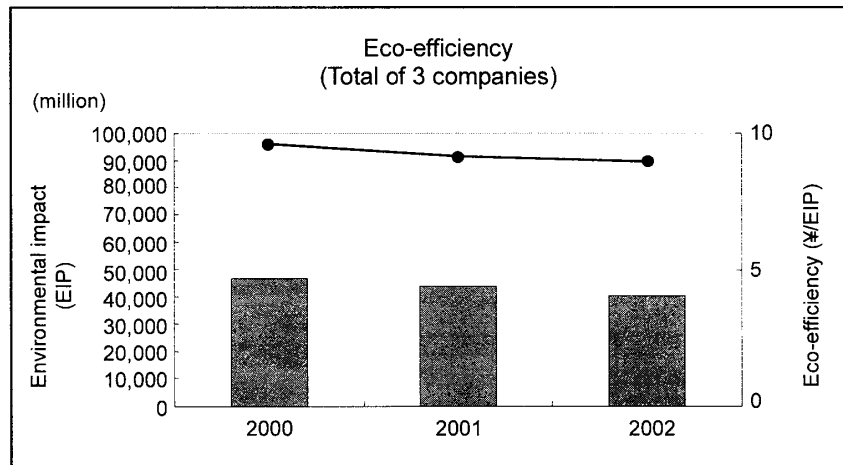


Figure 4.7: Transition of eco-efficiency of company (group) total

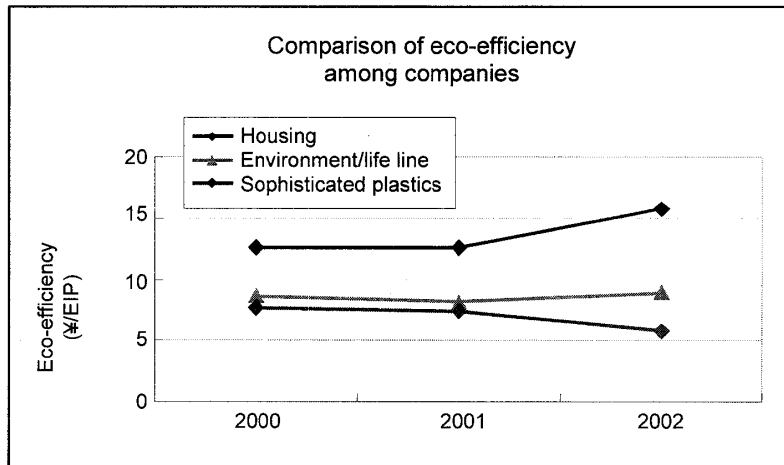


Figure 4.8: Transition of eco-efficiency by company

▼ Results of analysis and examination (Housing business)

Figure 4.9 simplifies raw materials used for housing constructions.

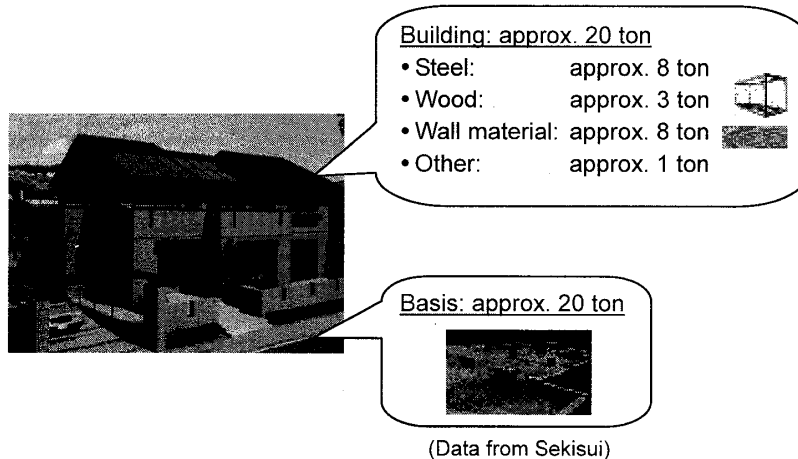


Figure 4.9: Raw material used for construction of house

<Transition of eco-efficiency values>

Figure 4.10 shows a transition of environmental impact points and eco-efficiency values of the housing business. Environmental impacts have largely decreased, and eco-efficiency values have improved. This is because environmental impacts have decreased by 40% from 2000 to 2002. Even though both sales amount and unit sales have decreased, the reduction of environmental impacts has been big enough to improve eco-efficiency values.

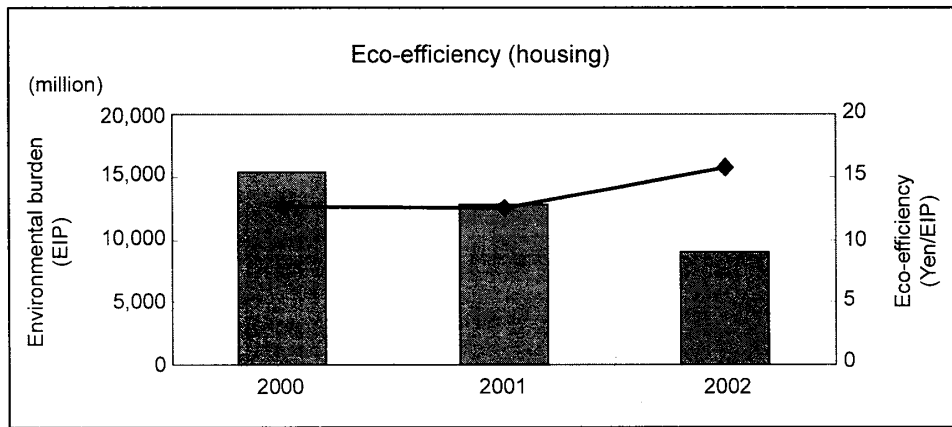


Figure 4.10: Transition of eco-efficiency, housing business company

<Balance of each measurement point>

Balance of each measurement point in the housing business is shown in Figure 4.11. Wastes have been reduced in a large amount. In an effort of zero emission, the landfill has reached zero in 2002. Figure 4.12 also clarifies that the share of cements is large. As a reference, Figure 4.13 details efforts of zero emission.

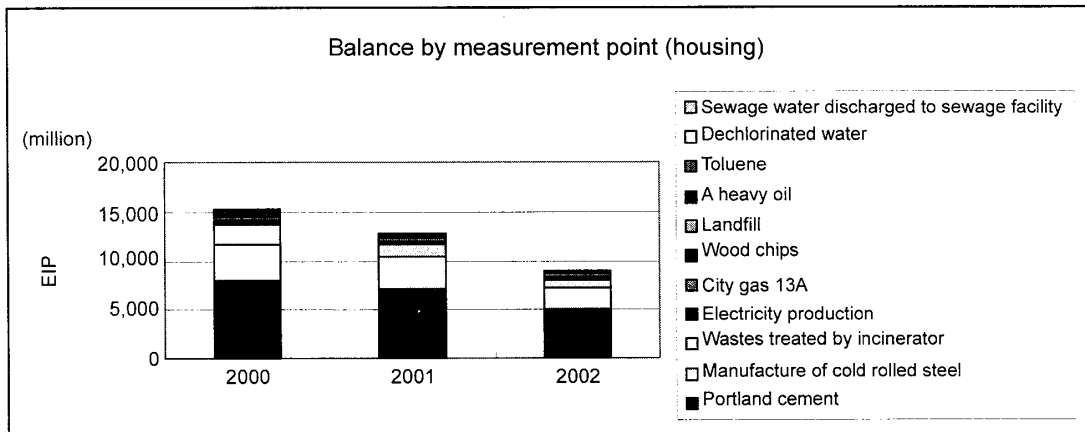


Figure 4.11: Balance by measurement point, housing business company

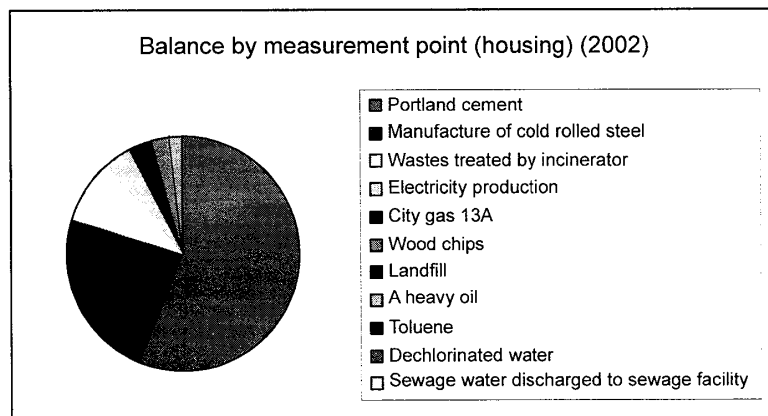
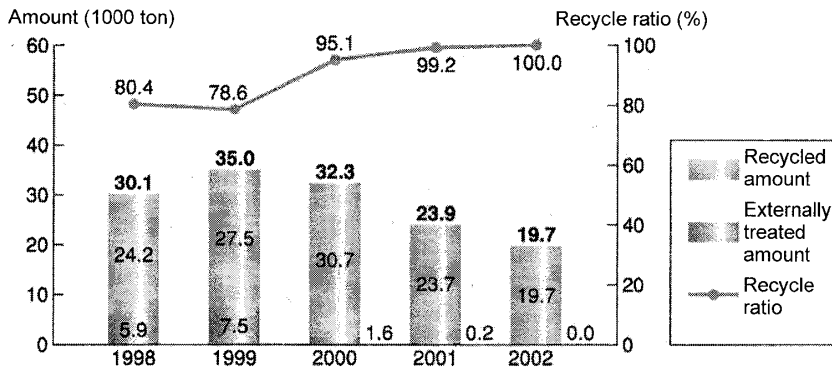


Figure 4.12: Balance by measurement point (2002)

● Recycle ratio of waste generated amount (assembly factory + external factory)



$$\text{Externally consigned treated amount} = \text{Landfill} + \text{External simple incineration}$$

$$\text{Recycle ratio} = \frac{\text{Waste amount} - \text{Externally consigned treated amount}}{\text{Waste generated amount}}$$

● Waste generation amount of assembly factory (per building)

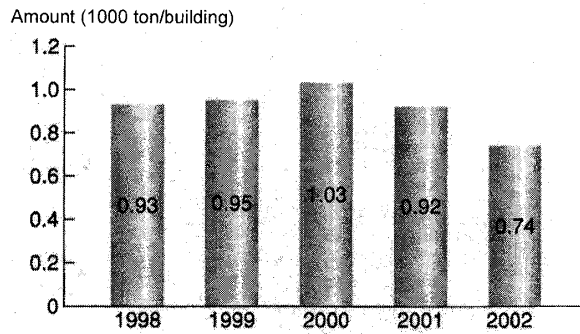


Figure 4.13: Zero emission activity of factory, housing business company

▼ Results of analysis and examination (Urban infrastructure & environmental products business)

<Transition of eco-efficiency values>

Figure 4.14 shows a transition of environmental impact points and eco-efficiency values of the urban infrastructure & environmental products business. Both values stay almost unchanged.

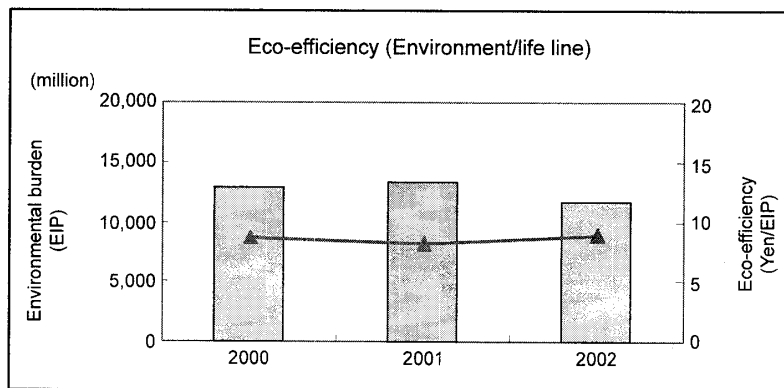


Figure 4.14: Transition of eco-efficiency of urban infrastructure and environmental products business company

<Balance of each measurement point>

The balance of each measurement point is shown in Figure 4.15. Environmental impacts stay unchanged, while the landfill has seen a large decrease in 2002. Figure 4.16 shows a large share of polyvinyl chloride. Figures 4.17 and 4.18 are excerpted from the environmental report and the results are compatible with the evaluation results of JEPIX.

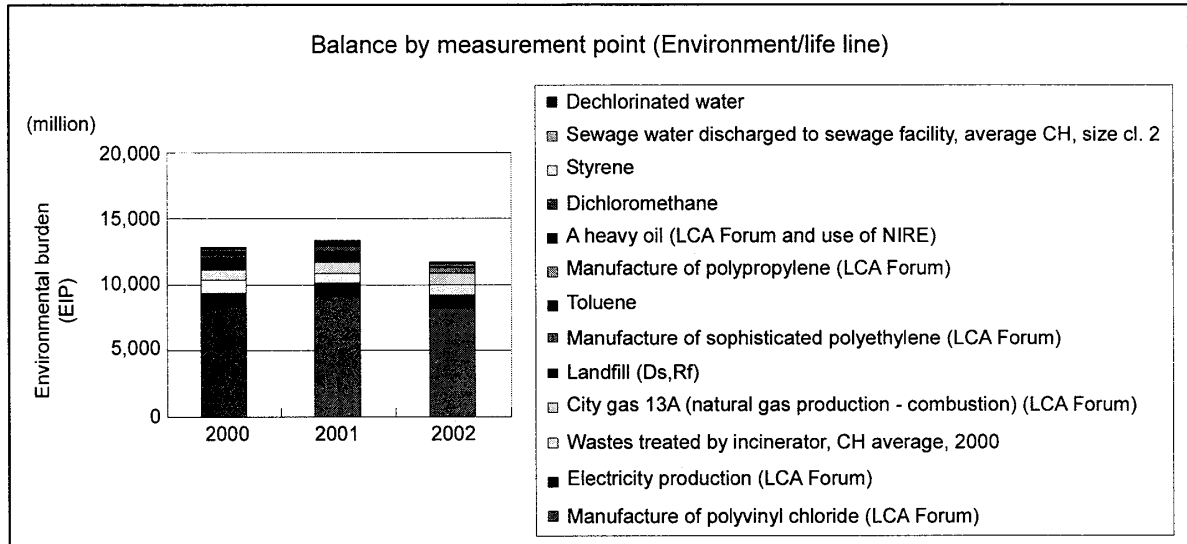


Figure 4.15: Balance by measurement point, urban infrastructure and environmental products business company

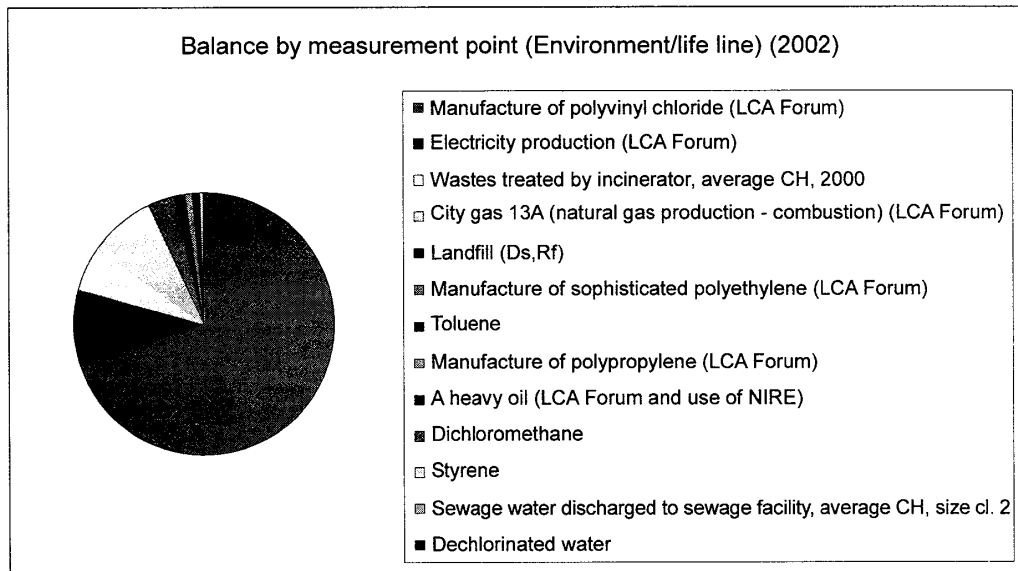
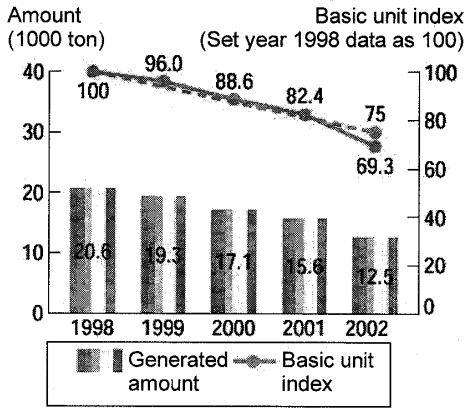


Figure 4.16: Balance by measurement point (2002)

● Waste generated amount,
Transition of basic unit of production
sales



● Externally consigned treated amount,
Transition of recycle ratio

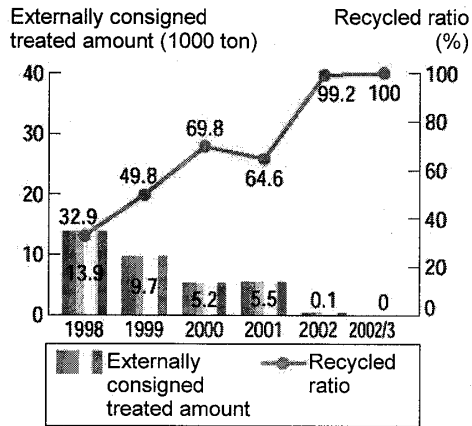
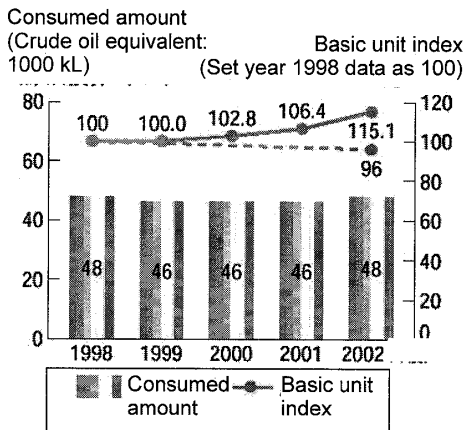


Figure 4.17: Waste reduction activity of urban infrastructure and environmental products business company

● Energy consumption,
Transition of basic unit of production
and sales



● CO₂ emission amount,
Transition of basic unit of production
and sales

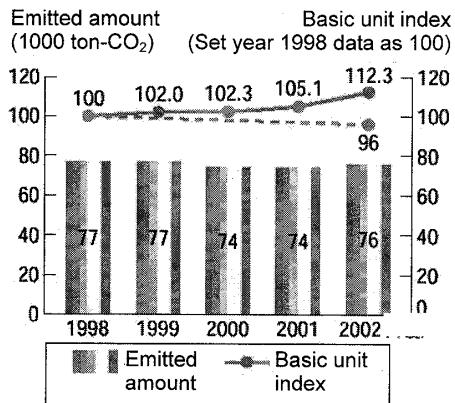


Figure 4.18: Waste reduction activity of urban infrastructure and environmental products business company

▼ Results of analysis and examination (High performance plastic business)

<Transition of eco-efficiency values>

Figure 4.19 shows a transition of environmental impact points and eco-efficiency values of the high performance plastic business. Eco-efficiency values have been on the gradual decrease, while environmental impacts rose in 2002.

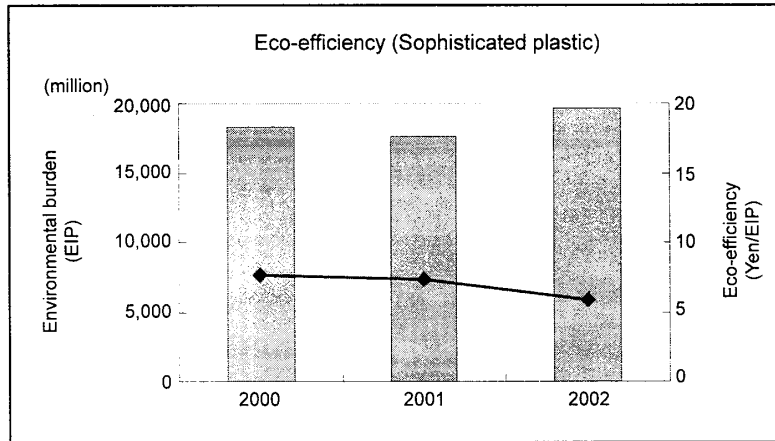


Figure 4.19: Transition of eco-efficiency of high performance plastic business company

<Balance of each measurement point>

The balances of each measurement point are shown in Figures 4.20 and 4.21. In comparison to two other areas of businesses where impacts of raw materials are remarkable, city gas, wastes and impacts of CFC are outstanding in this category of business. JEPIX describes a main cause of an increase in 2002 as city gas, and it should be under examination.

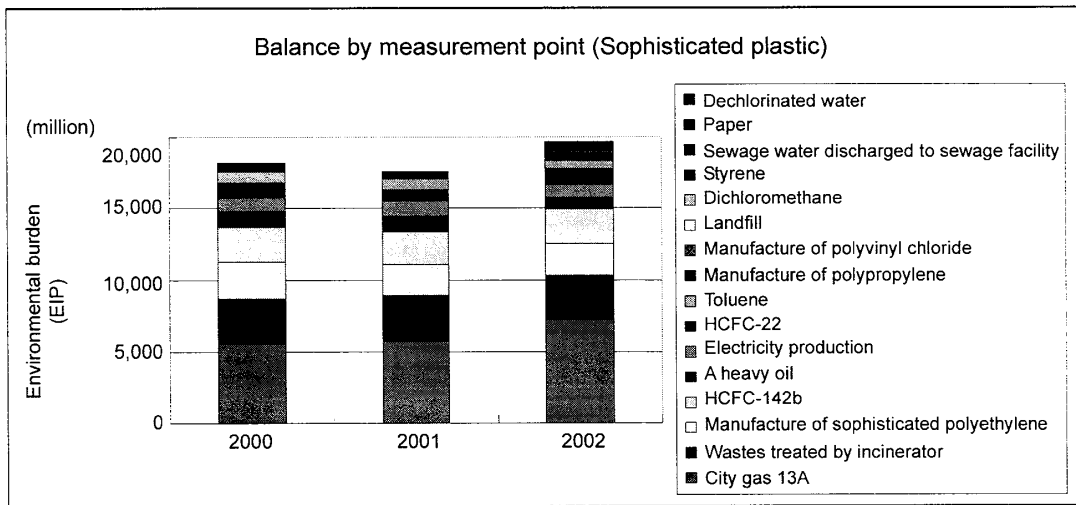


Figure 4.20: Balance by measurement point of high performance plastic business company

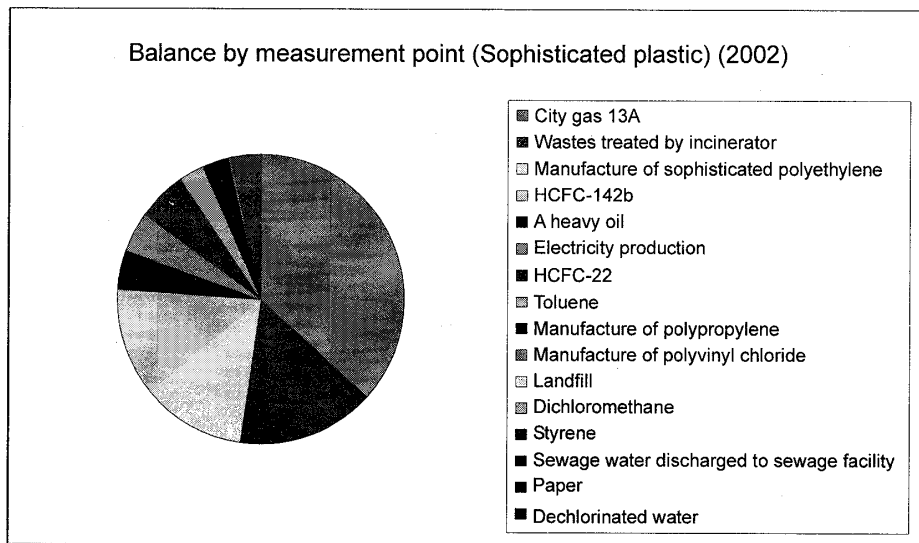


Figure 4.21: Balance by measurement point (2002)

7. Summary

- The results of this analysis emphasize characteristics of three areas of business and efforts to decrease environmental impacts.
- This analysis enables a comparison of environmental impacts of different areas of business.
- Portfolios of EIP from JEPIX as well as management indices (sales amount etc.) would be applicable as an index of environmental management.

8. Challenges and the future of JEPIX

- Examination of inventory data of energy is necessary.

Figure 4.22 compares environmental impacts of grade A crude oil and city gas in the general recognition that city gas is environmental friendlier than grade A crude oil (less impacts to global warming). This figure presents a different result from expected, and data of 2003 will guarantee this result.

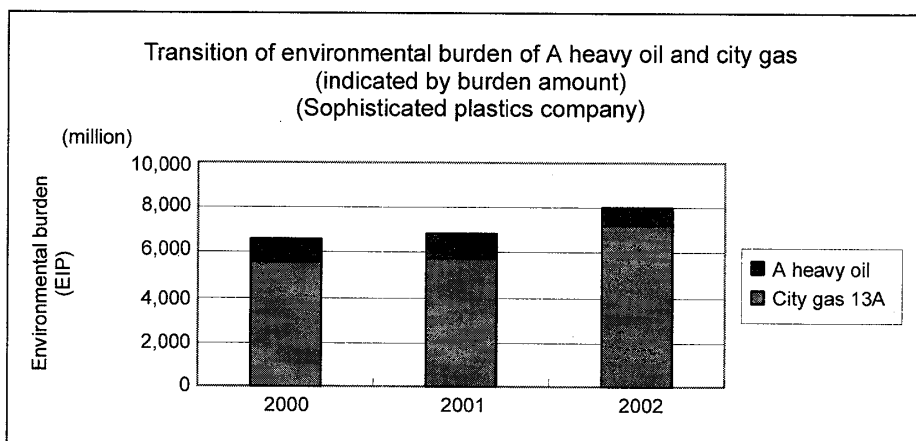


Figure 4.22: Environmental burden of A heavy oil and city gas

- Evaluation of products in their lifecycle

This eco-balance analysis targets environmental impacts in the production process of raw materials and energy, however our products are designed to decrease environmental impacts in their operation period. JEPIX would be useful to apply for planning environmental friendly products. Figure 4.23 exemplifies housing of high energy saving.

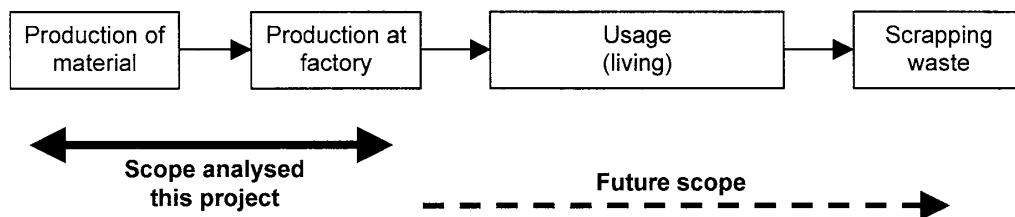


Figure 4.23: Future development of JEPIX

- Application of JEPIX as an risk analysis

Environmental protection activities have so far focused on business activities, while environment-conscious products are designed to reduce impacts on health in its use and to facilitate re-use and disposal. JEPIX would make it easier to calculate environmental impacts including raw materials and to respond appropriately to risks in the whole lifecycle of products.