



# Green Manufacturing for Global Competitiveness

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**Green Purchasing Network (GPN), Japan**  
**International Green Purchasing Network (IGPN)**









# What is “Green Purchasing”?



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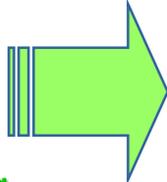
Balancing  
Q C D and E

**Green purchasing**

# Find Fundamental Solution by Changing the Input

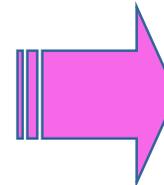
## Make the input green

Reduce input  
Non-hazardous material  
Easy-to-recycle  
Energy saving  
Resource saving



## Reduce the output

Waste  
Pollution  
Hazardous  
substances  
Carbon  
Dioxide



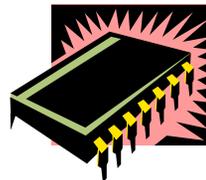
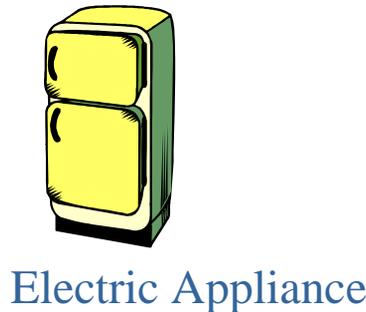
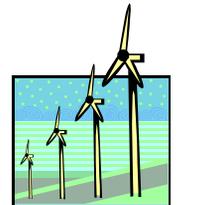
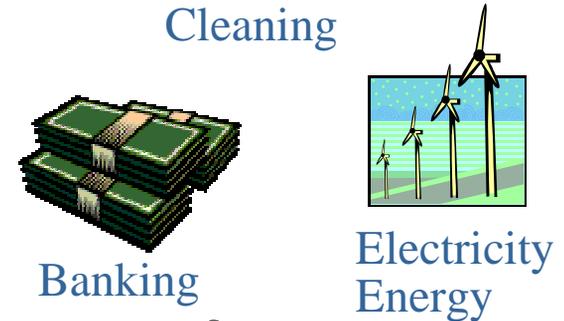
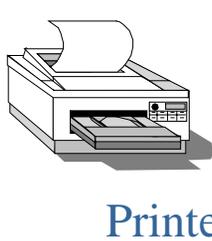
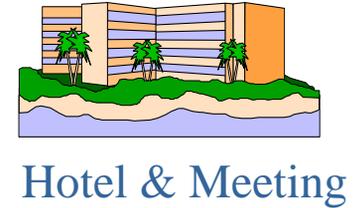
Recycled  
material



Recycling

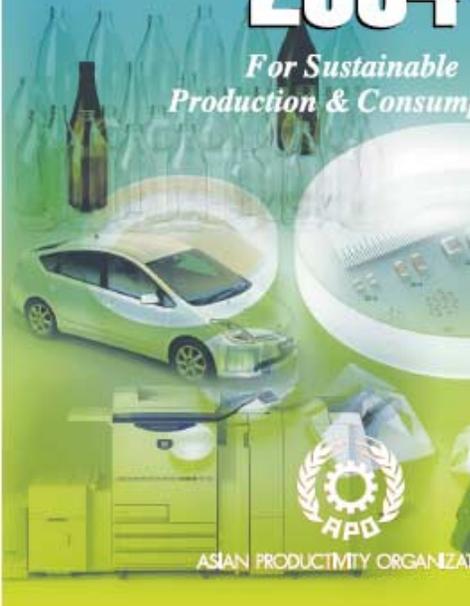


# Target fields of Green Purchasing



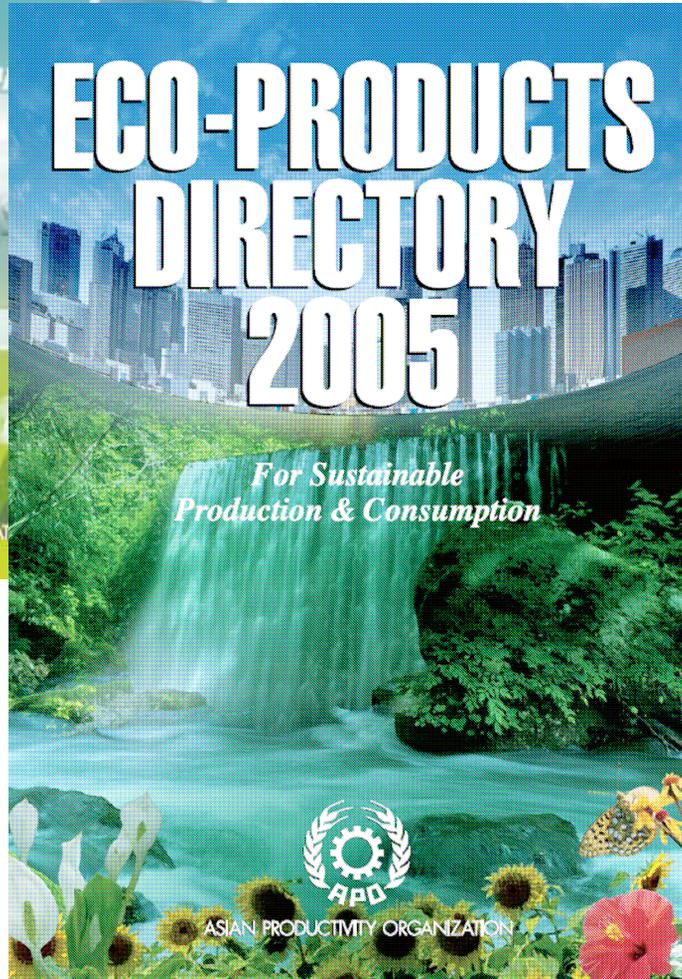
# ECO-PRODUCTS DIRECTORY 2004

*For Sustainable  
Production & Consumption*



# ECO-PRODUCTS DIRECTORY 2005

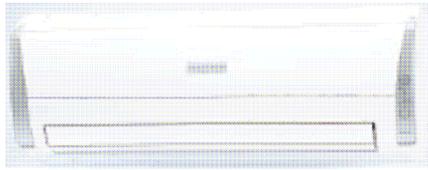
*For Sustainable  
Production & Consumption*



- This directory was edited by Prof. R. Yamamoto and published by the Asian Productivity Organization (APO) in 2004 and 2005.
- This databook includes about 700 eco-materials, eco-components, and eco-products manufactured in Japan.

# Examples of eco-products

## Home electric appliances



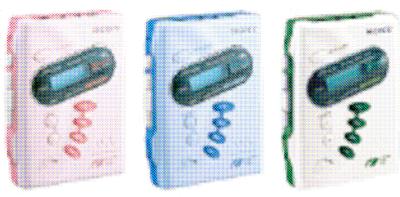
Toshiba Energy saving air conditioner



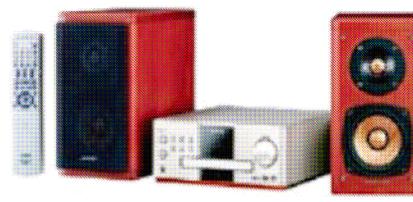
Victor video camera



Cassette with recycled resin



Sony Walkman using bio-plastic



Victor Compact DVD system



Liquid crystal color television



Victor Digital LCA TV



Sharp Plasma-cluster Ion Air purifier



Sony Notebook computer

# Examples of eco-products

## Home electric appliances



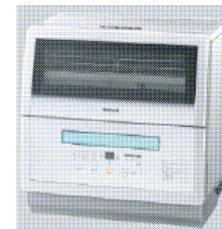
Toshiba Aero-cyclone vacuum



Sharp Washer and dryer



Water-saving dishwasher



Induction heat stove



Compact fluorescent lamp



Sharp Plasma-cluster Ion refrigerator



Sanyo water heater



Solar-powered charger



Home sewing machine



Mitsubishi FHT fluorescent lamp

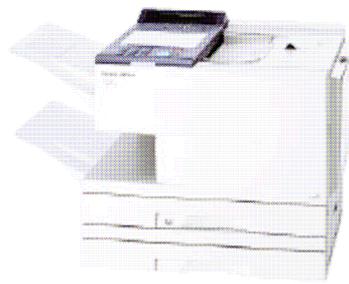


# Examples of eco-products

## OA/IT equipments



NEC Lightest Fax



Panasonic high performance fax



NEC Multi-functional copier



Fuji Digital multi-functional machine



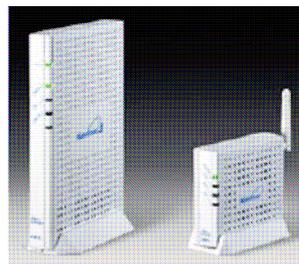
Canon Energy saving scanner



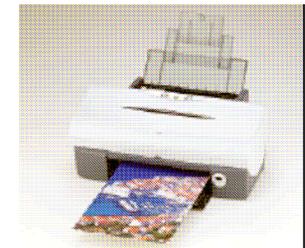
NEC Water-cooled computer



Kokuyo Computer mouse  
made from recycled ABS



NEC Wireless broadband router



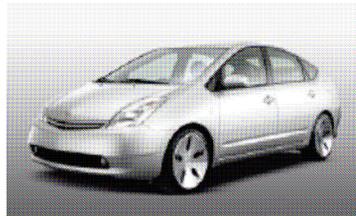
Canon Inkjet printer  
using recycled plastic

# Examples of eco-products

## Automobiles



Honda Fuel-cell car



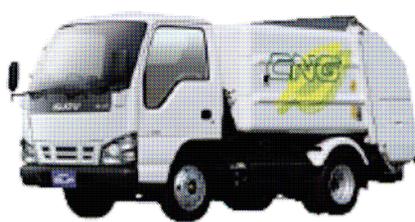
Honda Hybrid power car



Isuzu Giga



Natural gas Truck



Isuzu Elf CNG Truck



New Eco-body Truck Model



Car Navigation system



Yamaha Cygnus X scooter

# Examples of eco-products

## Machines



Ebara 850VA fuel cell system



Ebara wind generator



JSW cogeneration system



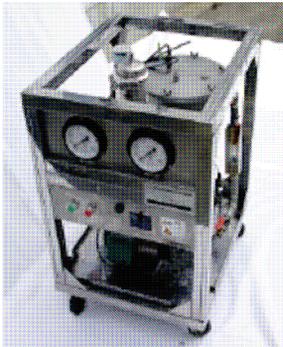
Komatsu construction crusher



JFE bigadan biogas system



Yamatake green Bio-Tower



Asashi oil filter



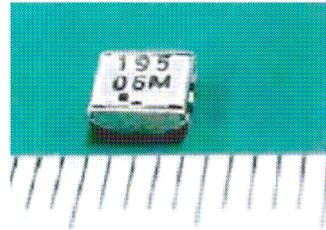
Hitachi laboratory automatic analyzer

# Examples of eco-components

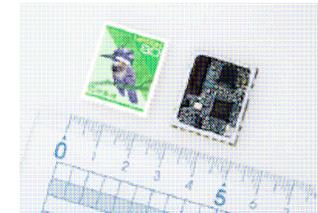
## Global warming



High performance roofing "ecolony"



4mm square isolator



Silicon-based TV tuner



GS ceramic halide lamp



Lightweight hub-unit bearing



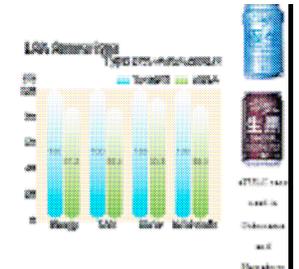
Magnet wire



Recycled toner



RENEIS engine



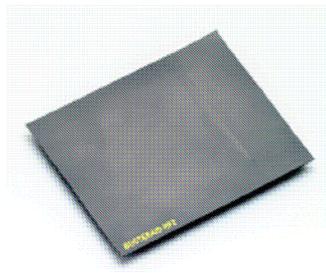
ATULC can

# Examples of eco-components

## Hazardous-free components



Murata lead-free transparent ceramics



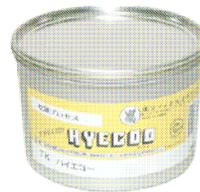
NEC halogen-free Noise suppression sheet



ALMT Cd-free electrical contact



Pb-free electric wire



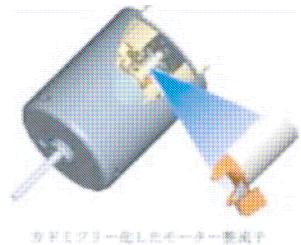
Toyo soybean oil-based ink



Toyo water-based ink



Toyobo water-based printing plate



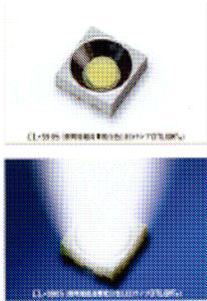
Mabuchi Cd-free motor



Furukawa halogen and lead-free electric wire

# Examples of eco-components

## Higher quality



Citizen high luminance LED



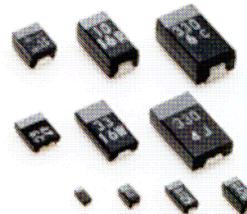
Cellular analog one chip



Nichicon advancing condenser



Nichicon power conditioner



NEC Tantalum chip capacitors



Sanyo Al-resin sash



Sekisui corrosion resistant house structure



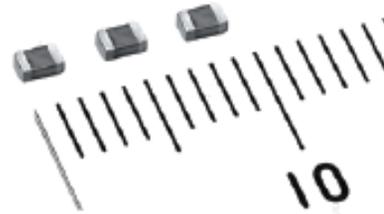
Nishimatsu FRP form

# Examples of eco-components

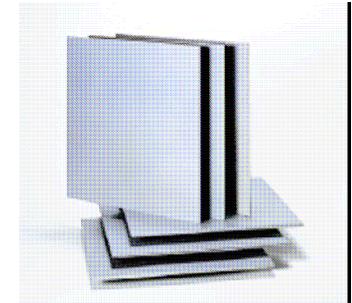
## Resource saving



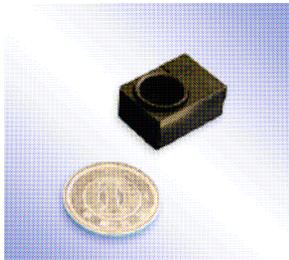
Ultra-small ceramic capacitor



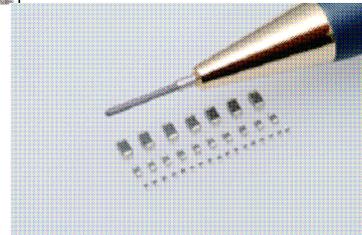
PTC thermistor



Obayashi Alcelite glass



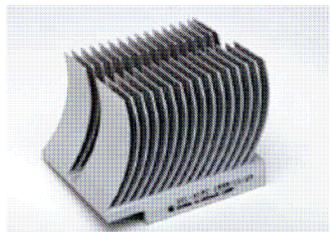
FDK actuator unit



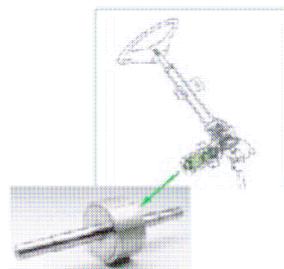
Taiyo high-loss inductor



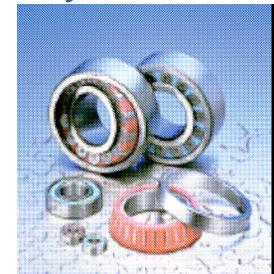
Taiyo recyclable feeder



Showa Denko heat sink



Neomax permanent magnet



NSK lube guard bearing

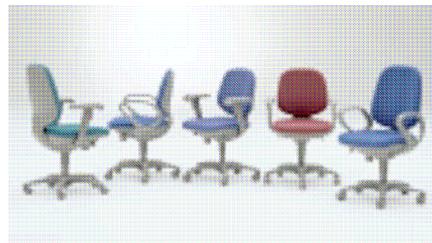


# Examples of eco-products

## Commodity



Table made from agriculture wastes



Recycled resin office chairs



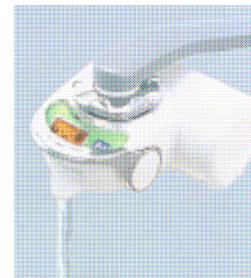
Clothes made from recycled plastics



Eco-hand soap



Bio-plastic spoon, fork and cup



Home water purifier



Bio-degradable diaper



Hyper Mat bedclothes



Hyper selan curtain

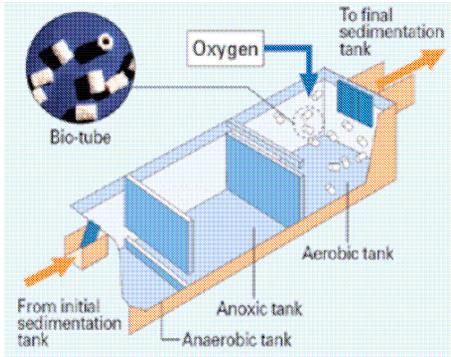


S-wood mouse pad



S-wood desk mat

# Eco-Metals



Bio-tube for sewerage treatment by JFE



Hitachi FINEMET® EMC

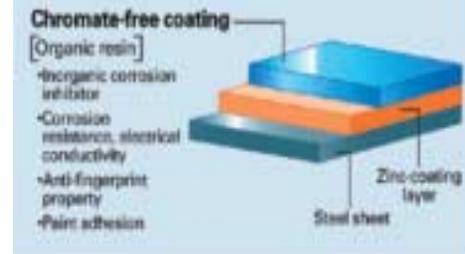


Eco-brass® of Sambo Copper Alloy



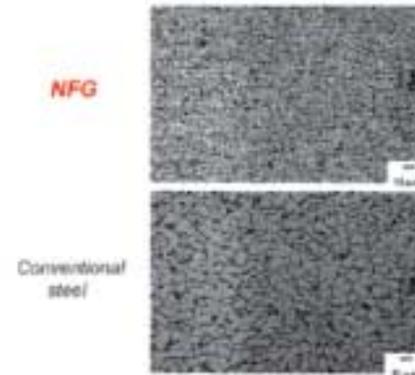
Mitsubishi Polycrystalline Silicon

## Layers of Chromate-free Coated Steel Sheets



JFE Cr-free coated steel sheet

Grain size of NFG is 1/3 smaller compared to Conventional steel.



Nakayama NFG® Ultrafine grained steel sheet



# Natural Materials



BioNature®

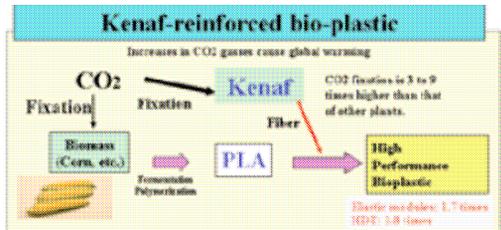
Kurabo Bio-Nature® fabrics



Industrial Hemp for textile fibers



“Hinokitiol” extracted from waste wood anti-microbicide

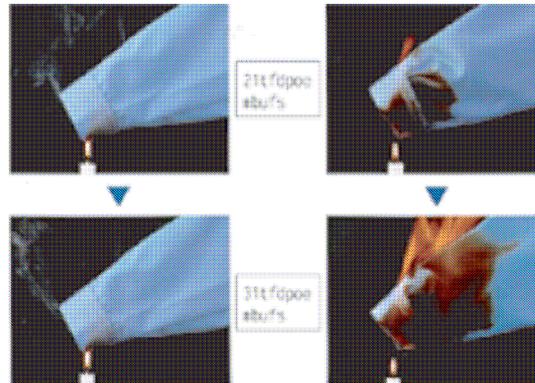


Kenaf plantation in Australia



Kenaf and bioplastic with kenaf fiber

NEC inflammable bioplastics for PC



Kurabo “BREVANO ECO” antistatic fabrics



LHT 100% recycled “Technical Wood”

# Eco-ceramics and glass



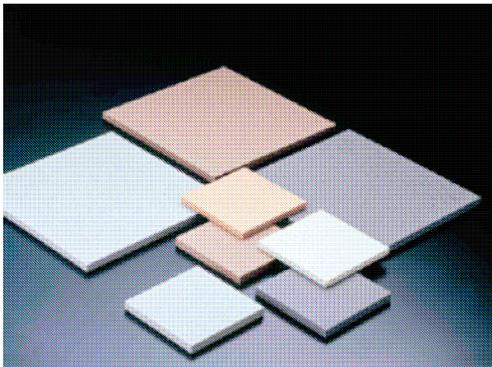
Nikon lead-free optical "Eco-glass"



Taiheiyo "Eco-cement"



Taiheiyo ST-coating material containing photocatalytic TiO<sub>2</sub>



Crystal Clay FP-series from waste glass



Kajima Artificial lightweight aggregate



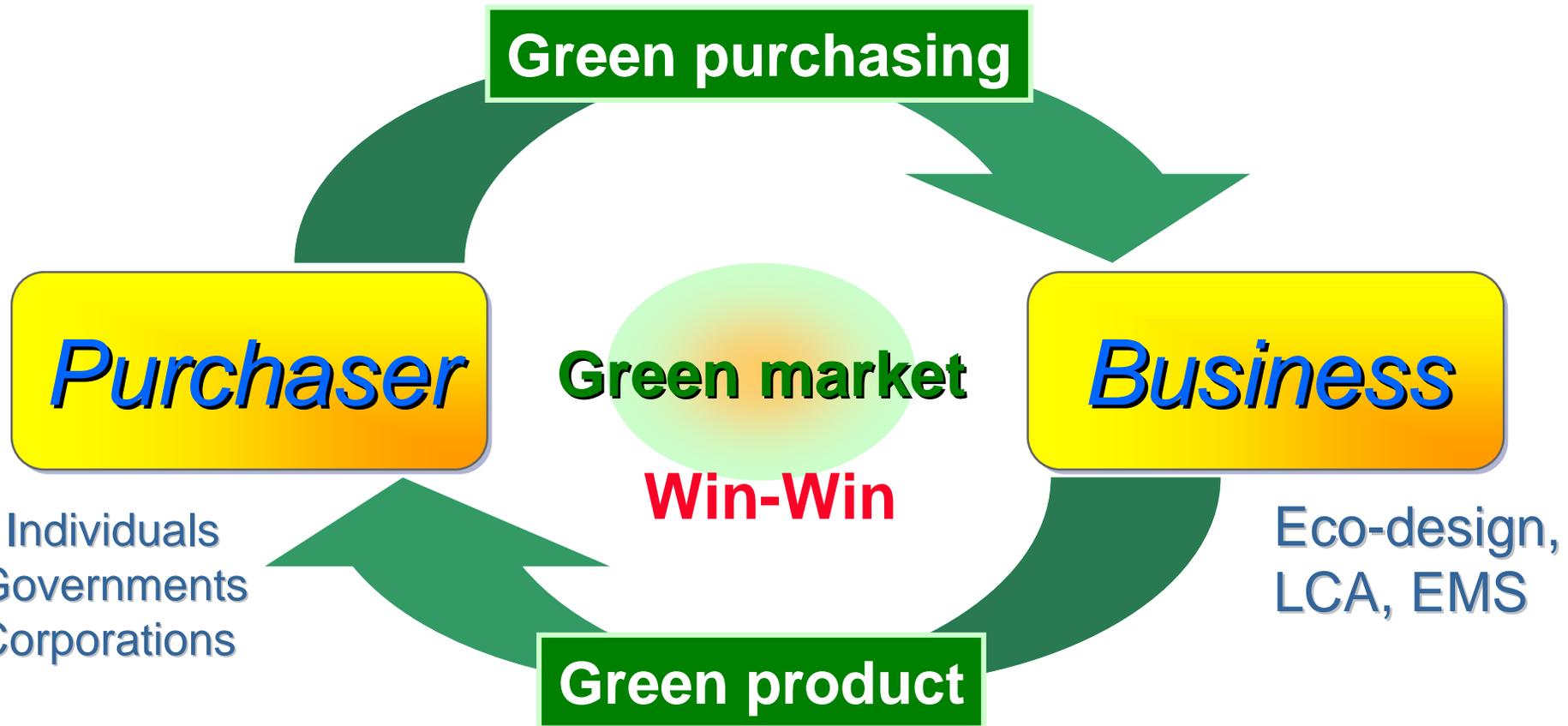
Baio "Katatumuri" soil conditioner



# Principles of Green Purchasing

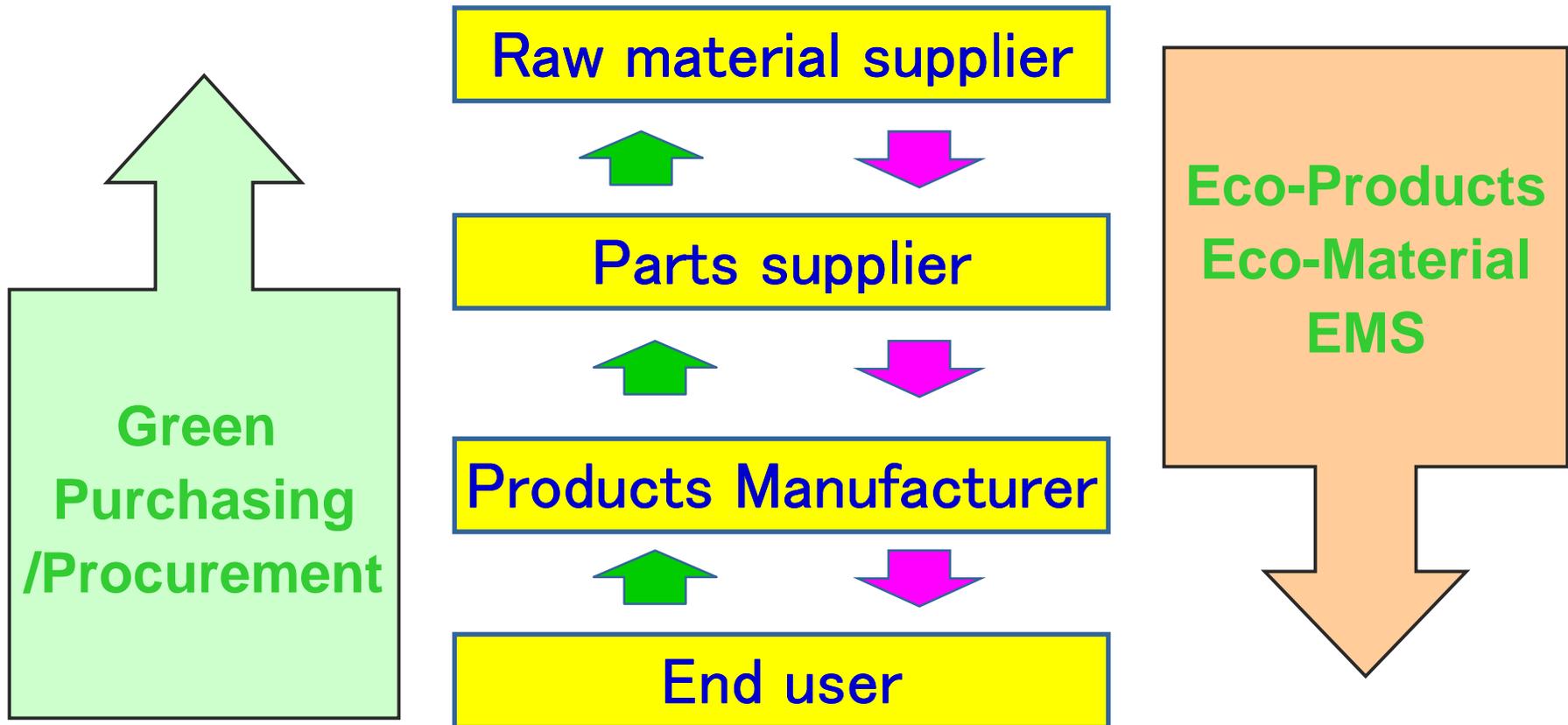
- **Principle 1** – Consider whether a product is needed before purchasing it or not.
- **Principle 2** – Purchase a product considering the various environmental impacts over its life cycle - from extraction of raw materials to disposal.
- **Principle 3** – Select suppliers who make a conscious efforts to care for the environment.
- **Principle 4** – Collect environmental information on products and suppliers.

# Green purchasing & Green Business



*Green Purchasing encourage environmentally conscious Management and eco-product development through the market*

# Greening Supply Chain



***To be competitive in the global market, all the businesses “must” enhance green manufacturing.***

# Green Purchasing Policies of Public Organizations

## Purchasing Power of Public Organizations

- **Europe:**

- Public purchasing: 1 trillion EURO/year
- Over 14% of GDP



- **US:**

- Federal government spends \$500 billion/year
- State/local governments spends \$400 billion/year



- **Japan:**

- National government spending: ¥14 trillion/year
- Local governments spending: ¥44 trillion/year
- Totally 17.6% of GDP



- **UN:** \$3 billion/year—value of business opportunities linked to UN direct/indirect spending: \$30 billion



# EU Green Purchasing Activities



- **Commission Interpretative Communication (2001)**  
on the Community law applicable to public procurement  
and the possibilities for integrating environmental  
considerations into public procurement
- **New Public Procurement Directives (March 2004)**
  - clarify possibilities for integrating environmental  
considerations at different stages of a public  
procurement procedure
- **Handbook on Environmental Public Procurement  
« Buying green! » (August 2004)**
  - give further explanations and best practice examples
- **General legal principles;**
  - Transparency, Non-discrimination, Link with subject  
matter of contract, mutual recognition of equivalent  
products /specifications/production methods/labels



# EU Green Purchasing Activities -2



- **European Green Procurement Database**
  - Covers more than 100 product and service groups
  - Provides key environmental aspects, and existing Eco-labels for the product groups
  - [http://europa.eu.int/comm/environment/green\\_purchasing/cfm/fo/greenpurchasing/](http://europa.eu.int/comm/environment/green_purchasing/cfm/fo/greenpurchasing/)
- **Status on green public procurement in EU;**  
Percentage of administrations that include environmental criteria for more than 50 % of their purchases (study in 2003)
  - Average in EU: 19%
  - Sweden: 50%, Denmark: 40%, Germany: 30%, Austria: 28%, UK: 23%

# US-EPA Green Purchasing Activities

- **Energy Star program (1992)**
- **Comprehensive Procurement Guidelines (1995)**
  - Promote purchasing recycled products
  - CPG Supplier Database
- **Farm Bill (2004)**
  - Encourage purchase of bio-based products
- **Environmentally Preferable Purchasing(EPP) program**
  - Based on “Executive Order 13101” (1998) which requires all the procurement officials to give preference to environmentally preferable products and services
  - **EPP Database**: Cover 53 products and service groups and link to various information sources
    - contract language, specifications, and policies
    - Environmental standards and guidelines
    - vendor lists of product brands
  - **Product focused EPP Guides, web-based training guide, Case studies, Pilot projects, role model of EPA**



# JAPAN Green Purchasing Activities

- **Green Purchasing Network (GPN)**



- Founded in 1996
- 2,800 members (2,200 companies, 300 governments, 300 NGOs)
- 15 Purchasing Guidelines, Product DB(12,000 products registered), Hotel DB, Award, Training/Seminar, etc.

- **Government - Green Purchasing Law**

- Action Plan for Greening Government Operations (1994)
- Green Purchasing Law enacted in 2000
- All the national institutions must draw up annual purchasing policy, implement, and report results.
- 201 items are designated with criteria

- **Eco Mark Program**

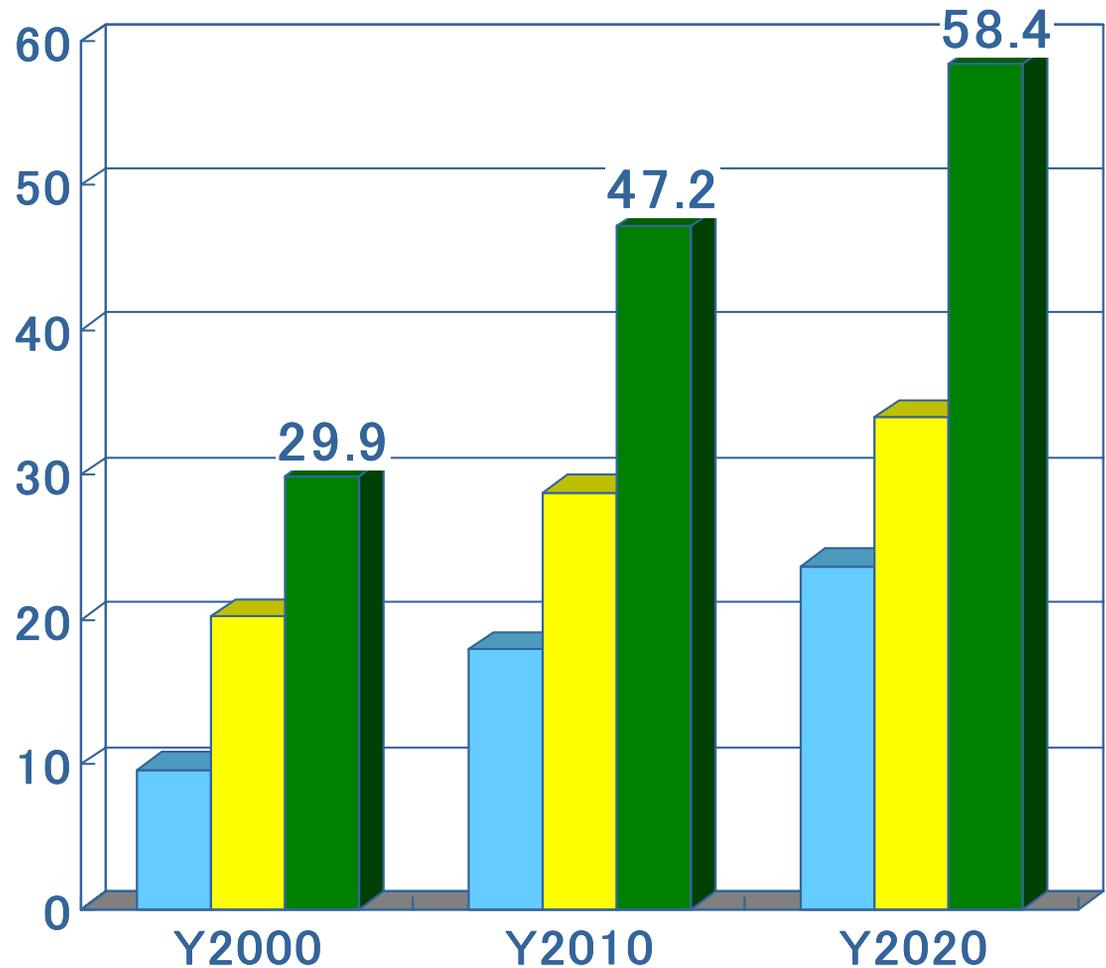
- Since 1989 by Japan Environment Association (JEA)
- 5,000 certified products within 45 categories



# Market Size of Environmental Business of Japan

Government estimates 47 trillion yen (4,200 billion US\$) in 2010.

(Trillion yen)

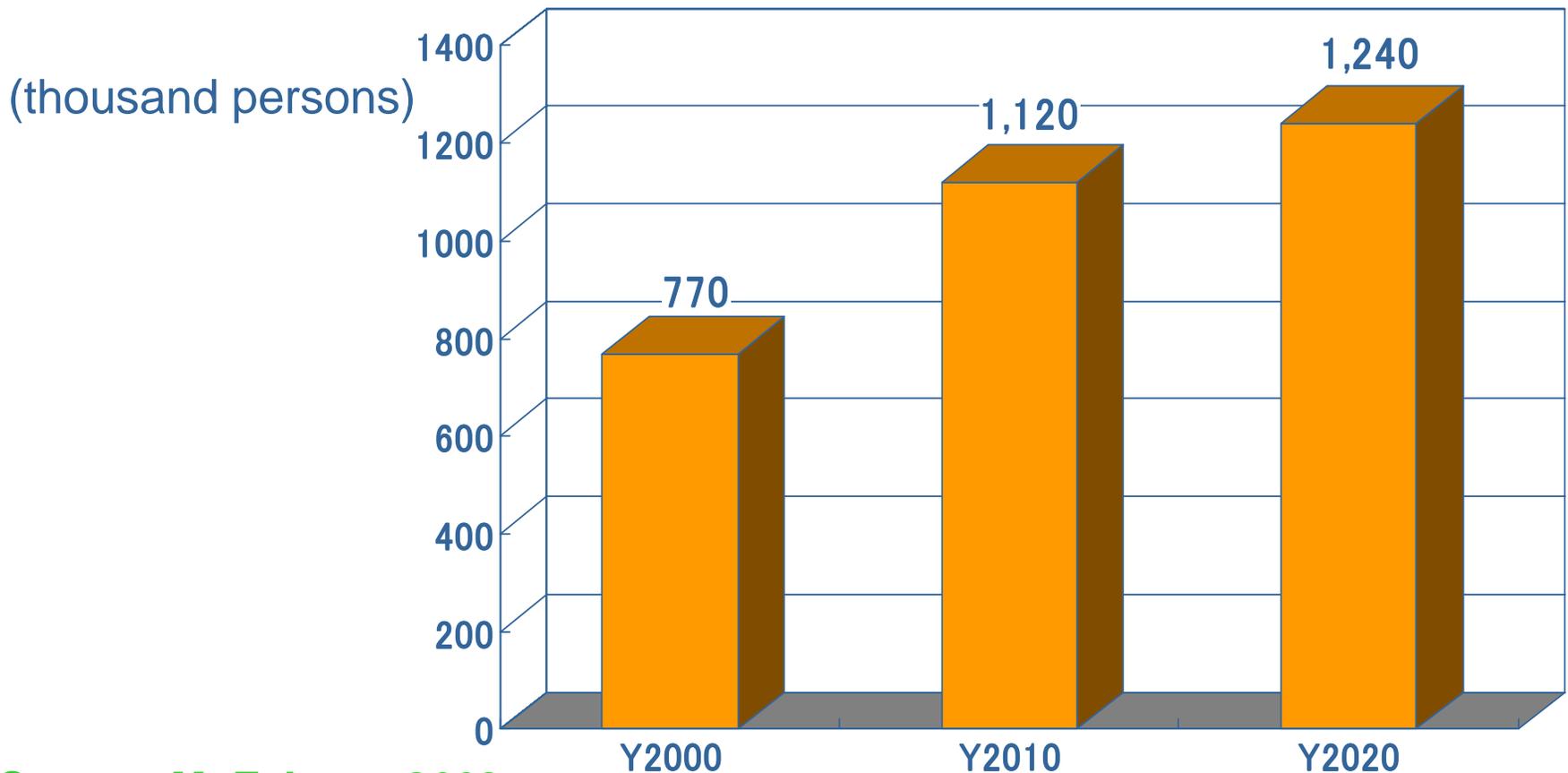


Source: MoE Japan 2003



# Employment Size of Environmental Business of Japan

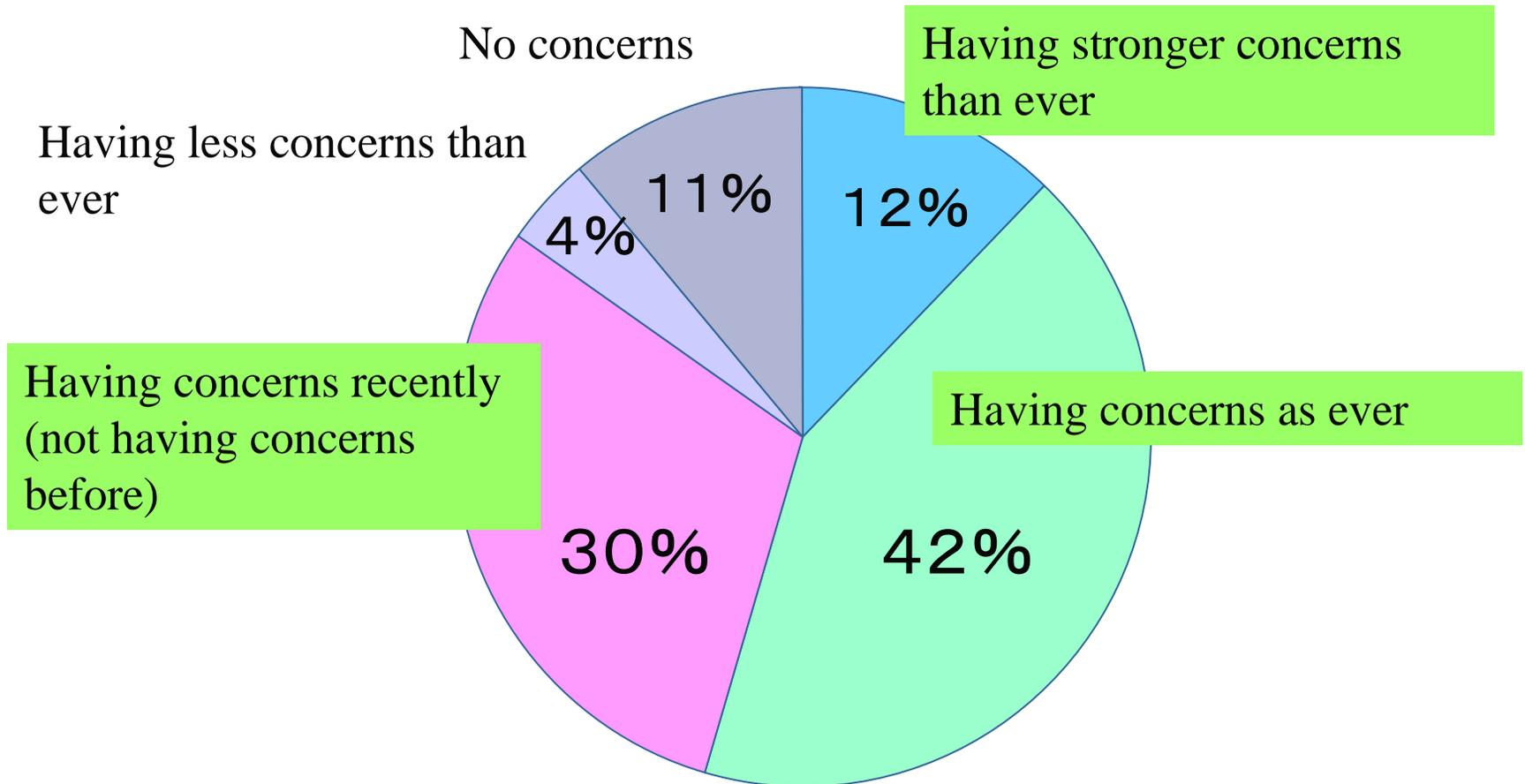
More than million employment within several years



Source: MoE Japan 2003

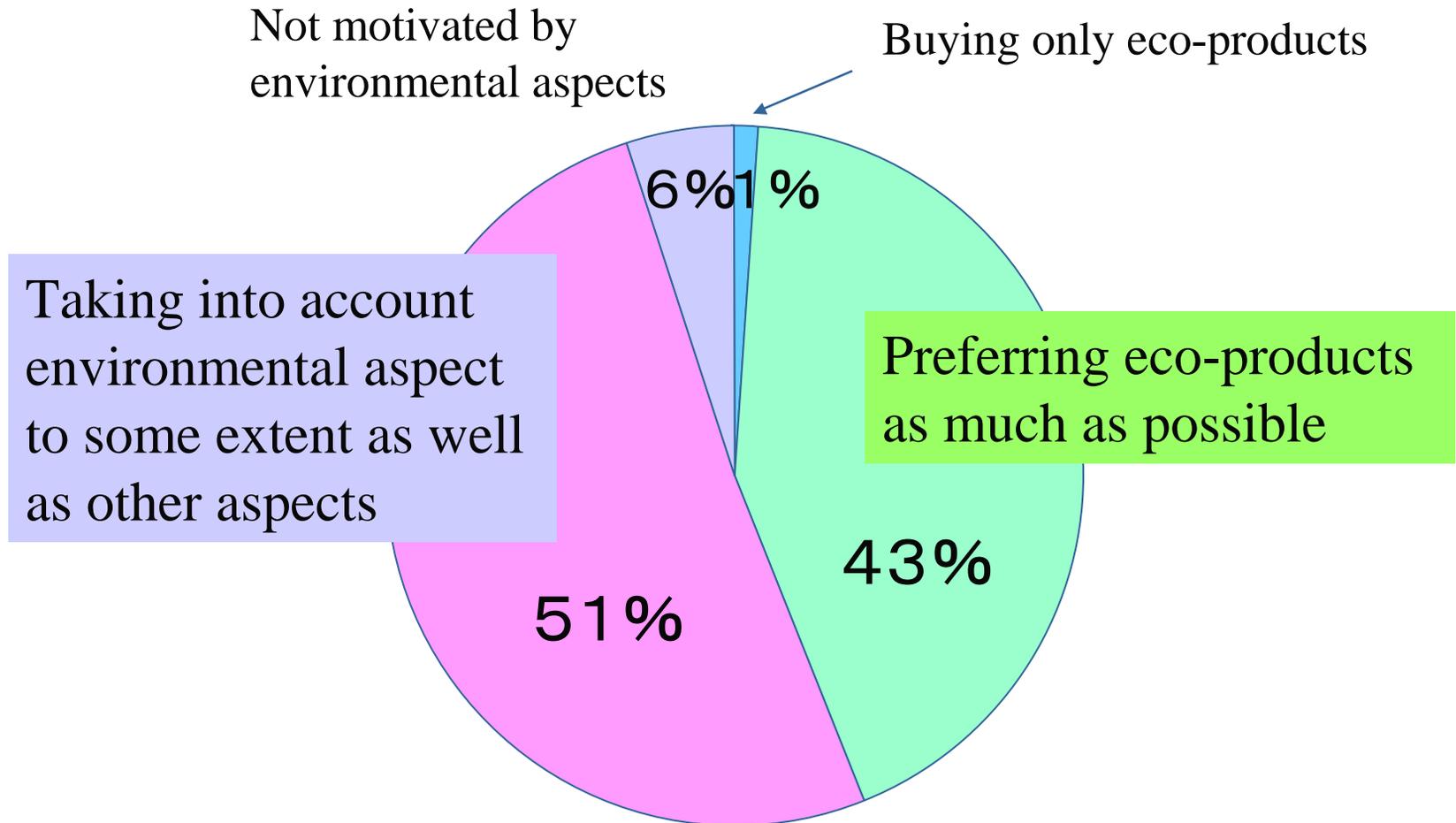


# Concerns about Environmental Issues



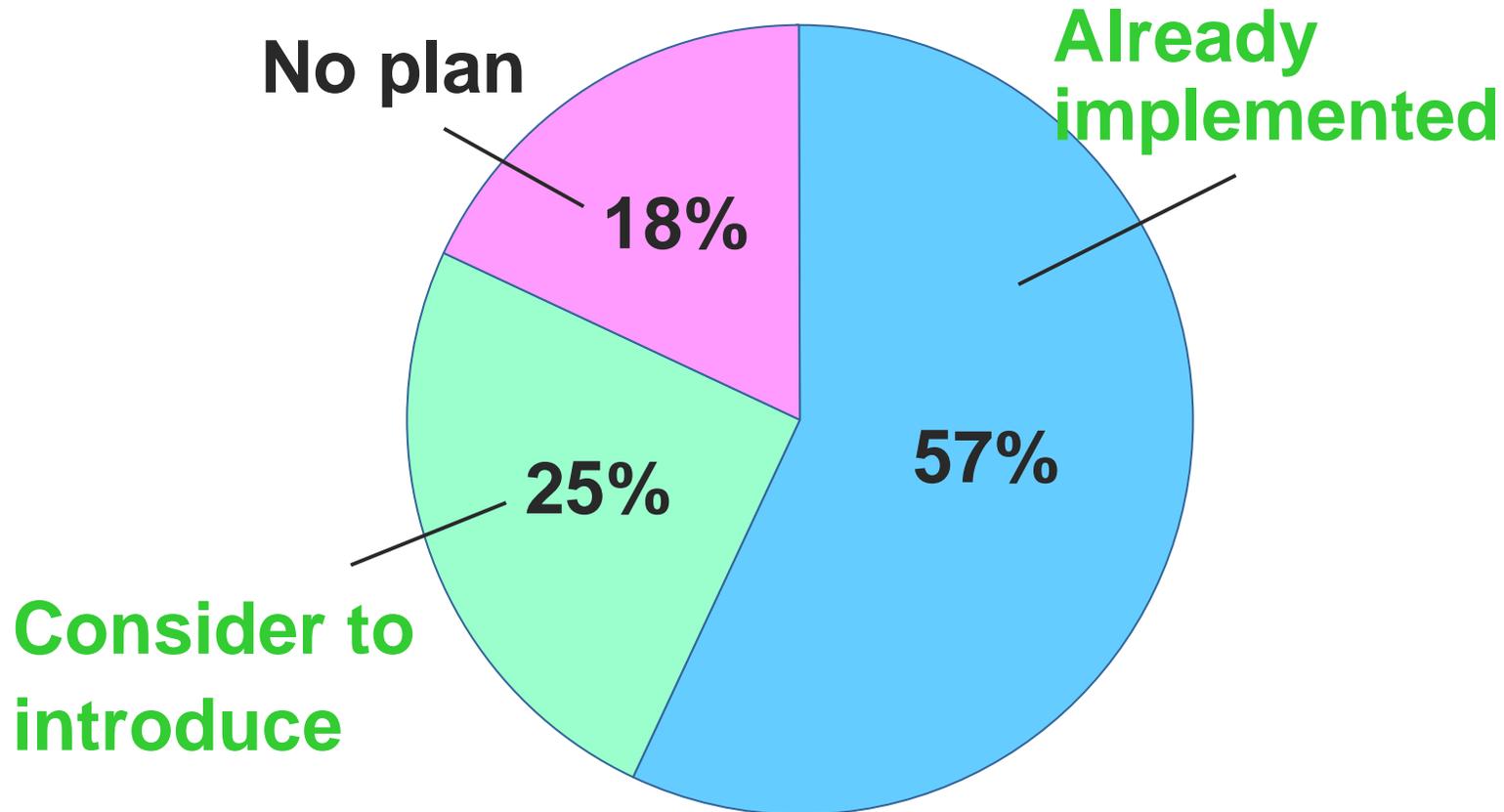


# Do You Prefer to Buy Eco-Products?





# Green Purchasing in Business Sector



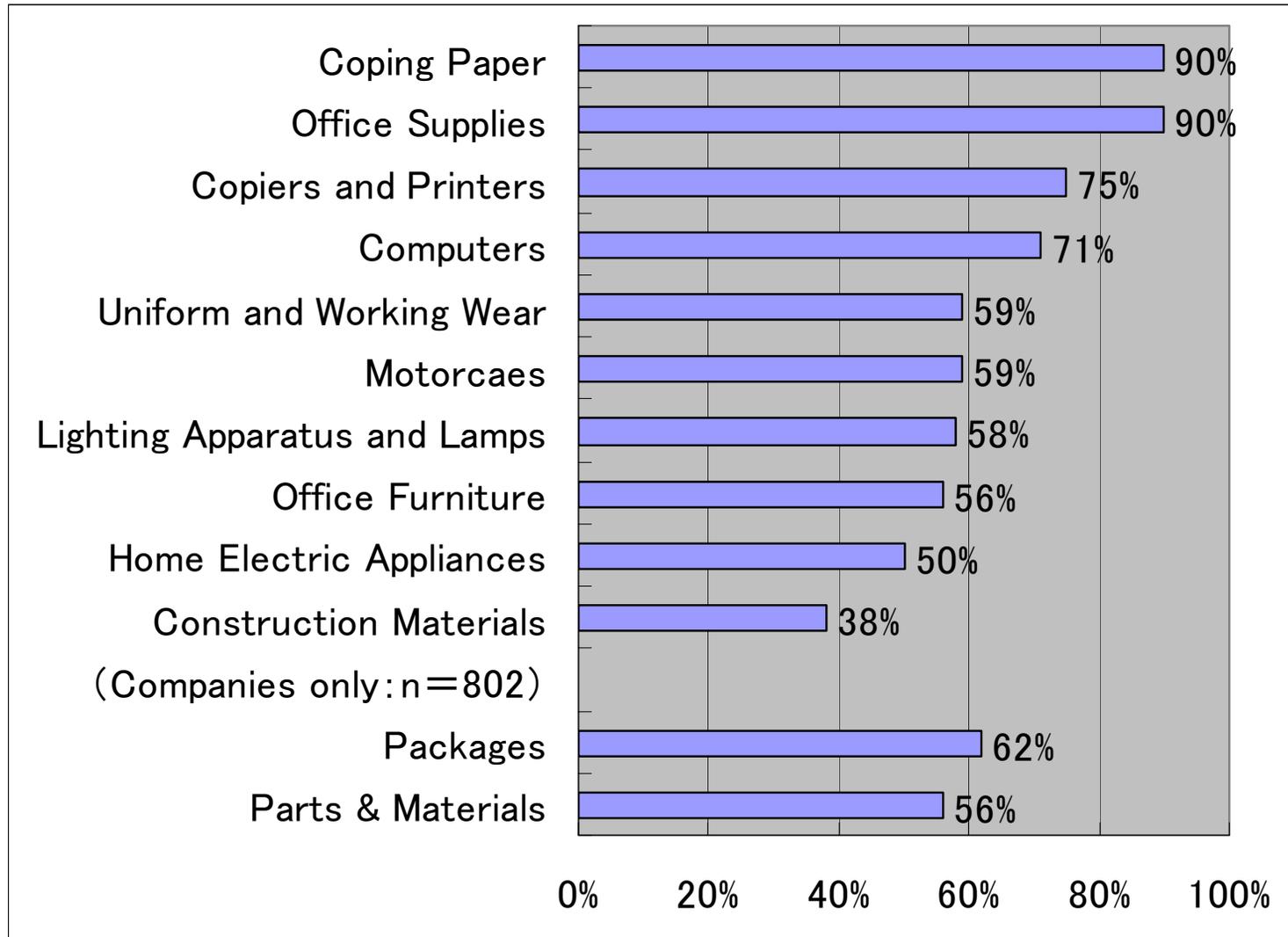
2,524 respondents (large sized companies)

Survey by MoE Japan in 2005

# Green Purchasing in Public Sectors

- **All** the central government ministries practice green purchasing
- **100%** the 47 prefectural governments and 12 designated cities are engaged in green purchasing
- **68%** of 700 cities systematically implement green purchasing
- Particularly advanced areas : papers, office supplies, office furniture, OA & IT equipments, motorcars, uniforms, and electric appliances

# Products Areas where Japanese Institutional Purchasers practices Green Purchasing

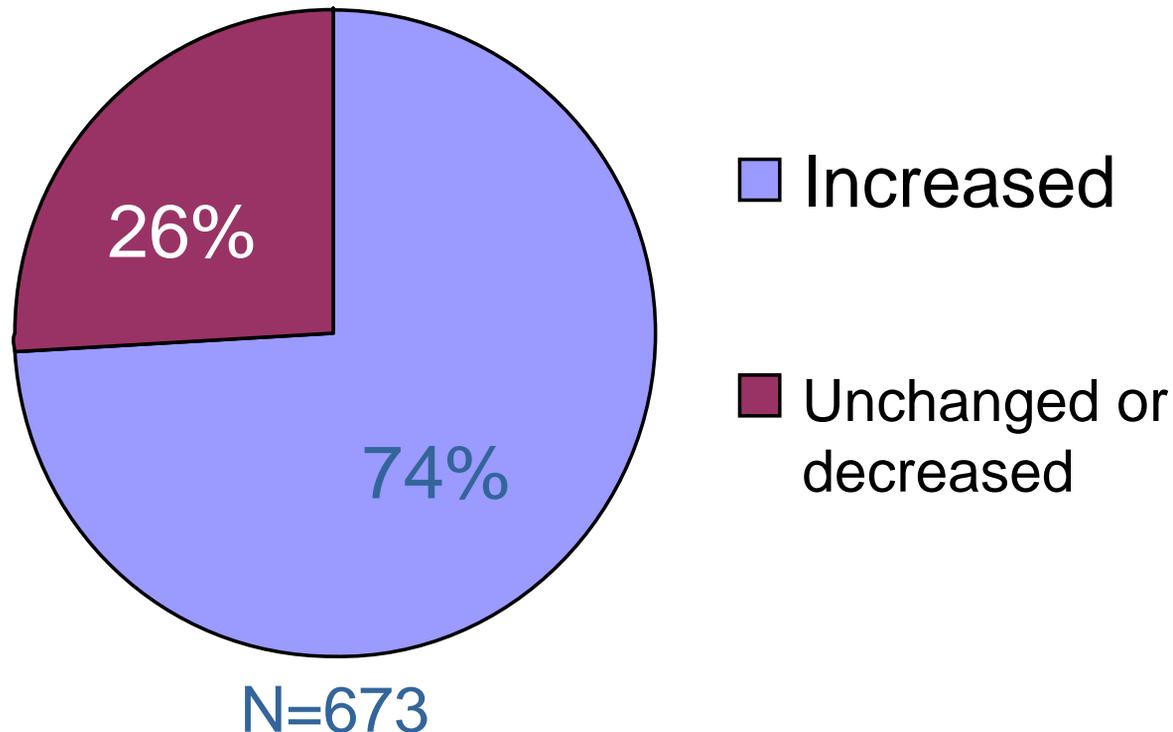


*Findings from survey by GPN in 2002*

# Market Impact of Green Purchasing

## *Findings from survey by GPN in 2001*

### Sales of Green Products

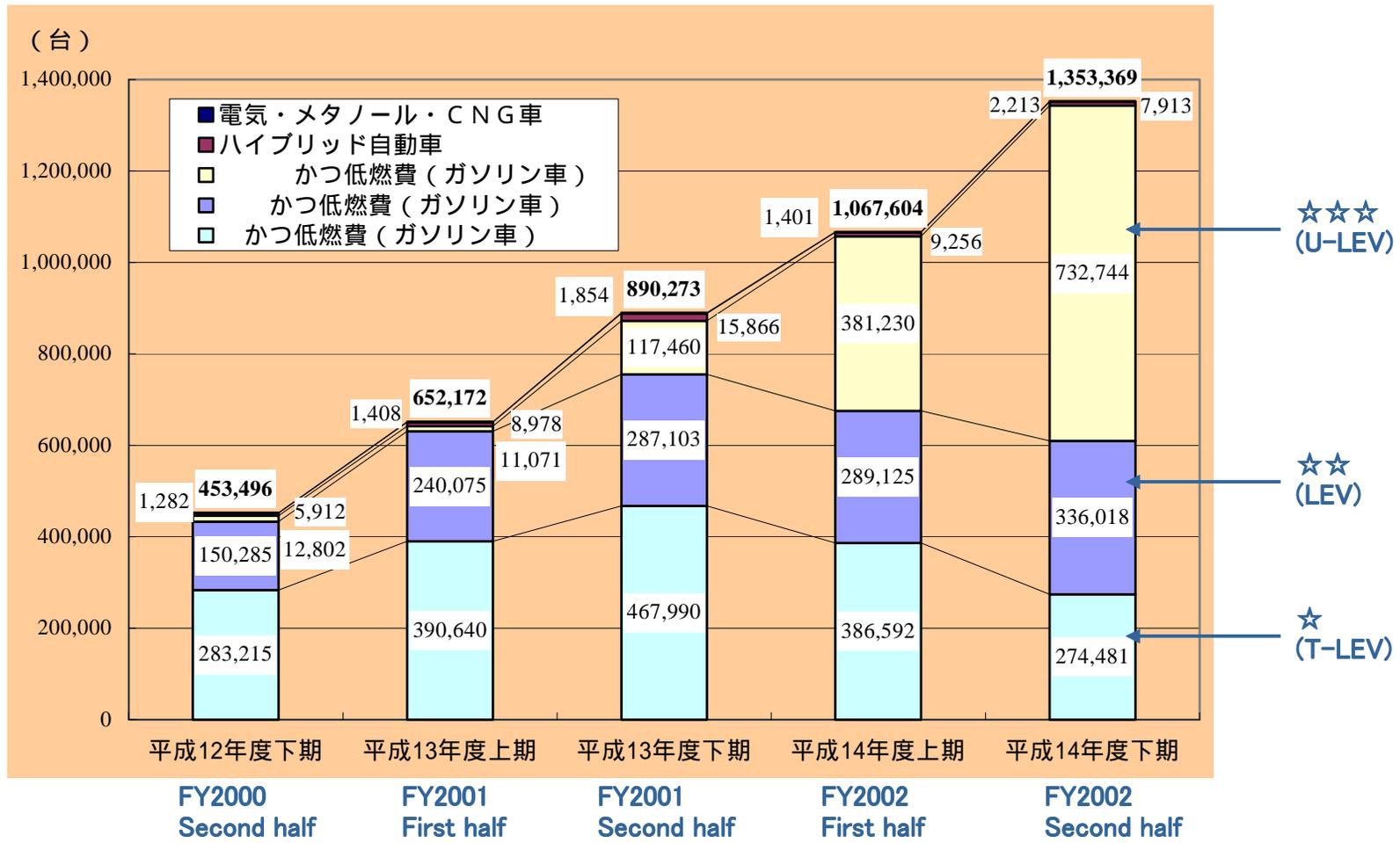




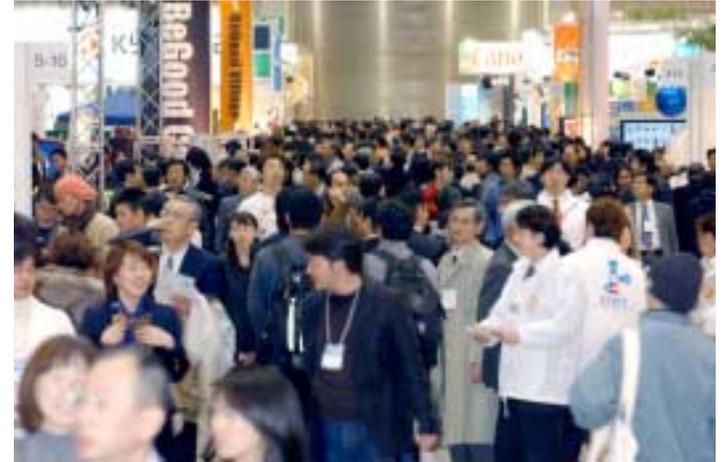
## Effect of Green Purchasing

# Market impact – Surveyed by MoE, Japan

Sales of lower emission and fuel efficient vehicles rapidly increased after enforcement of Green Purchasing Law



# Eco-Products Exhibition in Tokyo



***More than 400 companies,  
Exceeds 140,000 visitors***





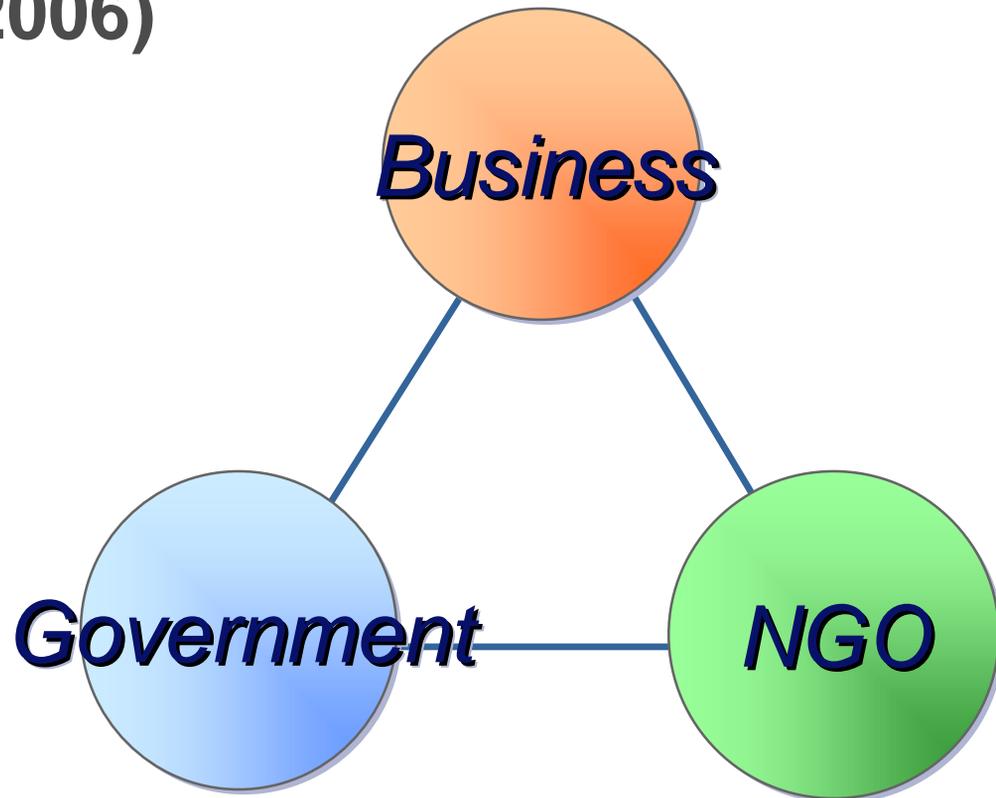
# Green Purchasing Network

- **Founded in February 1996 to promote green purchasing in Japan by the initiative of the Environment Agency**
- **The mission of GPN**
  - to promote the concept and practices of green purchasing
  - to provide guidelines and information necessary for practicing green purchasing.
- **Since then GPN has taken a leading role in promoting green purchasing in Japan.**



# More About GPN

- Independent non-profit organization
- **2,860 members** (Jan. 2006)
  - 2,261 corporations
  - 317 governments
  - 282 NGOs, NPOs
- Executive Committee
  - 39 members



***One of the largest  
environmental organizations in Japan***

# Activities of GPN

- Conferences, Seminars, Exhibitions
- “Green Purchasing Award”
- Training Course
- Case study on success stories
- Newsletter, Website
- Promotion pamphlet, posters
- Regional Networks
- Annual Surveys
- Principles of Green Purchasing
- **Purchasing Guidelines**
- **Products Database**
- **Hotel Database**
- **Information Plaza**



# Green Purchasing Guidelines for 15 Products and Service Areas

## Products

- Printing and Copying Paper
- Copiers, Printers, Facsimiles
- Personal Computers
- Stationery and Office Supplies
- Office Furniture
- Motor Vehicles
- Refrigerators
- Washing Machines
- TV Sets
- Air Conditioners
- Toilet and Tissue Paper
- Lighting Equipment
- Uniforms and Work Wear

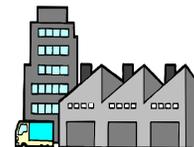


## Services

- Offset Printing Service
- Hotels and Inns



## Suppliers Evaluation Checklist



# GPN Purchasing Guidelines



## Personal Computers

- 1) Minimal power consumption during operation and standby mode (fulfilling requirements for “low energy consumption rate” as stipulated in the Law Concerning the Rational Use of Energy, and the International Energy Star program)
- 2) Capacity for upgrading and expanding functions in order to make long-term use feasible, and full maintenance service provided by the manufacturer
- 3) Designed to facilitate recycling and re-use of component parts
- 4) The manufacturer promotes the re-use of its own product after initial sale and usage, and endeavors to increase the recycling ratio of materials that cannot be re-used
- 5) Made with a large amount of recycled material
- 6) Does not contain lead, mercury, cadmium, hexavalent chromium compounds, or specific bromine-based flame-retardants (PBB, PBDE), to the utmost extent possible
- 7) When packaged with an in-house user manual, the manual is made and printed with consideration for the environment

### [Information Requirements]

Use of PVCs (for the chassis of the PC, display, and keyboard)



# GPN Products and Service Database

**GPN Database**

13 products area where purchasing guidelines exist

**Green Purchasing Information Plaza**

Various products and services not listed in GPN database

**Eco-Challenge Hotel Database**

# About GPN Database

## Product Environmental Performance Database

- More than **12,000 products** registered
- About 600 companies participating
- **300,000 page-views** monthly

*Currently Japanese language only*

### Product Categories

- Printing and Copying Paper
- Copiers, Printers, Facsimiles
- Personal Computers
- Stationery and Office Supplies
- Office Furniture
- Motor Vehicles
- Refrigerators
- Washing Machines
- TV Sets
- Air Conditioners
- Toilet and Tissue Paper
- Lighting Equipment
- Uniforms and Work Wear

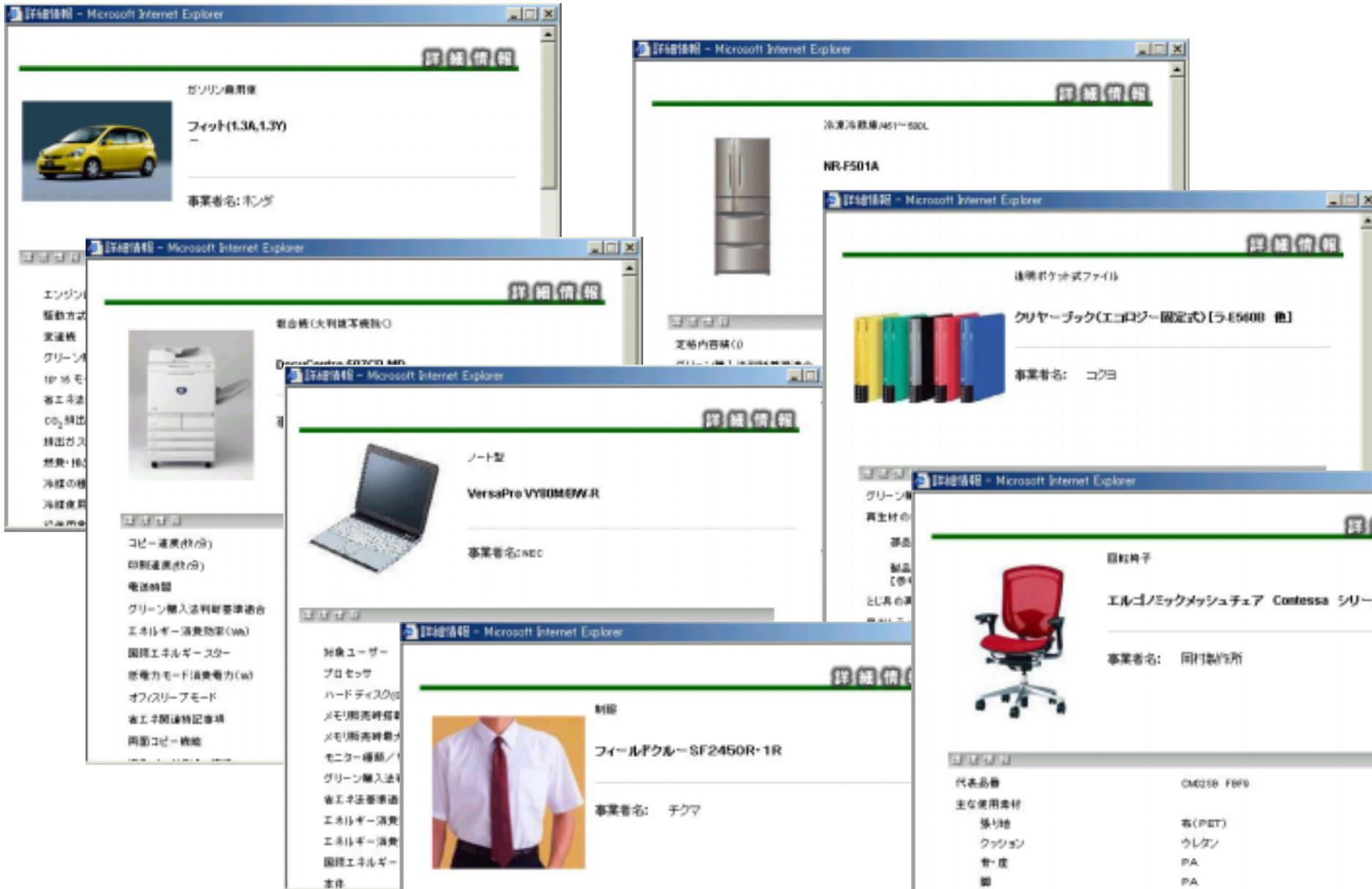


The screenshot shows the GPN Database website interface in Japanese. The browser title is "グリーン購入ネットワーク - Microsoft Internet Explorer". The address bar shows "http://www.gpn.jp/". The main heading is "グリーン購入のための GPN データベース" (GPN Database for Green Purchasing). Below the heading, there are several sections:

- 掲載商品分類一覧** (List of Registered Products): A vertical list of product categories such as "印刷・複写用紙" (Printing/Copying Paper), "コピー機" (Copiers), "プリンタファクシミリ" (Printers/Facsimiles), etc.
- トピックス** (Topics): A list of recent news items with dates and titles, such as "GPNデータベースがリニューアル" (GPN Database Relaunch) and "紙排出削減自動集積機情報更新" (Paper Discharge Reduction Automatic Accumulator Information Update).
- お役立ちリンク** (Useful Links): A section for additional resources.
- このサイトの使い方** (How to Use This Site): A section explaining the site's purpose and how to search for products.



# GPN DB - Registered Products



The image displays six overlapping browser windows from Microsoft Internet Explorer, each showing a product detail page from the GPN DB. The products shown are:

- Fit (フィット):** A yellow hatchback car. Model: フィット(1.3A,1.3J). Manufacturer: ホンダ (Honda).
- NR-F501A:** A refrigerator. Model: NR-F501A. Manufacturer: パナソニック (Panasonic).
- クリヤーブック (Clear Book):** A binder. Model: クリヤーブック(エコロジー固定式) [ラE5600 他]. Manufacturer: コクヨ (Kokuyo).
- VersaPro VY506WR:** A copier. Model: VersaPro VY506WR. Manufacturer: NEC.
- VersaPro VY506WR:** A laptop. Model: VersaPro VY506WR. Manufacturer: NEC.
- フィールドクルー SF2450R-1R:** A shirt. Model: フィールドクルー SF2450R-1R. Manufacturer: チクマ (Chikuma).
- エルゴノミックメッシュチェア Confessa シリ...** An office chair. Model: エルゴノミックメッシュチェア Confessa シリ... Manufacturer: 同村製作所 (Douchi Seisakusho).

Each window includes a product image, a title bar, and a main content area with product specifications and manufacturer information. The browser windows are titled '詳細情報 - Microsoft Internet Explorer'.

# Eco-Challenge Database for Hotels

- Database **specific to Hotels and Inns**
- Provides environmental performance information on hotels.
- Based on GPN guidelines
- Self-declaration system
- Started in 2003
- Any hotel meeting minimum requirements can be registered.
- 89 check points
- **240 facilities** are registered
- From **“Beginner”** to **“Top Class”**



The screenshot shows the homepage of the GPN Eco-Challenge Hotel Database. The header features the 'ECO CHALLENGE' logo and the title 'GPNエコチャレンジホテル旅館データベース'. Below the header is a banner image with the text '~環境にやさしいホテル・旅館のガイド~'. The main content area includes a search section with a search method dropdown (set to '地域から検索'), a search button, and a search results display area. There are also sections for 'お知らせ' (News) and 'ピックアップホテル紹介' (Featured Hotel Introduction), which includes a photo of a hotel and a list of scores for various environmental criteria.

環境への取り組み状況 (0点~10点)	スコア
環境への取り組み姿勢	4.0
環境管理計画 / リサイクル	4.4
食品廃棄物	4.0
省エネルギー / 節水	3.0
グリーン購入 / 化学物質	4.0



# Conclusions

## Key Factors for success in Japan -1

### [First stage (1995-2000)]

- Pioneering activities by lots of environmentally conscious major companies and local governments, which stimulated competitors and neighbors.
- Green Purchasing Network (GPN) has succeeded to involve wide range of businesses, public and NGO sectors.
- GPN and its members succeeded to make a nationwide big social trend.
- The Ministry of the Environment (MoE) backed up the voluntary movements and GPN.
- Success stories were introduced by the award and seminars by MoE and GPN.
- Businesses made considerable efforts to develop eco-products.



## Conclusions

### Key Factors for success in Japan -2

- It became much easier to get product environmental information from GPN Data Base, Eco-mark, suppliers catalog, etc.
- The movement was concurrent with popular trend of getting certificate of ISO14001.

#### [Second stage (2000-)]

- The mandatory Green Purchasing Law dramatically disseminated the activities among governmental sectors.
- Companies which products designated by the law worked hard to meet the criteria.
- EU RoHS directive accelerated corporate green procurement activities through supply chain.

# Conclusions

- **Customers** already started green purchasing/procurement across the world and had made reasonable successes.
- **Businesses** are increasingly required to supply eco-products, eco-components, and eco-services from customers throughout the supply chain.
- **To be competitive** in the global market, businesses should enhance green manufacturing.

*Thank you for your kind  
attention.*

GPN Website : <http://www.gpn.jp>

