

The Eco-efficiency Seminar 2004/12/09



IT and Eco-efficiency

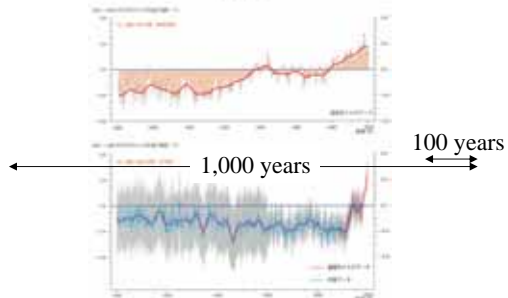
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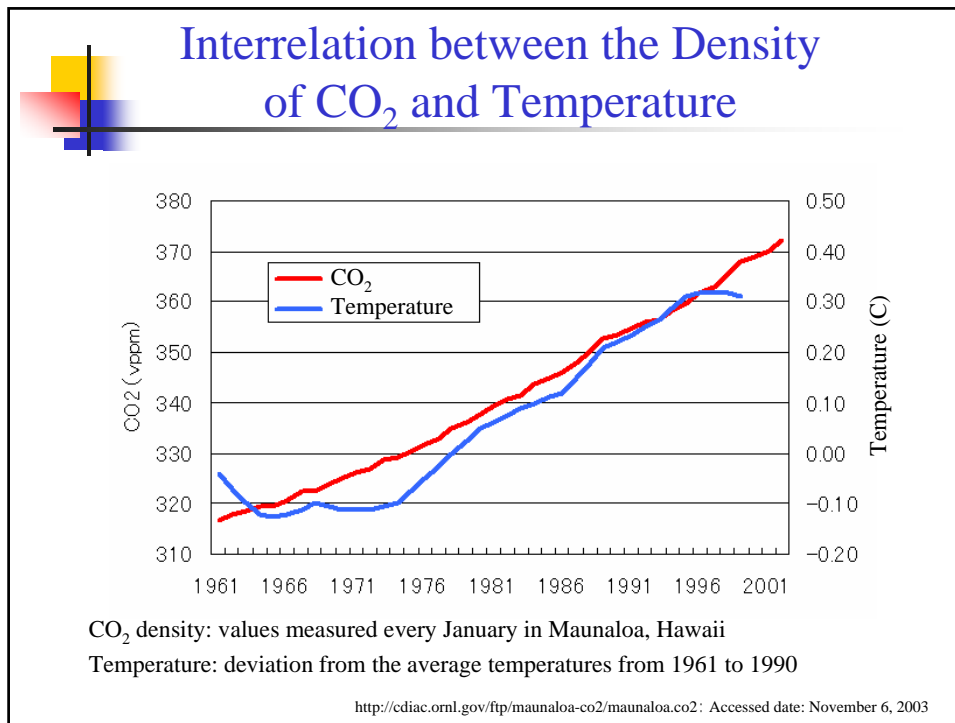
Aggravation of Environmental Problems of the World

Global ground temperature changes

140 years



Source: Inter-government Panel on Climate Changes (IPCC) Report, Ver.3

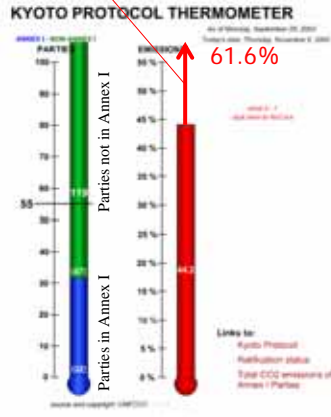


History of the Conferences of Parties to the United Nations Convention on Climate Change (COP)

March 1994	Enforcement of the United Nations Framework Convention on Climate Change (UNFCCC)
December 1997	Adoption of the Kyoto Protocol (COP3)
November 1998	Adoption of the Buenos Aires Plan of Action on Technical Cooperation among Developing Countries (BAPA) (COP4) The agreement was made on proceeding with operations, aiming for an agreement on concrete systems concerning emission trading at COP6.
November 2000	COP6 (in Haag) It aimed for earlier enforcement of the Kyoto Protocol.
November 2001	COP7 (in Marrakech) The rules regarding enforcement of the Kyoto Protocol were decided.
November 2002	COP8 (in Japan) The Kyoto Protocol was ratified.

Movements Concerning COPs

November 5, 2004 President Putin signed the Kyoto Protocol ratification bill.
 September 30, 2004 The Russian Cabinet decided to ratify the Kyoto Protocol.
 November 18, 2004 Russia entrusted the ratification instrument of the Kyoto Protocol to the U.N.
 February 16, 2005 The Kyoto Protocol came into effect
 (after 90 days from the conclusion of the enforcement terms).

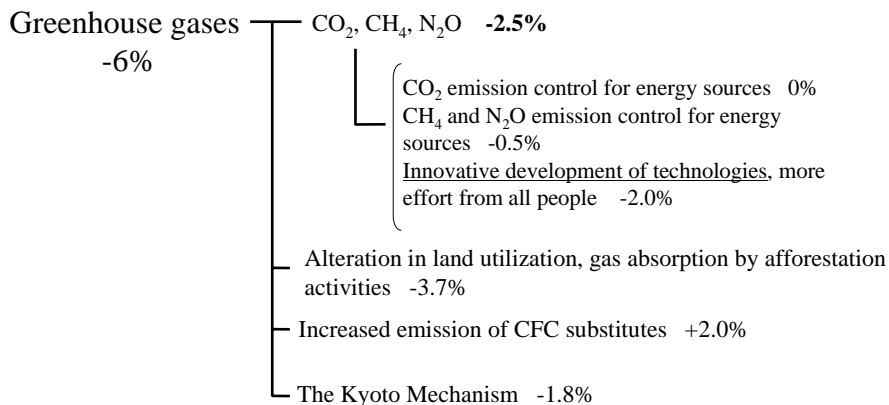


Enforcement terms


Number of the countries agreed: 55 or more

Emission rate: 55% or more

Japan's Script for the Reduction of Greenhouse Gas




Source: the interim report by the Demand and Supply Section, the General Energy Research Committee, the Agency for Natural Resources and Energy



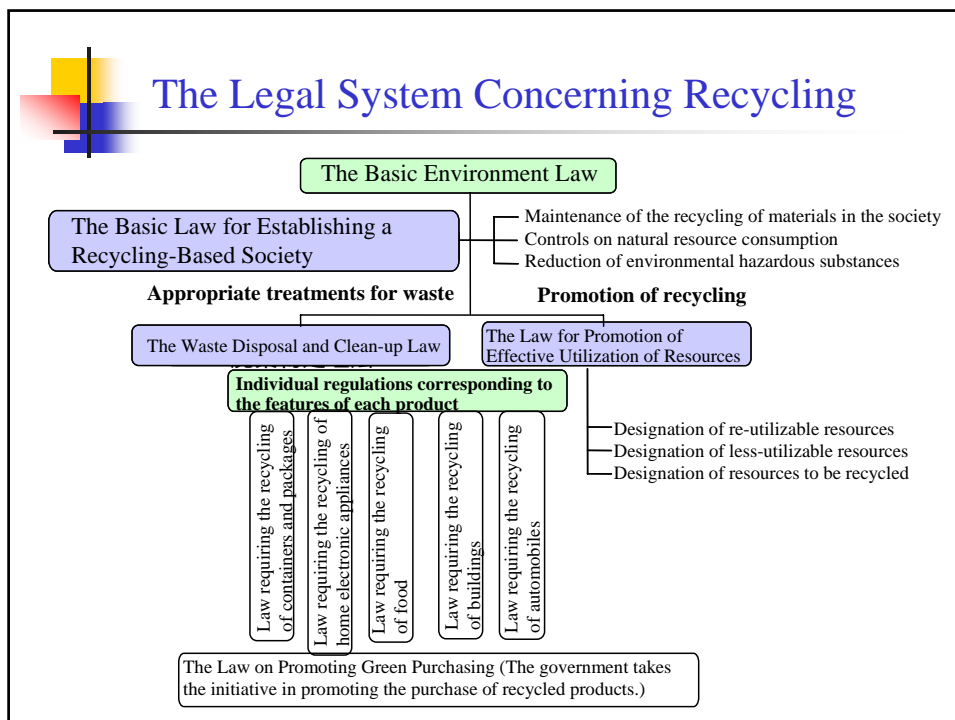
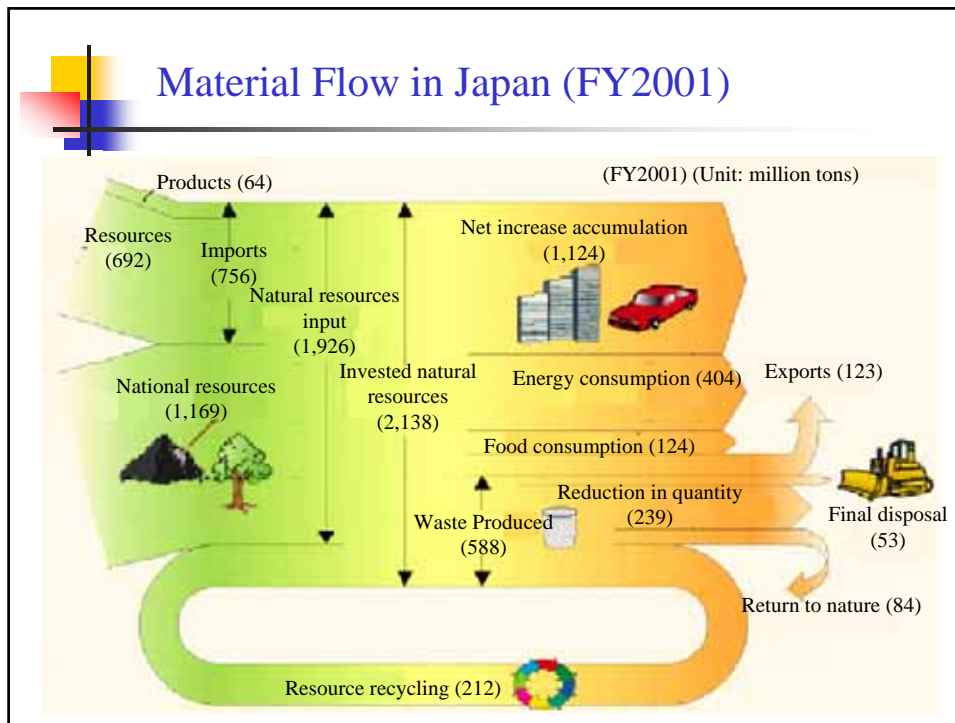
Summary of the Kyoto Mechanisms

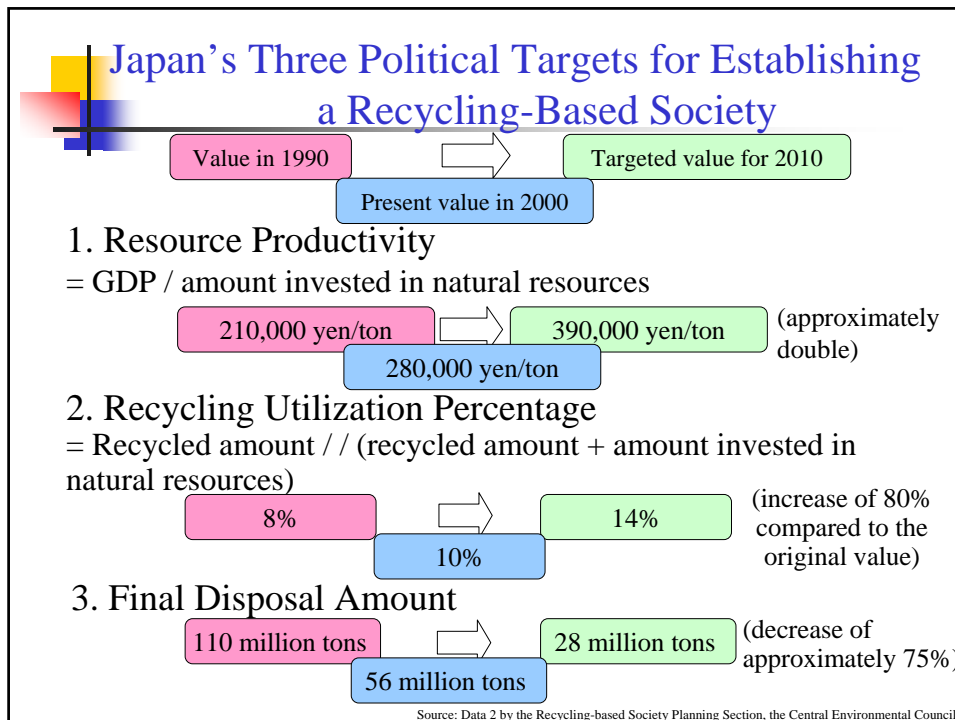
1. Introduction of Emission Trading (ET)
2. Introduction of Joint Implementation (JI)
3. Introduction of Clean Development Mechanism (CDM)



Emission Trading

1. History: J.H. Dales proposed it in Canada, for the improvement of water quality.
The permitted limit (cap) was set, and the emission rights were distributed (traded).
Cap and Trade
2. Emission distribution
 - (1) auction
 - (2) grandfatheringThe “grandfathering clause” was in effect in southern states in the U.S. until 1915.
3. Samples of emission trading
SO₂ Allowance Trading Program 1990
-Cap and Trade type -grandfathering

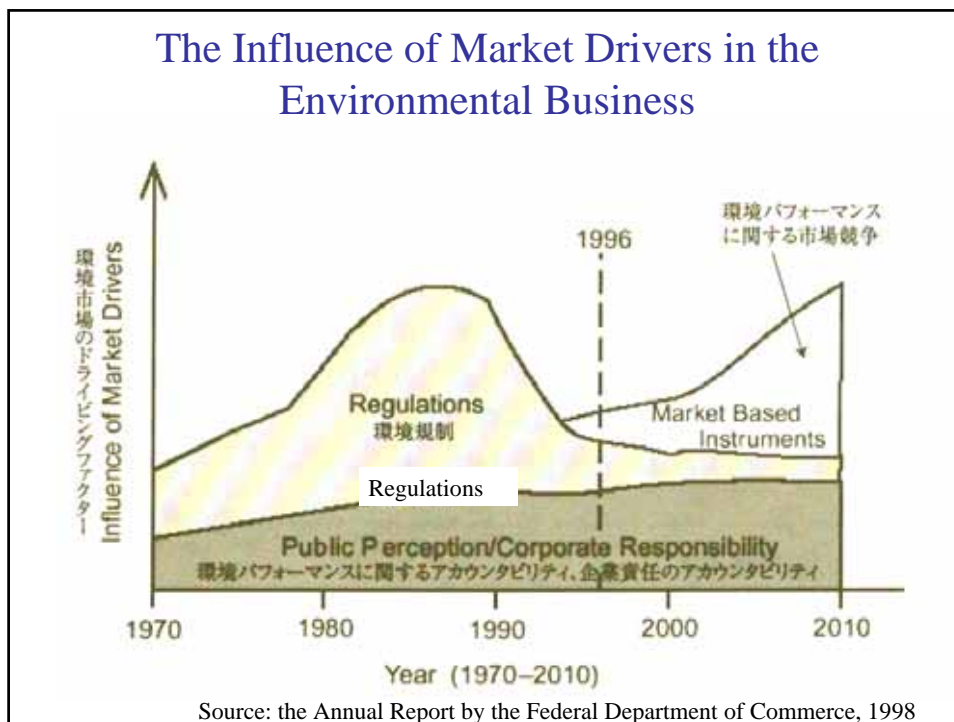




The Definition of Environmental Business

- There is no unified definition yet.
- In a wide sense, all the industries concerned with environmental matters are included, though it is hard to distinguish environmental businesses from non-environmental ones by the definition.
- In a narrow sense, generally, it means the industries dealing with waste to the air/water/ground.






In this presentation, environmental businesses in a wide sense are discussed.
Almost all the industrial sectors are involved in environmental business.



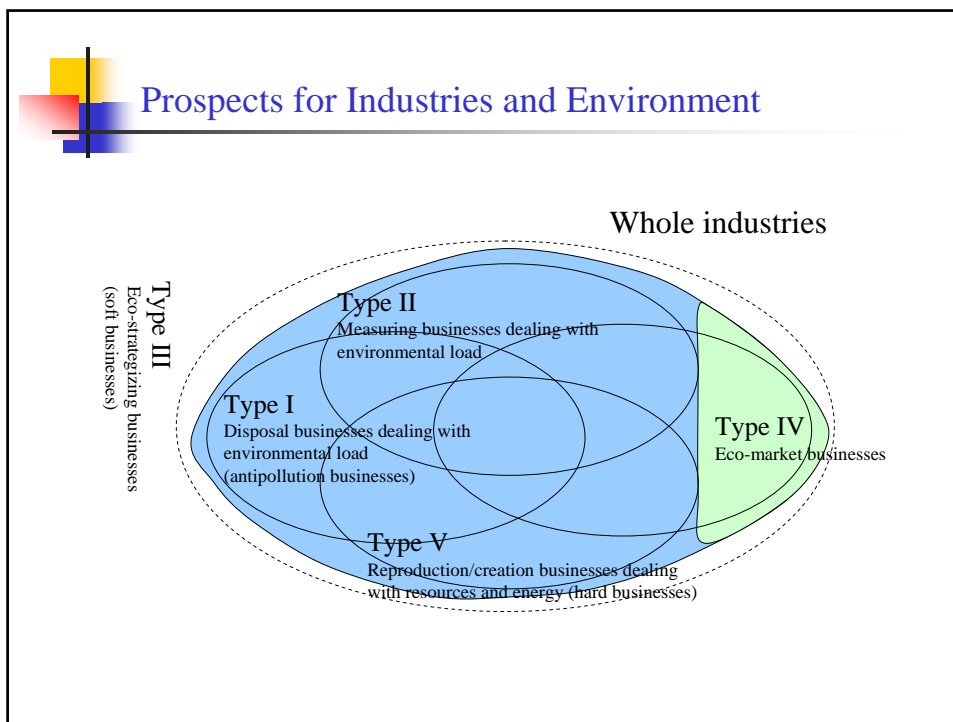
Classification of Environmental Businesses

- Type I : Disposal businesses dealing with environmental load (antipollution businesses)
e.g. recycling of unused cars - conversion to IT (Net)
- Type II : Measuring businesses dealing with environmental load
- Type III : Eco-strategizing businesses (soft businesses)
e.g. improvement of eco-efficiency, green purchasing, eco labels, and eco funds
- conversion to IT
- Type IV : Eco-market businesses
e.g. emission trading and CDM - conversion to IT
- Type V : Reproduction/creation businesses dealing with resources and energy (hard businesses)
Natural energies, energy saving, and renewal of resources

Expansion of the Environmental Business Market (Type I) in Japan

	Market size (hundred million yen)		labor force (workers)	
	FY1998	FY2010	FY1998	FY2010
Eco-analytical devices	300	400	1,290	1,080
Antipollution devices 	11,690	15,760	18,610	19,370
Waste disposal/recycling devices 	4,870	7,120	7,740	8,940
Facility construction (developing land for waste filling) 	1,660	340	1,490	310
Restoration and creation of a desirable environment 	17,350	54,850	62,020	192,840
Eco-related services 	2,230	7,360	9,880	28,610
Drainage/sewage disposal	920	12,120	12,420	42,500
Waste disposal/recycling	407,220	531,750	1,183,310	1,332,390
Eco-harmonious products	34,970	43,760	62,620	77,760
Total	481,210	673,460	1,359,380	1,703,700

Source: WG1 references by the Recycling-based WG, the Industrial Structure Council



Eco-efficiency



Type III: Eco-strategizing businesses
(concerned with the eco-efficiency)

Recent trends relating to eco-efficiency indexes

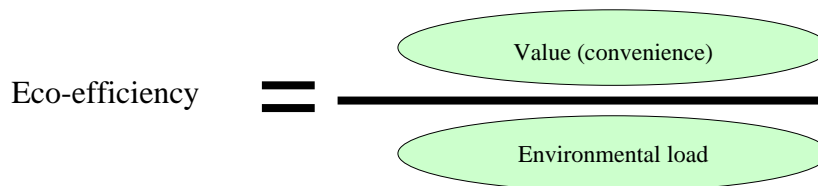
- The Japan Environmental Management Association for Industry created the guidelines for eco-efficiency indexes.
- The Japan Eco-efficiency Forum was established in October 2004.
- Regarding outside Japan, eco-efficiency was proposed by the Wuppertal Institute in Germany in the early 1990s.
 - * It published the “Factor 4.”

Eco-efficiency



The Definition of Eco-efficiency

Numerator = value (convenience),
denominator = environmental load



The current state of eco-efficiency:

80%: Companies (manufacturers) operating eco-friendly businesses PR

(Source: the second council report, 2002. the Association for Resource Productivity, Eco-efficiency and Industrial Environment Management)

At present, unified/standardized criteria are being investigated.

Eco-efficiency

Factor

- Factor evaluates the improvement of the eco-efficiency.

$$\text{Factor} = \frac{\text{Eco-efficiency (on FY 2004)}}{\text{Eco-efficiency (on FY 19xx)}}$$

product to be evaluated

base product

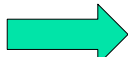
- The current state of factor:
8%: companies adopting the product factor (excluding constructors)

Source: the second council report, 2002.
the Research for Resource Productivity and Eco-efficiency,
Japan Environmental Management Association for Industry

Eco-efficiency

Analyses of the Eco-efficiency Index (1)

- Objects of Analysis**
 - Each product or service
 - e.g. by Fujitsu
 - Value (convenience) functions of the product
 - Environmental load CO₂ emissions in the life cycle
 - All corporate activities
 - e.g. by Toshiba
 - Value (convenience) sales
 - Environmental load Environmental hazardous substances
 - Total environmental load converted into monetary value (Calculated with environmental accounting)
 - Society as a Whole
 - e.g. by the Environment Agency
 - Value (convenience) GDP
 - Environmental load Amount invested in natural resources

 System Boundary (the term used in LCA)

Eco-efficiency

Analyses of Eco-efficiency Index (2)

Terminology

- Absolute value**
 - e.g. by Ricoh
 - Value (convenience) / total profit on sales
 - Environmental load sales index (hundred million yen/ELU) / Environmental load
 - Total amount of environmental load
 - Various indexes of environmental load produced in the lifecycle are integrated by conversion into CO₂ emissions, in the accordance with the EPS by the Environmental Institute of Sweden.
- Comparison value (factor)**
 - e.g. by Matsushita Electronic Industries
 - New Product / released on FY 2002
 - Existing product / released on FY 1995

Eco-efficiency

Typology for the Eco-efficiency Index

- Value (convenience)
 - Environmental load
- Functions
 - Economic values
 - Physical amounts

Examples →
- Invested/emitted amounts
 - Inside/outside the business scope
 - Integrated/individual impact

Examples →

Eco-efficiency

Typology for the Eco-efficiency Index (for values)

Value (convenience)

- Capacities
 - Toilets (area), PC (CPU + disk capacity)
 - Electric appliances (performance × durability), refrigerators (capacity)
 - Washing machines (capacity), printers (printing speed × graphic quality)
 - Electric appliances (fixed at 1 because there is no appropriate method for qualification)
 - Food containers (shut-off function against oxygen and vapor)
 - Communication devices (maximum transmission speed)
- Economic values
 - Economic appliances, paper, electric power, etc.
- Physical amount
 - Paper, paints, medicines, cement, lenses, watches, etc.

Adoption case

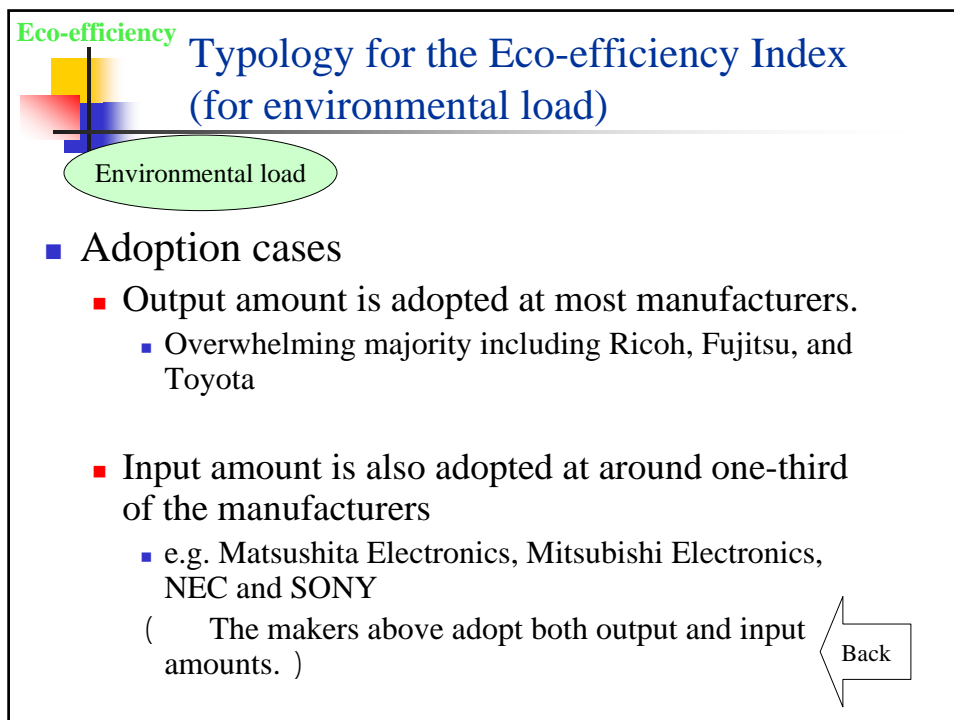
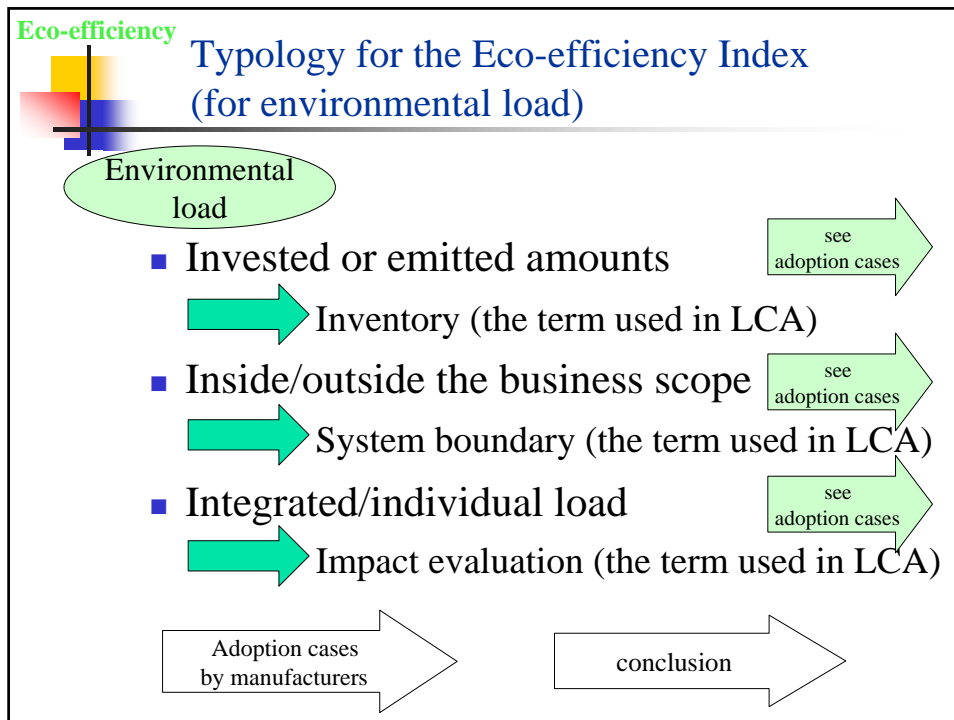
Eco-efficiency

Typology for the Eco-efficiency Index (for values)

Value (convenience)

- Adoption cases
 - Capacity units are adopted at most manufacturers.
 - e.g. INAX, Matsushita Electronics Industries, and Fujitsu
 - Economic value units are also adopted at around one-third of the manufacturers.
 - Ricoh, NEC, Toshiba
 - Physical amount units are still in the examination stage.
 - Immovable unit (always fixed as 1)
 - Mitsubishi Electronics

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Eco-efficiency Typology for the Eco-efficiency Index
(for environmental load)

Environmental load

■ Adoption cases

- The indexes adopted at around half of the manufacturers deal with inside scope only.
 - e.g. NEC (I/O analysis, another index is under examination for other uses) and Toyota
- The indexes adopted at around half of the manufacturers deal with both inside and outside scopes.

(Including evaluations in the lifecycle, or in the stages of use and disposal)

 - e.g. Mitsubishi Electronics, Fujitsu, Matsushita Electronics, and Ricoh
- The index that deals with outside the business scope is still in the stage of examination.

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Eco-efficiency Typology for the Eco-efficiency Index
(for environmental load)

Environmental load

- Adoption cases of integrated indexes are adopted at about one-third of the manufacturers
 - Mitsubishi Electronics (resources, energy, and chemical substances)
 - Ricoh (resources, water, chemical substances, and emission to air/water)
 - INAX (new resources, energy consumption for production/use, and mass)
(Integrated index is variously adopted at manufacturers with their original ideas.)
- The adoption cases of independent environmental load are noticeably observed.
 - CO₂: e.g. SONY, NEC, Matsushita Electronics, and Fujitsu
 - Resources: e.g. SONY, NEC, and Matsushita Electronics
 - Wastes: e.g. SONY, NEC, and Matsushita Electronics
 - Chemicals: e.g. SONY and Matsushita Electronics
 - Water: e.g. SONY

Eco-efficiency


Merits and Demerits of Factors by Type

	Merits	Demerits
Unified sole factors	<ul style="list-style-type: none"> The synthetic improvement is instantly comprehensible for observers outside the company (information acquiring side). 	<ul style="list-style-type: none"> The validity of the integrated method is still not satisfactory. It is not easy to popularize the concept of integration.
(Multiple) individual factors	<ul style="list-style-type: none"> It is easier for the companies (information disclosing side) to create. The individual improvement of each environmental factor is comprehensible for observers outside the company (information acquiring side). 	<ul style="list-style-type: none"> The synthetic improvement is not so comprehensible. Even when one factor improves significantly, it is still necessary to check other factors individually.

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Eco-efficiency as an Index

- Evaluation of corporate efforts to improve the capacities of products, as well as to reduce environmental load
 - Reasonable contributions to the environment are going spread.
- The comparison of improvements with the product produced by the manufacturer in the base year.
 - The comparison of improvements is difficult on an absolute scale.
- Evaluation with Factors (Target Values)
 - 10+ ~ : , 5+ ~ : , 1+ ~ :



Future Activities by the Japan Eco-efficiency Forum

- Establishment of indexes appealing for participant companies
 - Indexes reflecting corporate efforts
 - Indexes regarded as a selection standard by consumers
 - Indexes promoting purchase substitution

- Establishment of indexes appealing for consumers
 - Comprehensiveness
 - Substantiality