



**UNEP Global Mercury Partnership**

**Waste Management  
Partnership Area**

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**July 15, 2011**

# Meeting Participants

- **Country representatives (Cambodia, China, Germany, India, Japan, Kiribati, Kyrgyzstan, Nigeria, Philippines, Syria, Thailand, U.S.A)**
- **International organizations (Secretariat of the Basel Convention, UNEP Chemicals, UNIDO, UNITAR)**
- **NGOs (Parques Nacionales Panama Group, Zero Mercury Working Group/Citizens Against Chemicals Pollution)**
- **Japanese organizations/experts**



A light olive-green map of the Waste Management Partnership Area, showing the outlines of the United States, Canada, and Mexico. The map is positioned in the background of the slide.

# Objective

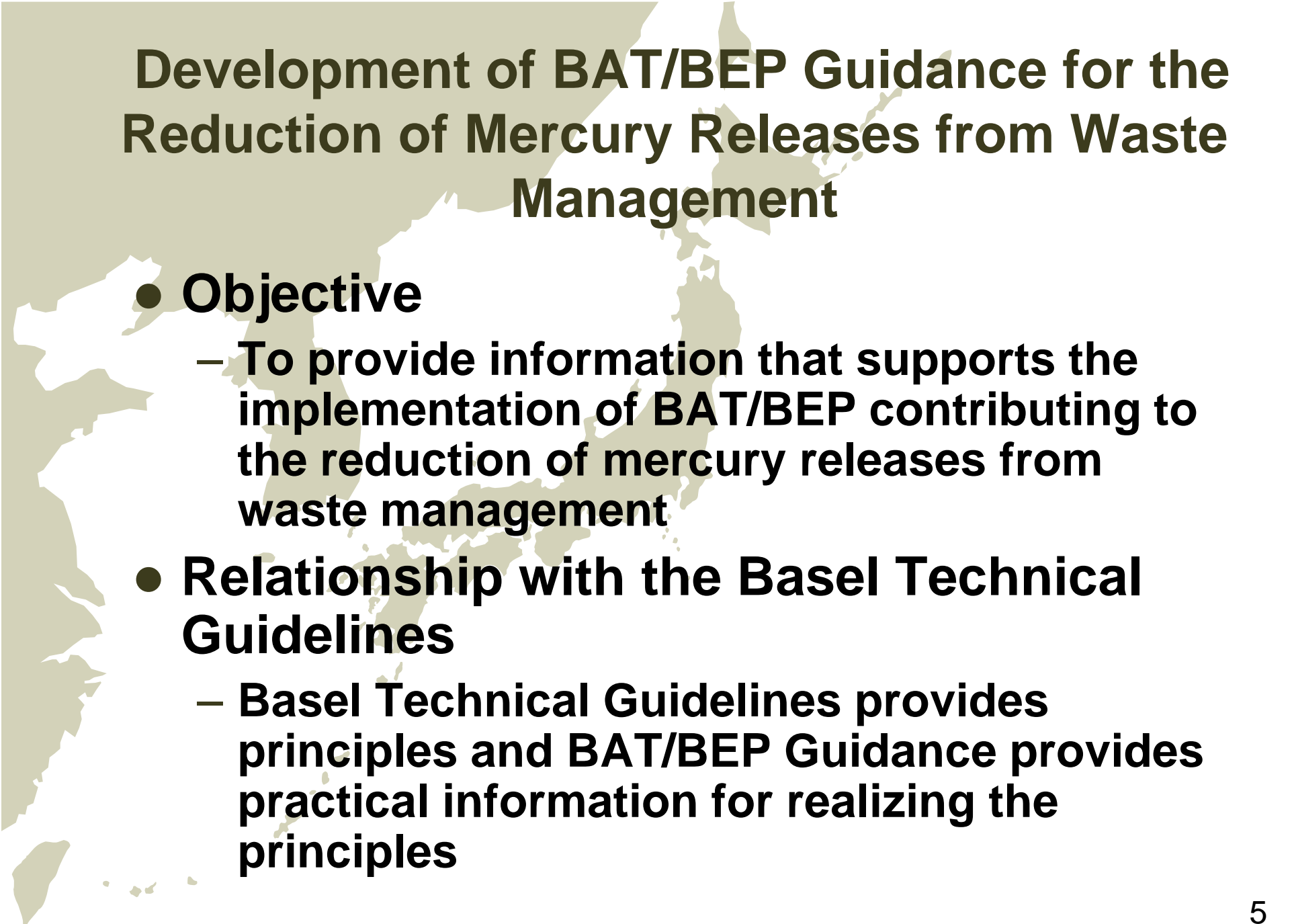
**Overall objective of the Waste Management Partnership Area:**

**“Minimize and where feasible, eliminate unintentional mercury releases to air, water, and land from mercury waste by following a lifecycle approach”**



# Current Status and Challenges

- **Example of projects**
  - **Development of Basel Technical Guidelines for the Environmentally Sound Management of Waste Consisting of, Containing, or Contaminated with Mercury (hereinafter “Basel Technical Guidelines”)**
  - **Development of BAT/BEP Guidance for the Reduction of Mercury Releases from Waste Management**



# Development of BAT/BEP Guidance for the Reduction of Mercury Releases from Waste Management

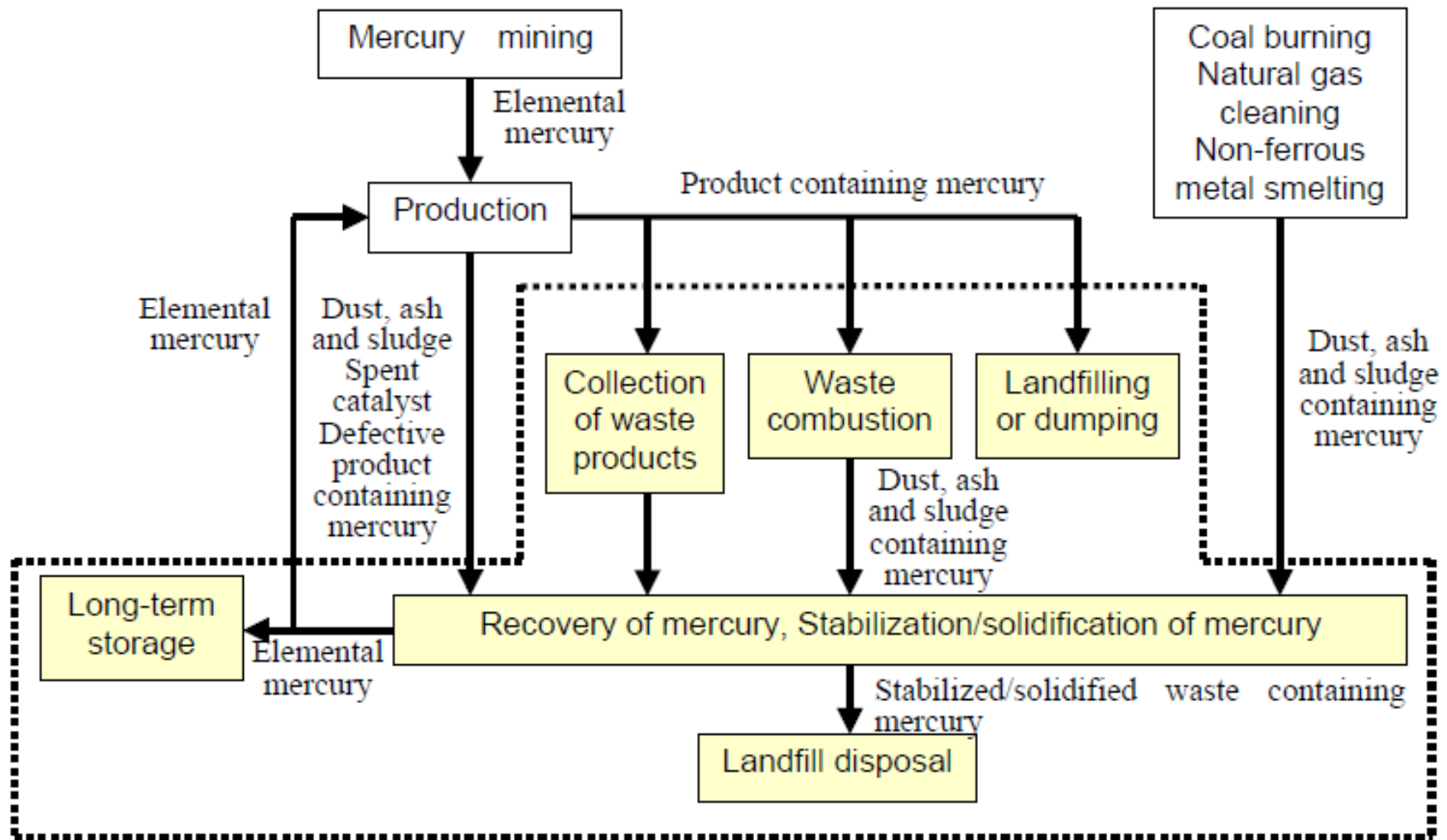
- **Objective**

- To provide information that supports the implementation of BAT/BEP contributing to the reduction of mercury releases from waste management

- **Relationship with the Basel Technical Guidelines**

- Basel Technical Guidelines provides principles and BAT/BEP Guidance provides practical information for realizing the principles

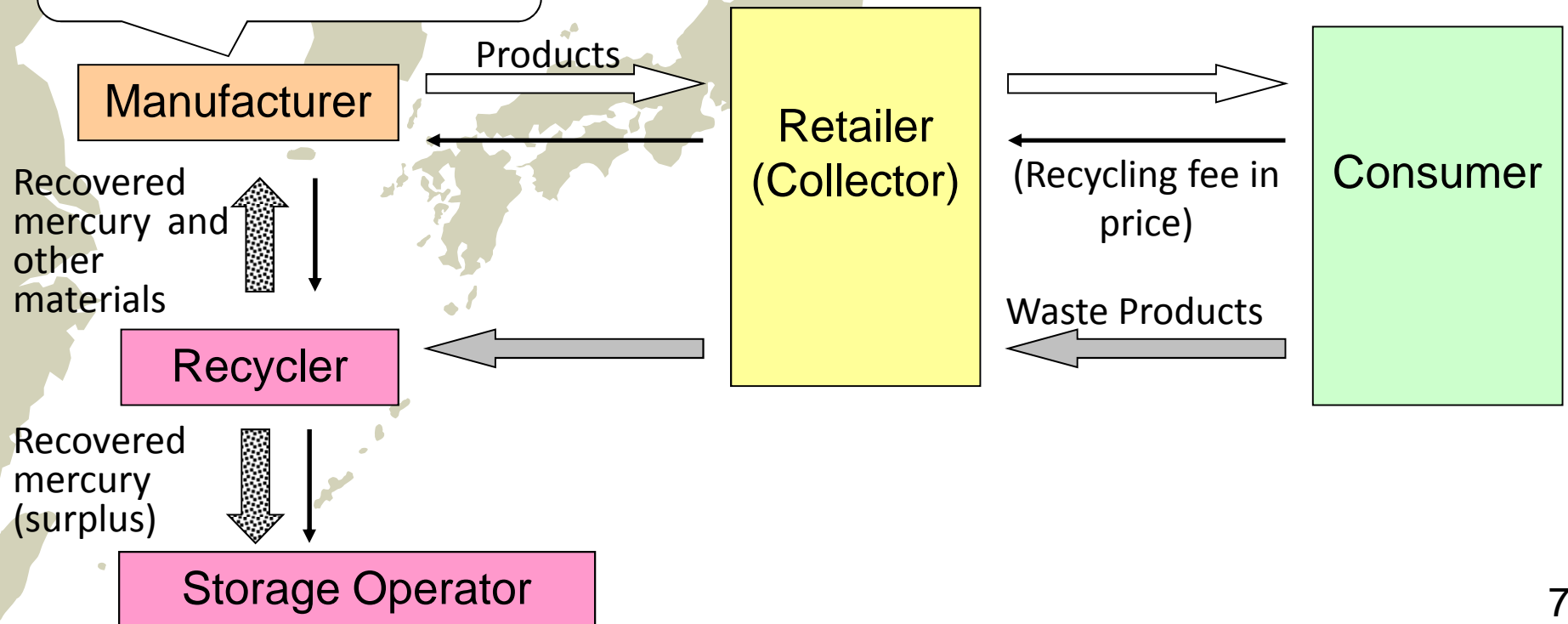
# Scope of the BAT/BEP Guidance



# Principles for Management of Waste Products Containing Mercury (1)

- **Closed system for utilization of mercury**

\*Switch to mercury free alternative as soon as it is available



# Principles for Management of Waste Products Containing Mercury (2)

- **Steps to establish collection and recycling systems**
  - **Identify mercury containing products in the domestic market (List of mercury containing products and their mercury contents provided in the Guidance)**
  - **Calculate mercury amount in the products**
  - **Estimate costs to establish and operate a collection and recycling system**
  - **Identify priority products**

# Principles for Management of Waste Products Containing Mercury (3)

- **Establishment of take-back system**
  - **Legal or voluntary system?**
    - **Established industry association could be a partner for pursuing a legal system**
  - **For the establishment of a collection system**
    - **Identification of products containing mercury at source: Labeling is a useful tool**
    - **Collection methods: Setting collection boxes at public sites or Specific day and time at regular waste collection points**
    - **Key to success**
      - **Information dissemination about collection**
      - **Incentives for bringing waste products to collection boxes**
      - **Analysis of different collection rate by region/locale**

# Principles for Management of Waste Products Containing Mercury (4)

- **Establishment of mercury recovery facilities**
  - Desirable to recover mercury and other materials at facilities taking measures to prevent mercury releases
  - Permit system should be introduced for mercury recovery facilities as hazardous waste treatment system
- **Other options**
  - To dismantle the products and store parts containing mercury in a drum and place it under rain-proof areas until mercury recovery facilities are established, or
  - export to other countries which has proper facilities<sup>10</sup>

# Principles for Management of Waste Products Containing Mercury (5)

- **Cost sharing by stakeholders**
  - **Building consensus on sharing costs of**
    - **Collection and recycling of waste products containing mercury (including the construction of mercury recovery facilities)**
    - **Long-term storage of elemental mercury recovered from waste products**
    - **Interim storage of containing mercury parts of waste products (including the construction and operation of dismantling facilities)**

# Principles for Management of Waste Products Containing Mercury (6)

- **Methods of cost sharing by stakeholders**
  - **EPR (extended producer responsibility)**
    - **Costs of collection and recycling of waste products and storage of recovered mercury is reflected to the prices of products**
  - **If EPR is not applicable, the public sector needs to play some roles (such as collection of waste products) → gradually reduce involvement of the public sector**

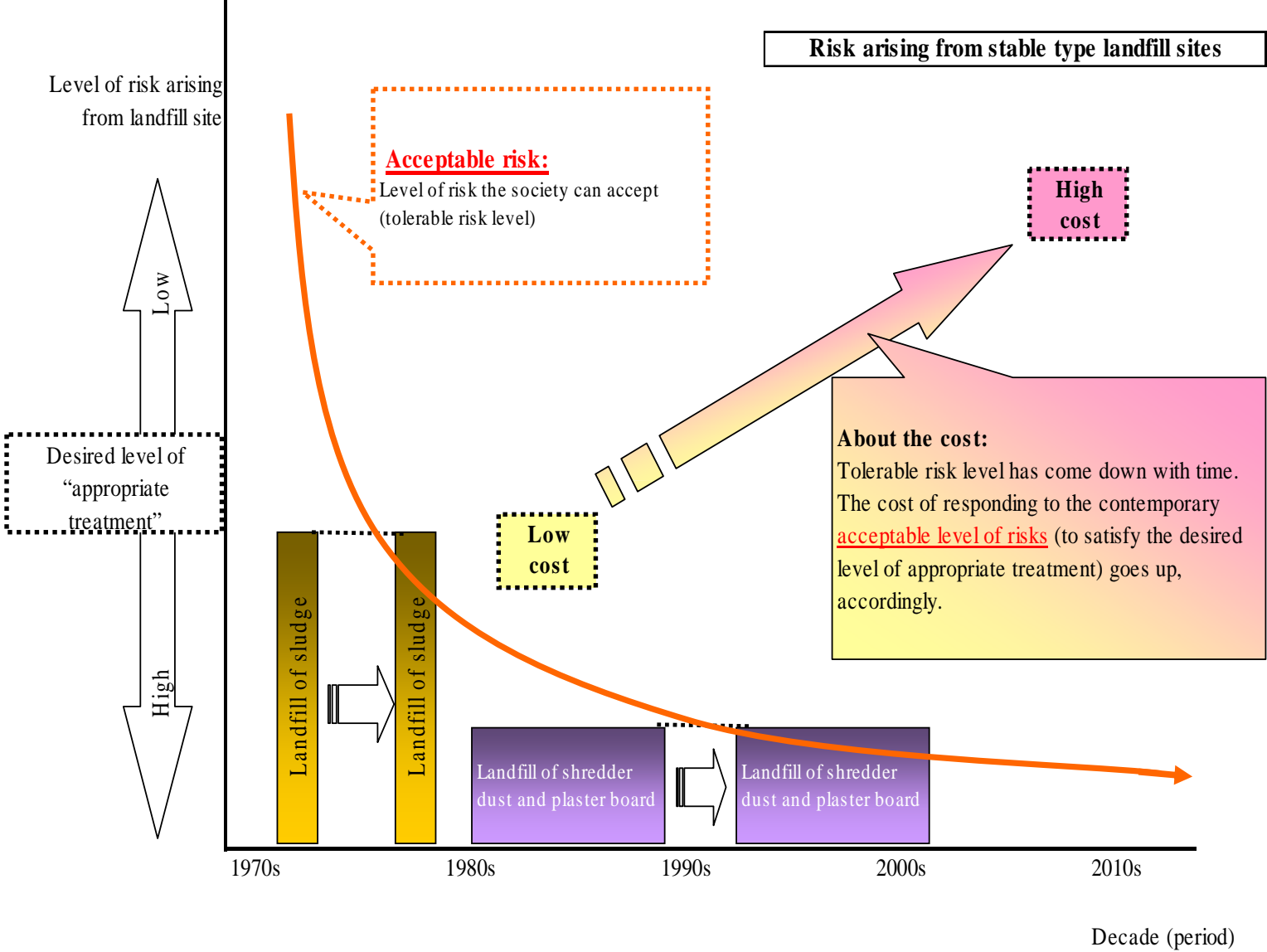


Drum cans containing mercury flasks in storage



**Practices for Reduction of  
Mercury Releases from Waste  
Management in Japan**

**Risk arising from stable type landfill sites**





## **Practices for Reduction of Mercury Releases from Waste Management**

- **Elimination of mercury in dry-cell batteries**
- **Reduction of mercury releases from waste incinerators as co-benefits of controlling major air pollutants**

# Background for elimination of mercury in dry-cell batteries

- Report by the Tokyo Metropolitan Institute for Environmental Protection in November 1983
  - Mercury concentrations of flue gas from waste incinerators
    - Usual conditions: 0.05-0.1 mg/m<sup>3</sup>
    - Addition of one button type mercury battery: 1.5 mg/m<sup>3</sup> (15-30 times)

 Raised

- Public awareness of risks of mercury released from waste batteries
- Needs for battery collection system



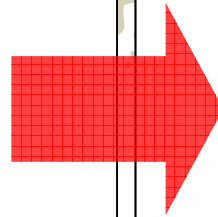
# **Actions for elimination of mercury in dry-cell batteries**

- **Municipal Waste Management Association**
  - Requested Battery Manufacturing Industry Association of Japan (BAJ) to reduce mercury contents in batteries
- **Manufacturers under BAJ**
  - Started voluntary collection of used mercury-containing batteries
  - Refrained from exploring new usage of mercury-containing batteries
  - Conducted research on mercury reduction in alkaline manganese batteries
  - Conducted research on mercury-free batteries
  - Conducted research on the impact of landfilled used alkali and manganese batteries on soil

# Mercury Free Battery

1980~

Mercury pollution by Battery became a serious problem in waste management.



1991

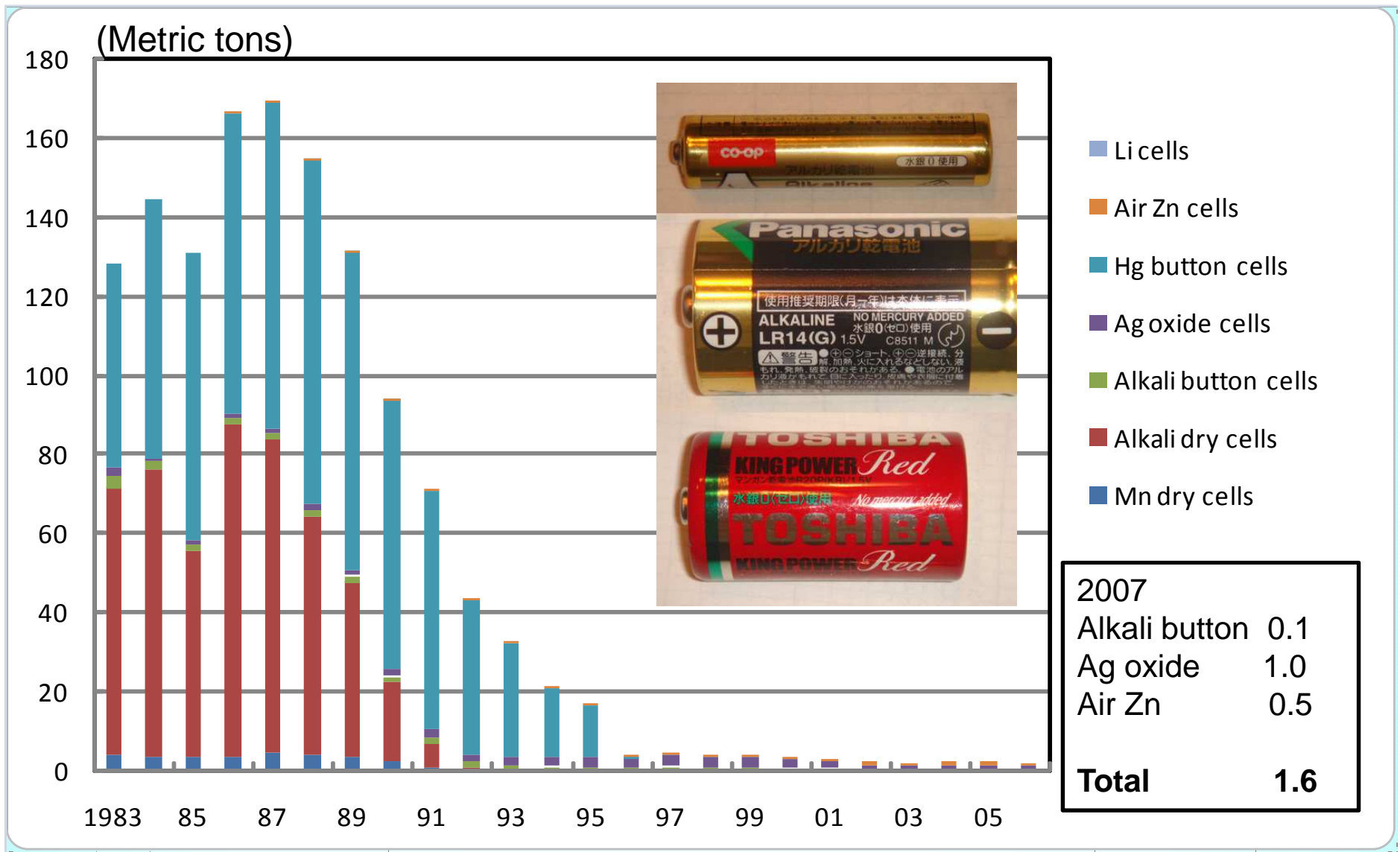
Mercury Free Mg Battery


1992

Mercury Free Li Battery



# Outcome of actions for elimination of mercury in dry-cell batteries : Mercury Use in Batteries





We have to explain what are the problems in waste management stage by scientific manner.



Then, producers will Design for Environment

We in waste management sector like to know what are contained, how much, trend in future and other.

# Legal framework for co-benefits of controlling major air pollutants

- **Particulate matters, SO<sub>x</sub>, NO<sub>x</sub>, HCl**
  - Air Pollution Control Law (1968)
- **Dioxins/frans**
  - Law concerning Special Measures against Dioxins (1999)
- **Mercury**
  - no special emission regulation → **Emission standards for air pollutants, especially dioxins/frans/co-planer PCBs, bring a benefit of reducing mercury emissions from waste incinerators.**

# National Dioxins\* Emission Standards for Waste Incinerators

<b>Incineration capacity</b>	<b>Emission standards</b>
<b>200 – 2,000 kg/hr</b>	<b>New: 5 ng-TEQ/m<sup>3</sup>N</b> <b>Existing: 10 ng-TEQ/m<sup>3</sup>N</b>
<b>2,000 – 4,000 kg/hr</b>	<b>New: 1 ng-TEQ/m<sup>3</sup>N</b> <b>Existing: 5 ng-TEQ/m<sup>3</sup>N</b>
<b>4,000 kg/hr &lt;</b>	<b>New: 0.1 ng-TEQ/m<sup>3</sup>N</b> <b>Existing: 1 ng-TEQ/m<sup>3</sup>N</b>

\*Dioxins include polychlorinated dibenzofrans (PCDFs), polychlorinated dibenzo-para-dioxins (PCDDs), and co-planer PCBs

# Example of co-benefits of controlling major air pollutants

- **Retrofitting emission gas treatment systems at two facilities for controlling dioxins/frans**
  - **Facility A**
    - Electric precipitator + wet gas treatment → Quenching tower + bag filter + wet gas treatment (activated carbon in rinse water)
  - **Facility B**
    - Electric precipitator + wet gas treatment → Quenching tower + bag filter + dry gas treatment (activated carbon injection)

# Example of co-benefits of controlling major air pollutants

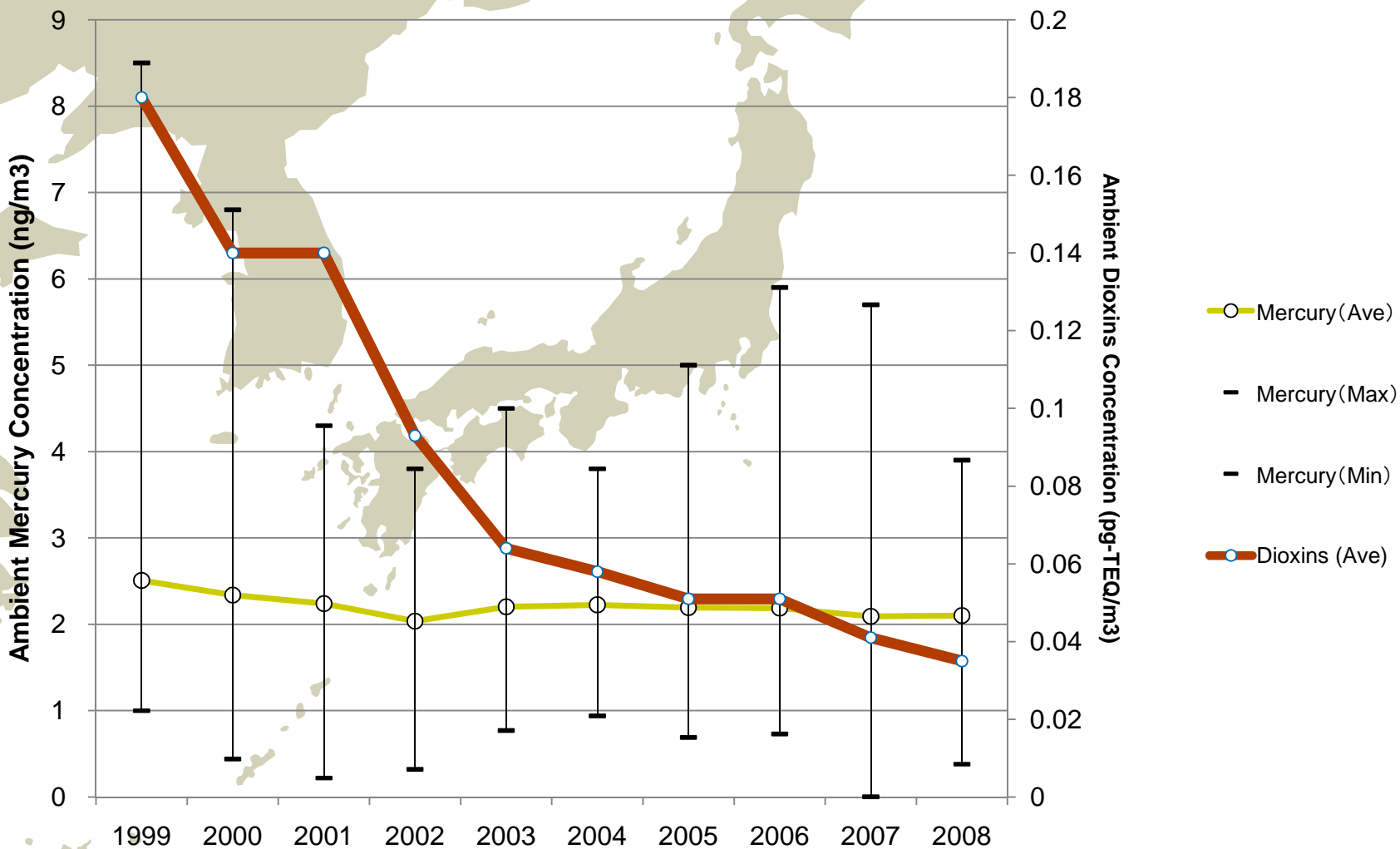
- **Concentrations before and after retrofitting**
  - **Gaseous PCDDs/DFs (ng-TEQ/m<sup>3</sup>N)**
    - **Facility A**
      - Stack gas: 0.083 (before) → 0.043 (after)
      - Fly ash: 1.2 → 0.095
    - **Facility B**
      - Stack gas: 3.6 → 0.19
      - Fly ash: 0.87 → 0.58
  - **Mercury**
    - **Efficiency of mercury removal rate: 22% → 90%**

Source: SAKAI Shin-ichi et al. (2006): Co-benefit of Controlling Unintentional Persistent Organic Pollutants (UPOPs) in Municipal Solid Waste Incineration, in the 4<sup>th</sup> I-CIPEC, September 26-29, 2006, Kyoto, Japan.

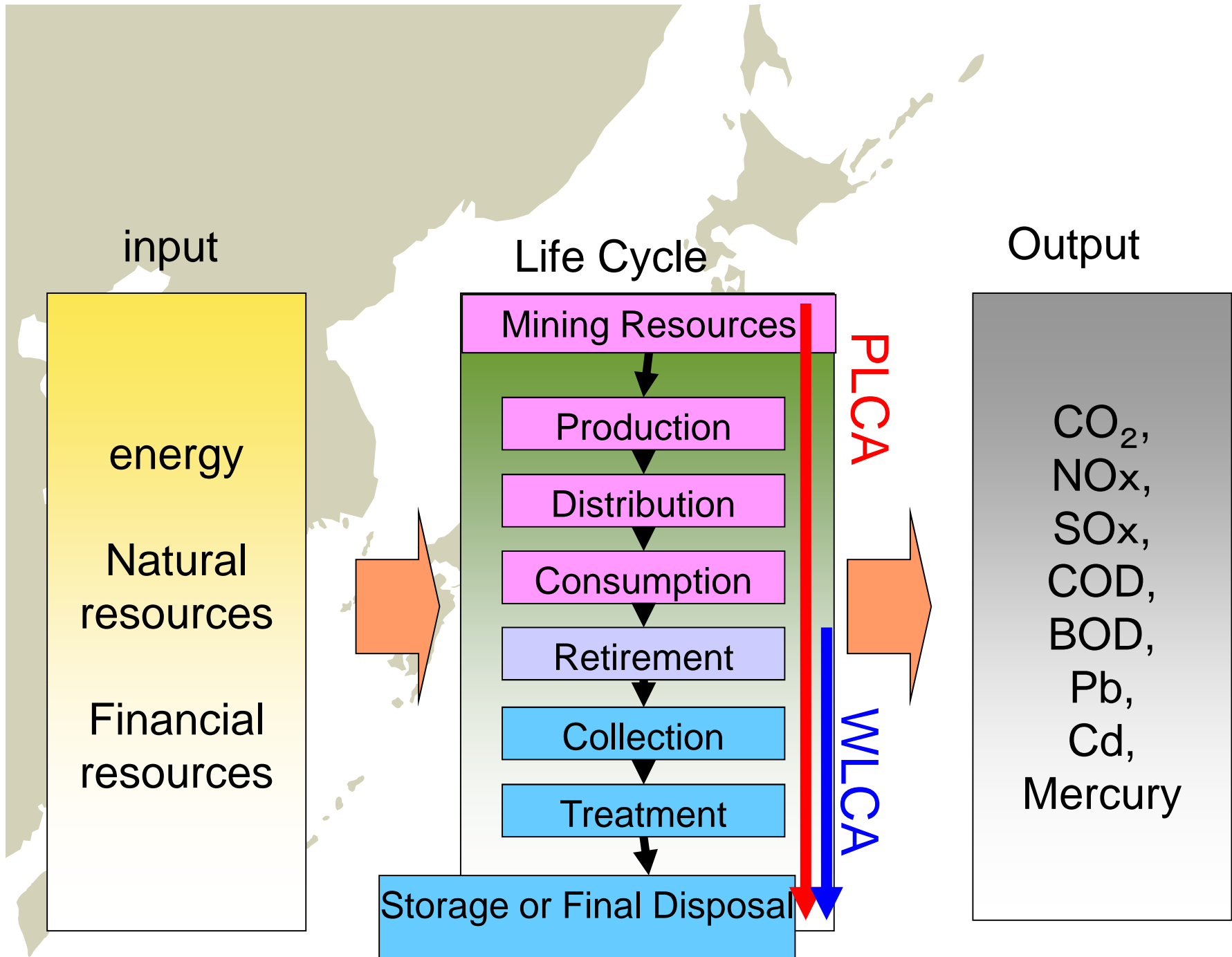
# Standards for mercury discharge from waste incineration facilities

- **Kyoto Prefecture (ordinance):** **0.2 mg/m<sup>3</sup>**
- **Tokyo Santama Eco Cement Plant:** **0.05 mg/m<sup>3</sup>**
- **EU, cement kilns and other facilities co-incinerating wastes and other fuels, etc.:** **0.05 mg/m<sup>3</sup>**
- **EU, waste incineration facilities:**  
**0.05 mg/m<sup>3</sup> (minimum 30 minutes)**  
**0.1 mg/m<sup>3</sup> (maximum 8 hours)**

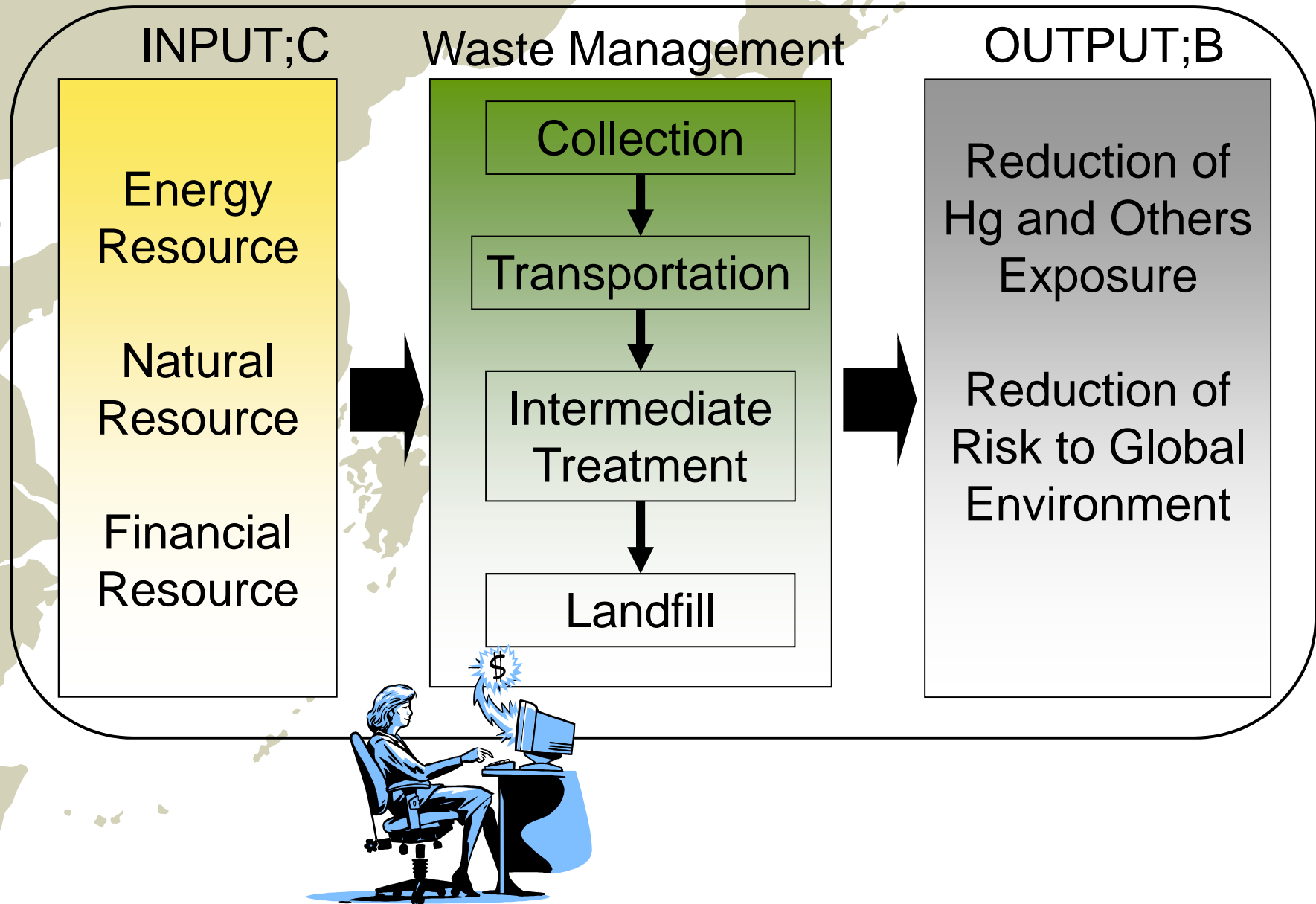
# Decrease of Dioxins Concentration and Mercury Concentration in Japan



Source: Ministry of the Environment, Japan



# Development of WLCA Tool





# Total Management

- **Not only mercury but also other pollutants.**
- **Not only separate collection but also disposal and storage.**
- **Not only for human health and environmental risk but also economic and technical limitations.**




# Issues in Mercury Management

- **Lack of Scientific and Quantitative Risk Assessment**
- **Lack of Environmental Impact Assessment**
- **Cost/Benefit Analysis**



# Life Cycle Approach

- **Product (Content of Mercury, Characteristics, Life span, Other material) → appropriate management (Waste Management Partnership)**
- **Waste Disposal system → Design for Environment (Product Partnership )**

- 
- **Each country should set up some kind of platform to exchange information among producer's sectors and waste management sector in order to promote Design for Environment.**