

Evaluation of Notebook and Desktop Personal computer through the EcoLeaf Type III Environmental Label

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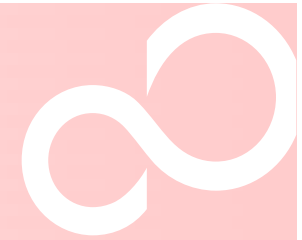
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Introduction



■ The Purpose of this Study

- In this study, notebook and desktop PC, which EcoLeaf Type III labels are certified, are analyzed and the potentials for effective environmental loads reduction are discussed.

■ What is the EcoLeaf Label



- A Japanese version of Type III environmental labeling program launched in June 2002.
- Promoted by the Japan Environmental Management Association for Industry (JEMAI).

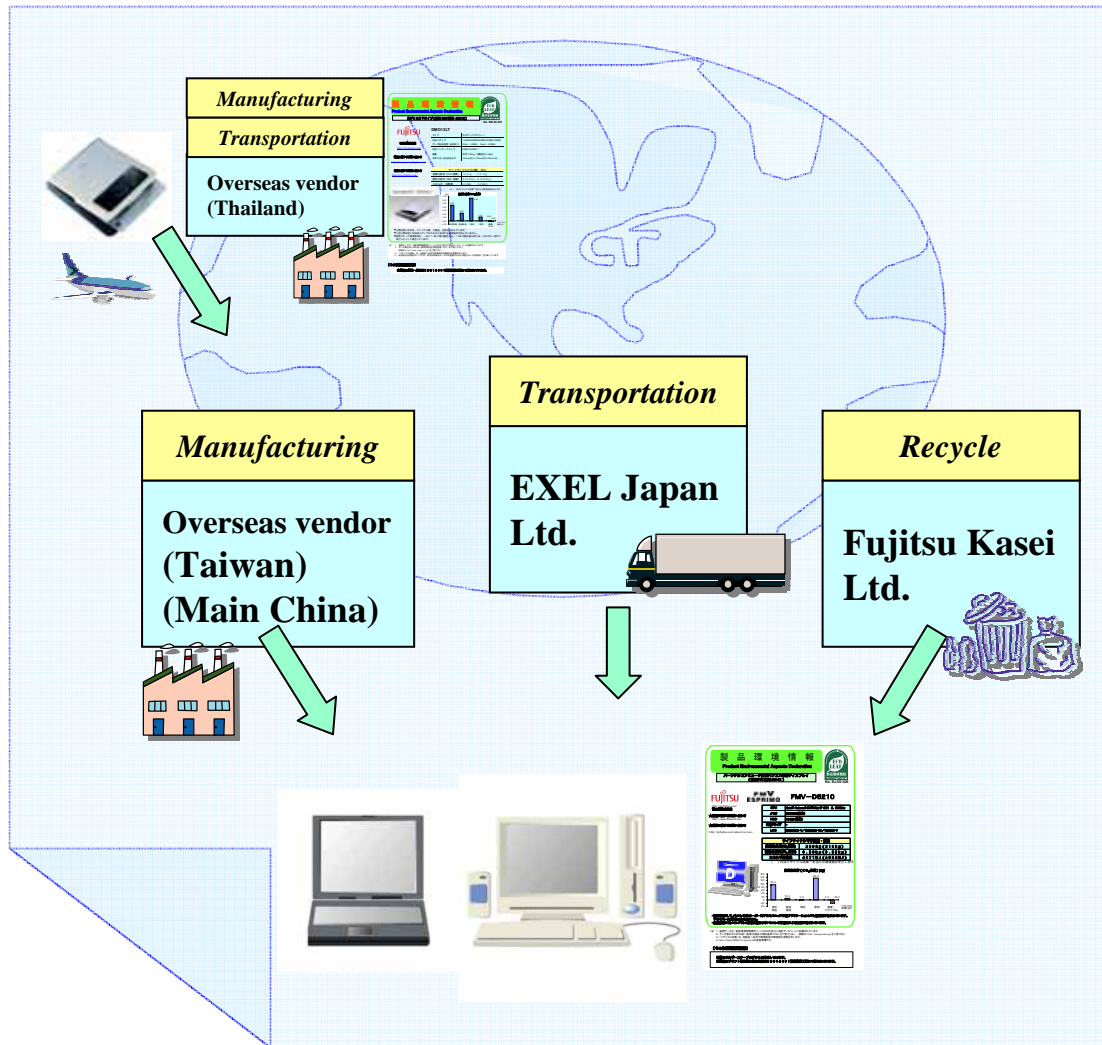
■ Fujitsu's Activities

- Acquired thirty eight labels for PCs and two for magneto-optic disc drives.
- Acquired System Certification, which enables to verify collected data internally and publish by ourselves, in PC business units.



Notebook PC :	33 products (From Jun. 2003)
Desktop PC :	4 products (From Apr. 2005)
PC Display :	1 products (From Apr. 2005)
MO :	2 products (From Sep. 2004)
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Sum.	40 products

Data Collection through Global Supply Chain

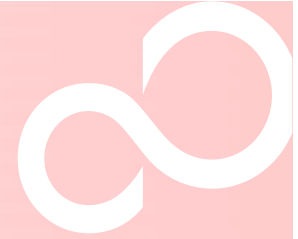


Supply Chain Data Management

- For Global EMS
- For Chemical Substances (such as RoHS compliance)
- For Fujitsu's Green Assessment
- For **Life Cycle Assessment**
- etc...

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PSC for Personal Computer



What is PSC

- A set of standards named Product Specification Criteria (PSC) for each product categories in order to ensure the objectivity and consistency of declared information.
- The first PSC for notebook PCs was developed in 2003 and later modified to include the evaluations of desktop PCs and monitors.

Summary of Personal Computer's PSC

⇒ Functional unit is set as one unit of product. Product stages are divided into five.

[PRODUCTION]

- Both raw materials acquisition and material manufacturing are calculated at *Materials Production stage*.
- LCD panel manufacturing, mounting of the main board, and product assembly are considered as foreground data source and reported at *Product Production stage*.

[DISTRIBUTION]

- The transportation between the product assembly site to Japanese domestic customers.

[USE]

- Three modes are considered: active/standby, energy saving, and off mode.
- Products are assumed to be in use 240 days a year for 4 years.

[DISPOSAL/RECYCLE]

- The product collection rate is set to 100% and a deduction is made for product reuse, component reuse, and material recycling.

Comparison of Notebook and Desktop PCs

Product Specifications

	FMV-C6200	FMV-C5200 VL-171SE
CPU	Intel® Celeron® M processor 350 (1.3GHz)	Intel® Celeron® D processor 330 (2.66GHz)
Memory	256MB	256MB
HDD	40GB	40GB
Display type	TFT Color LCD	TFT Color LCD
Display size	14.1inch	17inch
ODD drive	CD-ROM	CD-ROM
FDD drive	×	○
Product weight	3.39 kg	10.97 kg
Total weight (inc. packaging)	4.93 kg	14.59 kg

Overall Results of Comparisons

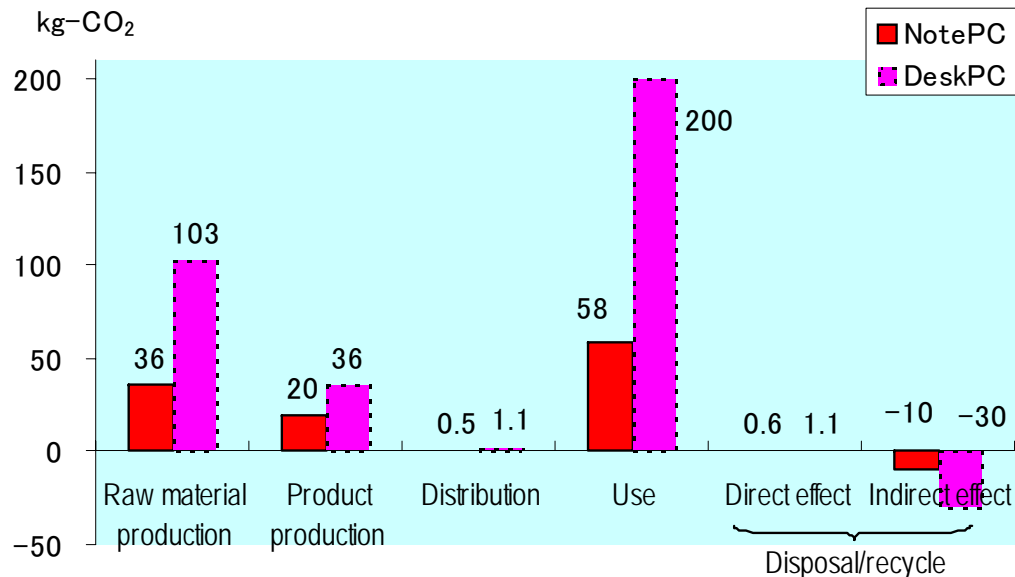


Figure: CO₂ emission of Notebook and Desktop PCs

-Life cycle CO₂ emissions of
(including the recycle effects)

⇒ Notebook PC is **105(kg-CO₂)**

⇒ Desktop PC is **311(kg-CO₂)**

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Stage Breakdown of Notebook PC

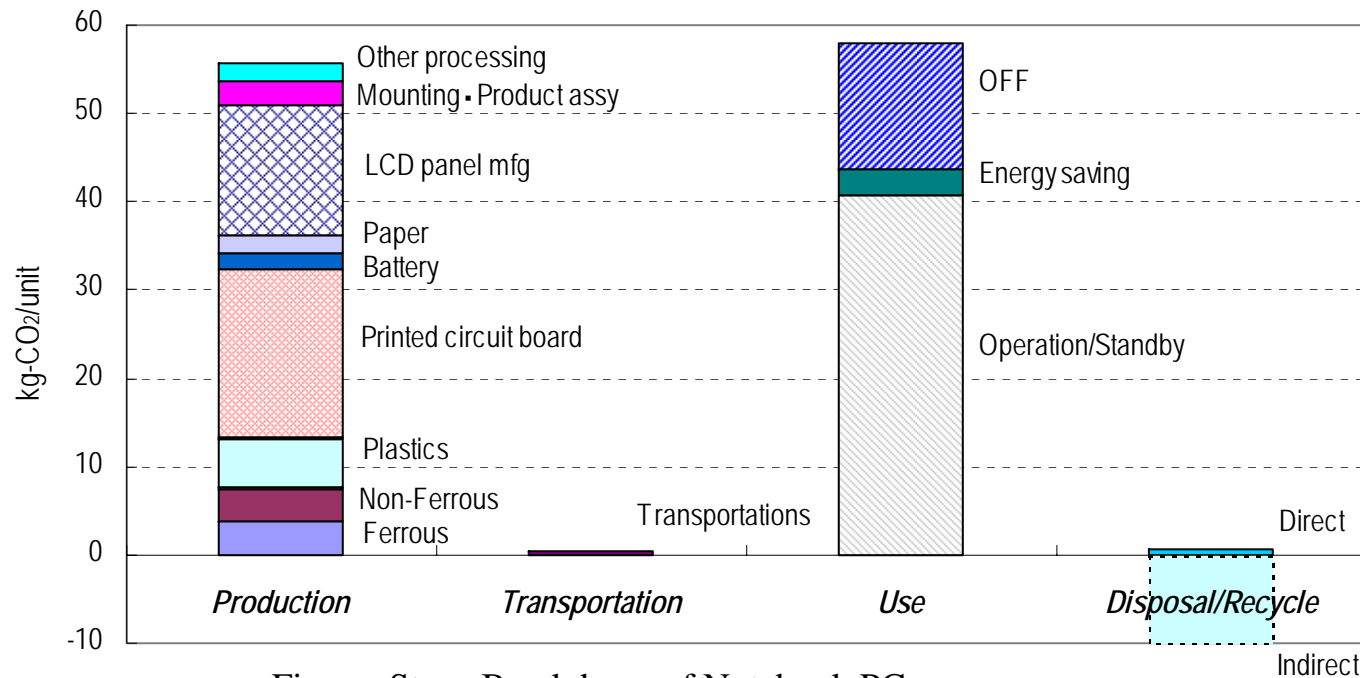


Figure: Stage Breakdown of Notebook PC



Production stage is as high as Use stages

- due to...
- the high manufacturing loads of semiconductor and LCD panel
 - the low electricity consumption during the operation and standby mode
 - the short replacement cycle

⇒ Application of environmentally benign manufacturing processes for **semiconductor** and **LCD panel** will contribute to reduce the total CO₂ emission

⇒ Electricity reduction during OFF mode is another challenge for further reduction

Stage Breakdown of Desktop PC

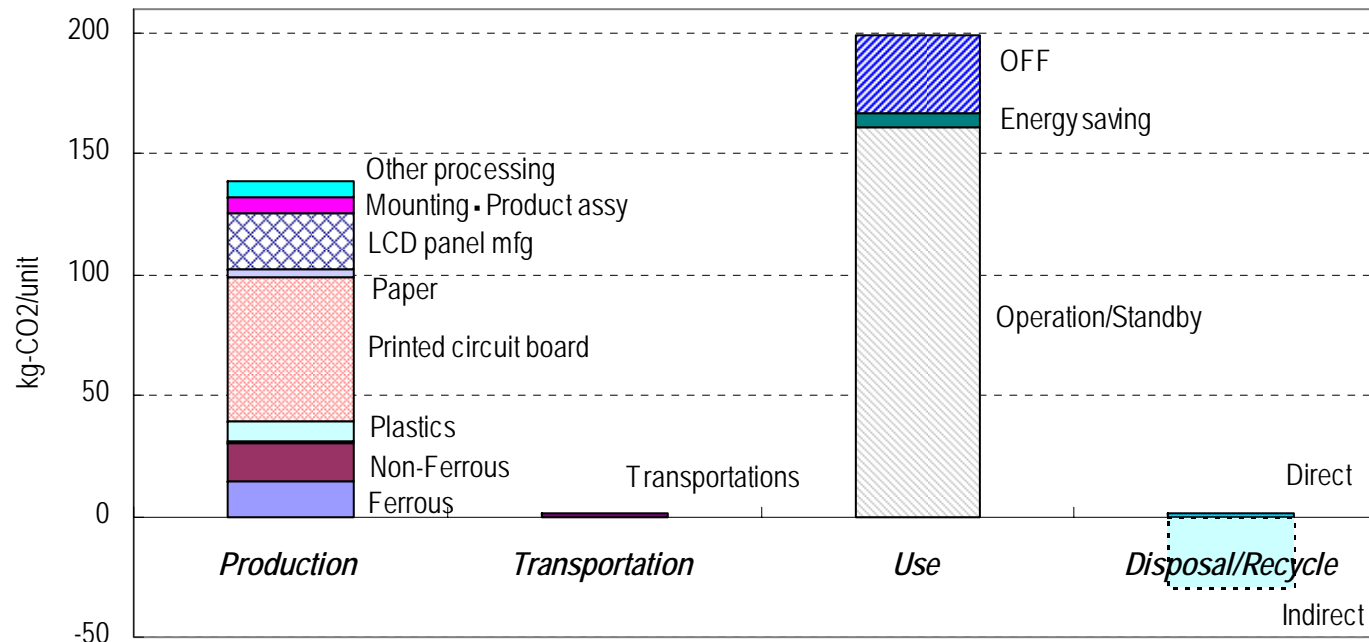


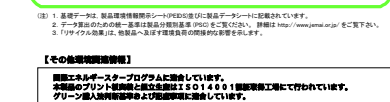
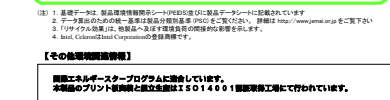
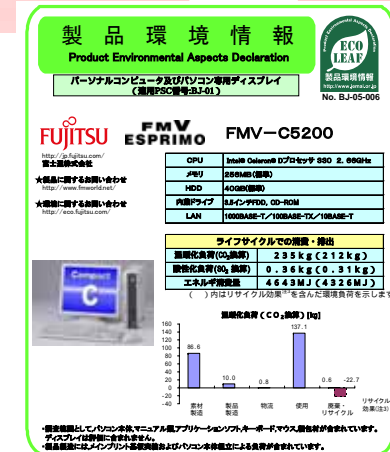
Figure: Stage Breakdown of Desktop PC

• Use stage is the highest

-contributes more than 60% of the total emission

-Energy saving capabilities is not as significant as portable products

⇒ More efforts can be made to reduce the electricity consumption especially in the operation/standby mode.



Application of Social Cost [EXTRA]

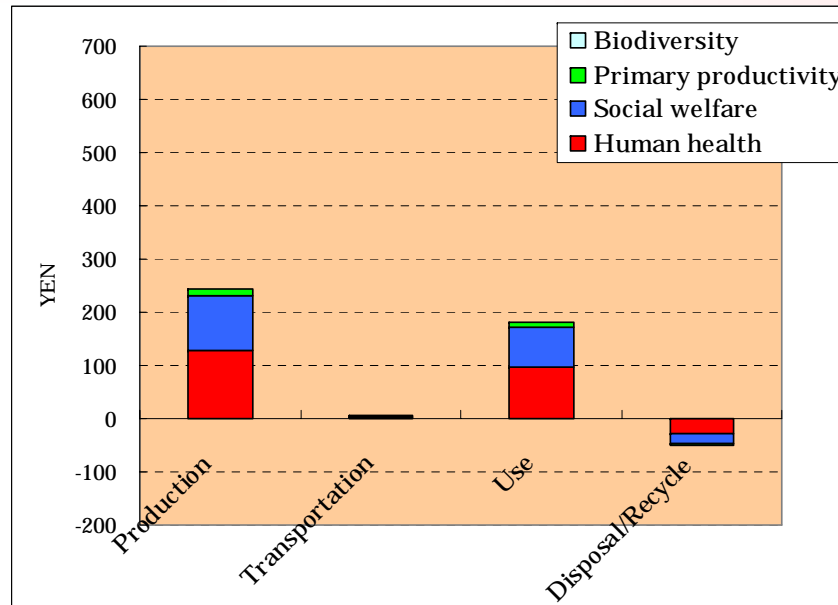


Figure: Social Cost of Notebook PC

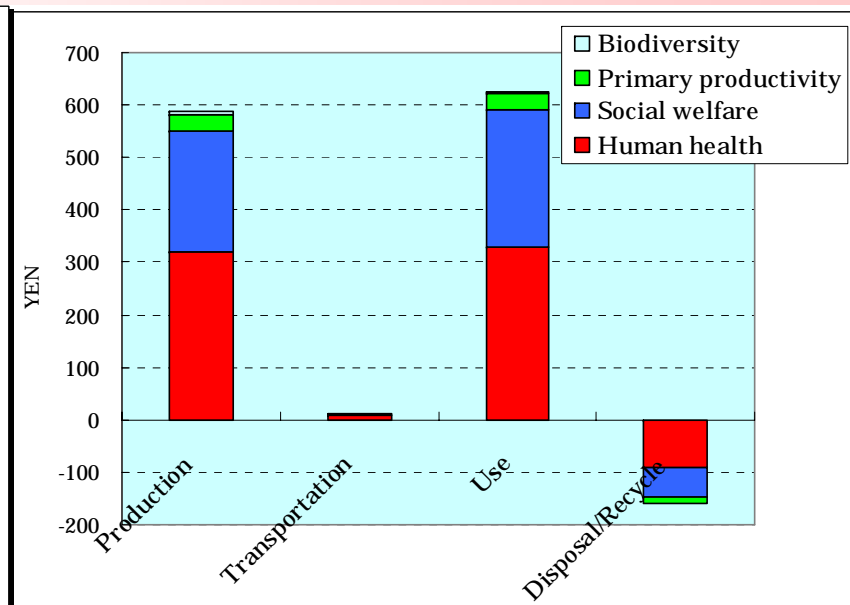


Figure: Social Cost of Desktop PC

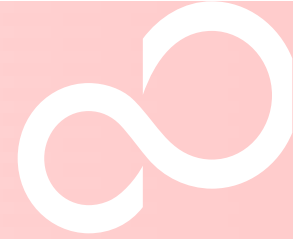
- Life cycle impact assessment method based on endpoint modeling* (**LIME**) is applied.

*Developed by the National Institute of Advanced Industrial Science and Technology

- Human health and Social welfare are the major elements of social costs.
- As a result, social costs of Notebook PC is **¥383**, whereas Desktop PC is **¥1,080**.

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Conclusion



- Data collection from global supply chain is the key issue even in the framework of LCA.
- Environmentally significant stage of notebook PC is different from that of Desktop PC, thus required different solutions.
- Manufacturing of LCD panel and printed circuit board, and electric consumptions during operation/standby and off mode are the key factors to reduce environmental loads of PCs.

