

# Resource Efficiency and Solid Waste Management and Recycle

- From Preliminary Findings of  
"Toward Resource Efficient Economy  
in Asia and the Pacific" -

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Asian Development Bank  
at EcoAsia, 8, August 2007

The logo of the Asian Development Bank (ADB), consisting of the letters "ADB" in a white serif font on a dark blue square background.

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- From '3R Asia Report' -

- Current Solid Waste Management Issues in Asia
- Resource Efficiency and Waste Management
- Opportunities
- Current Practices and Emerging Issues
- Way forward

# Consequences of Solid Waste and Poor Management

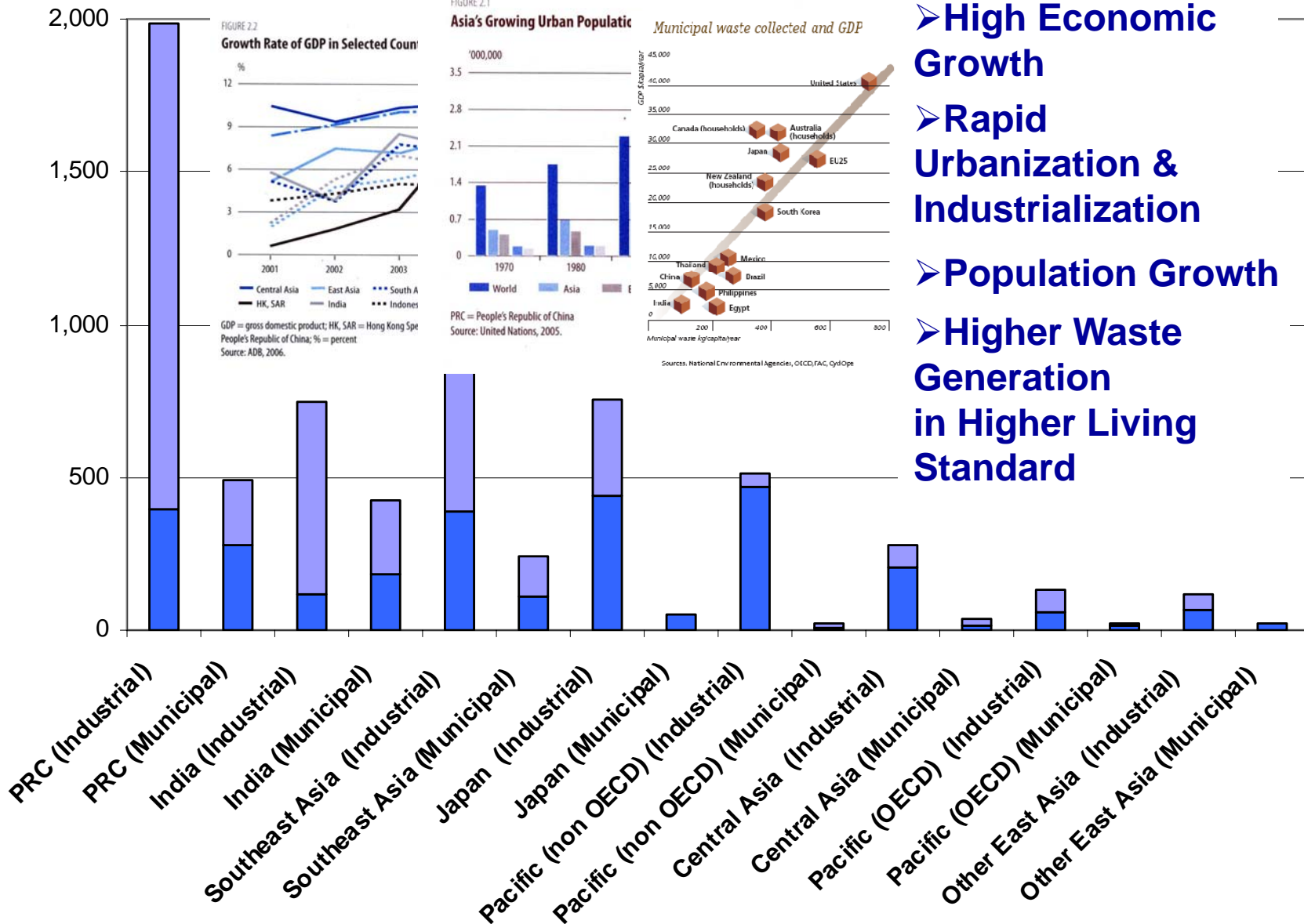
- Low hygienic safety in urban area
- Pollution and health risk around poor landfill /dump sites & incinerators
- Pollution and health risk in recycling hazardous waste
- Clogging drainage and flooding
- Disastrous collapse of waste piles
- Impacts on ecosystem
- NIMBY (Not In My Back Yard)



*Photos: Waste Concern, ADB*

# Projected Solid Waste Generation 2000-2050 in Asia

Million Metric Ton



- High Economic Growth
- Rapid Urbanization & Industrialization
- Population Growth
- Higher Waste Generation in Higher Living Standard

Data Source: M. Tanaka, et.al, 2003

# Managing Solid Waste

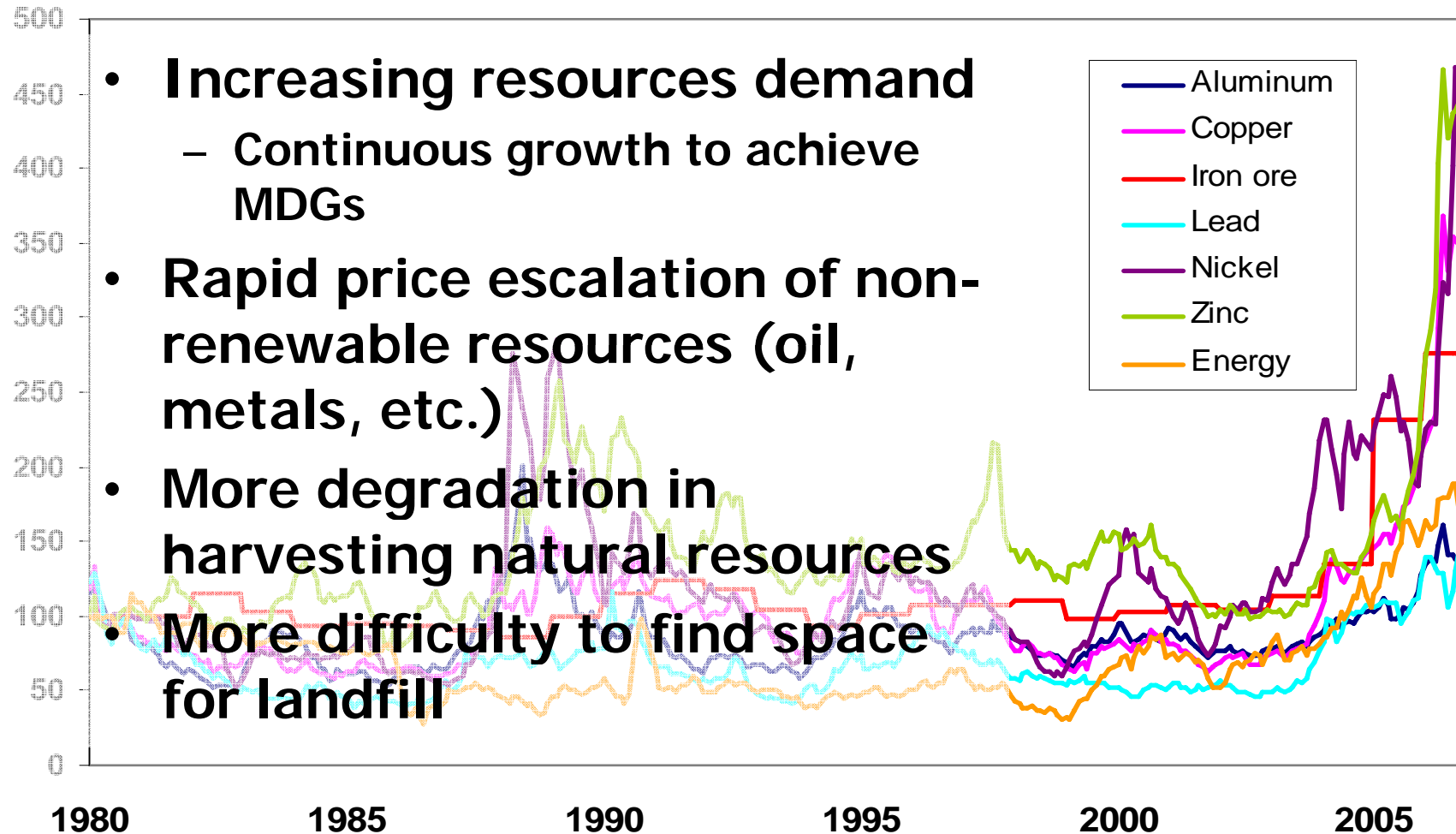
	Nature of Municipal Waste	Municipal Waste Management
<b>High Income Countries</b>	High per capita generation High calorie, Low moisture, Separated at source	Legislation with high investment High Collection Rate (>95%), Regulated incineration and landfill, Institutional recycle mechanism, EPR, Facility for hazardous waste
<b>Middle Income Countries</b>	Middle per capita generation, Food Waste, Low calorie, High moisture, Mixed	Middle Collection Rate (>75%), Legislation, Shifting open dump to sanitary landfill, Formalizing recycling business
<b>Low Income Countries</b>	Low per capita generation, Food Waste, Low calorie, High moisture, Mixed	Low Collection Rate (<75%), Open Dumping or Unauthorized Deposit, Informal Recycling

Source: Modified from CYCLOPE & VEORIA

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# Plus, Increasing Resource Constraint

Price Index of Metals and Energy (nominal, 1980 = 100)

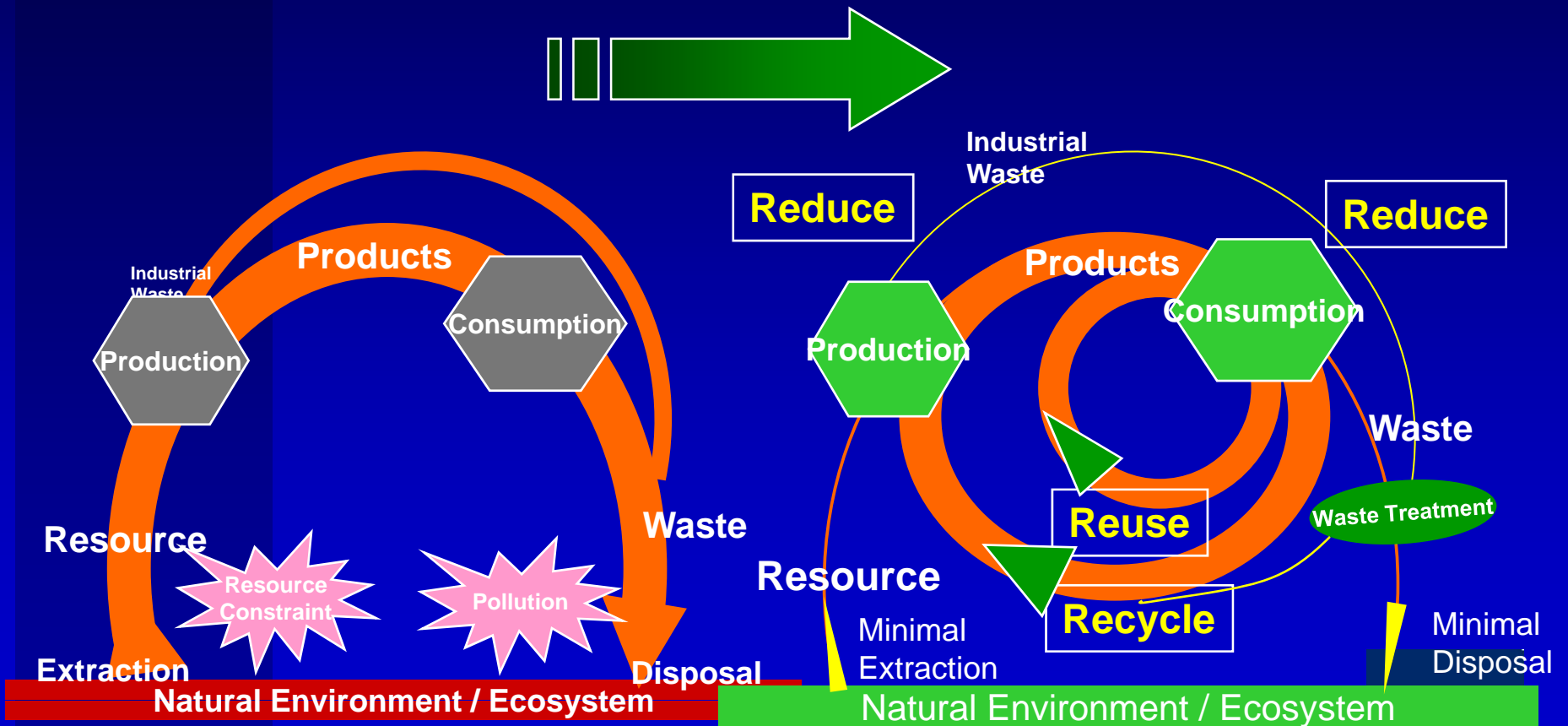


- **Increasing resources demand**
  - Continuous growth to achieve MDGs
- **Rapid price escalation of non-renewable resources (oil, metals, etc.)**
- **More degradation in harvesting natural resources**
- **More difficulty to find space for landfill**

Sources: International Monetary Fund, Primary Commodity Prices, available: [www.imf.org](http://www.imf.org), downloaded 9 October 2006; World Bank Development Prospects Group, Commodity Price Indexes.

# Resource Efficiency:

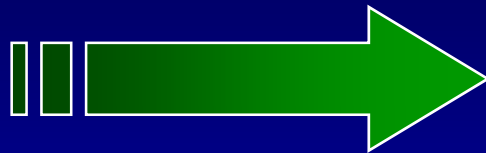
“The use of smaller amounts of physical resources to produce the same product or service.”





# Resource Efficiency:

“The use of smaller amounts of physical resources to produce the same product or service.”

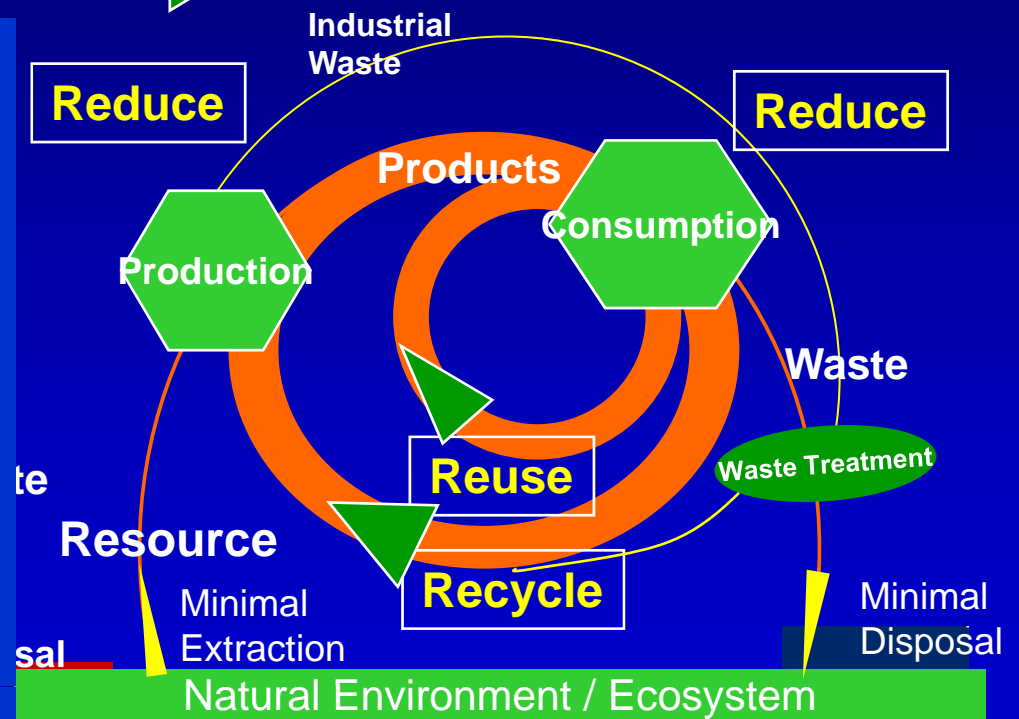


## Resources include:

- Material
- Energy
- Water

## Waste include:

Solid, Waste Water, Air Pollutant, GHG, etc.



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# Opportunities

## 1. Resource Recovery Business

- Estimated Potential: \$320 billion/yr
- New Products (construction materials etc.)
- Needs environmental consideration

## 2. Eco-industrial Park

- Cascaded use of by-products/waste/energy



- Common facilities for environment protection
- PRC, Japan, ROK, Thailand, ...

# Opportunities (contd.)

## 3. Biomass and Waste to Energy

- CDM for Landfill, agricultural waste

## 4. Income Generation for Poor Groups

- Organize informal sector/community

### Waste Concern (Bangladesh)

- Organize community in collaboration with local government, to collect 100% household waste, make compost (70-80%), sell farmers or fertilizer company as additive (\$40/ton)
- sell recyclables
- replicated in 20 cities and towns
- Initiated CDM project



Photo: Waste Concern



# National Policies

**PRC:** Product related laws are being developed including take-back and recycling of e-appliances, under “Circular Economy” policy.

**India:** New law obliges municipalities to segregate organic from household waste to treat by composting etc. (2000)

**Malaysia:** National Environment Policy 2002 guides all programs towards Integrated Waste Management. National Solid Waste Action Plan passed (2003).

**Singapore:** Its Green Plan 2012 sets “Zero Landfill” objective, with a national recycling program (target: 60% recycling by 2012).

**Republic of Korea:** has been able to decouple municipal waste generation and private final consumption with new volume based fee and recycling food waste.

**Japan:** “Sound Material Cycle Society Law” and Kyoto target facilitated recycling based business and consumer behavior to reduce 50% of final disposal, 33% of industrial waste (1989-2003) .

**Philippines:** Ecological Solid Waste Management Act (2000) for “Zero Waste” requires local government to recycle 25% of waste collected.

Image © 2009 TerraMetrics

Google

# Private Sectors:

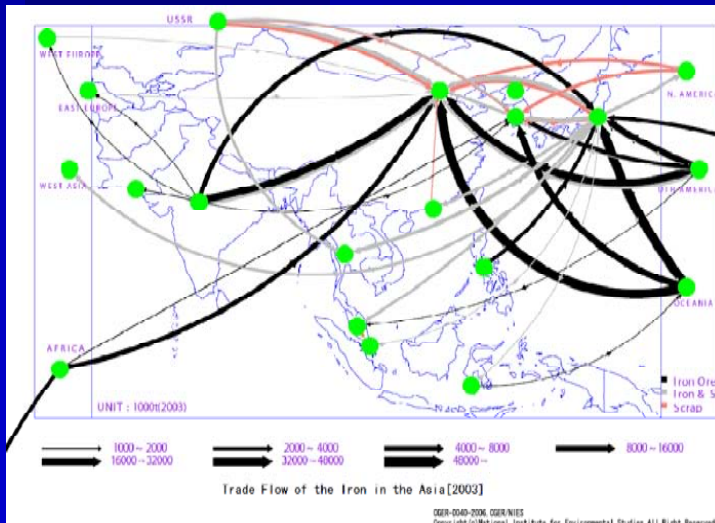
- Leading companies are addressing:
  - Design for Environment
    - Improve resource efficiency in production (efficient process, recovery of by-products) and consumption (ex: light weight, durable goods)
    - Reduce hazardous chemical used in products and remains in products or wastes
  - R&D for waste treatment/material recovery
  - Initiate Product Take Back System
    - Utilize supply chain advantage
  - Alter packaging practices
    - Reduce package weight, Plastic form to card board
  - Set resource efficiency/recycle target in each firm or industry
- **Drivers:** National targets, Cost reduction in resource and waste, Stricter chemical regulations (RoHS, REACH), Extended Producers Responsibility, Consumers selection
  - All of them need Governmental interventions.



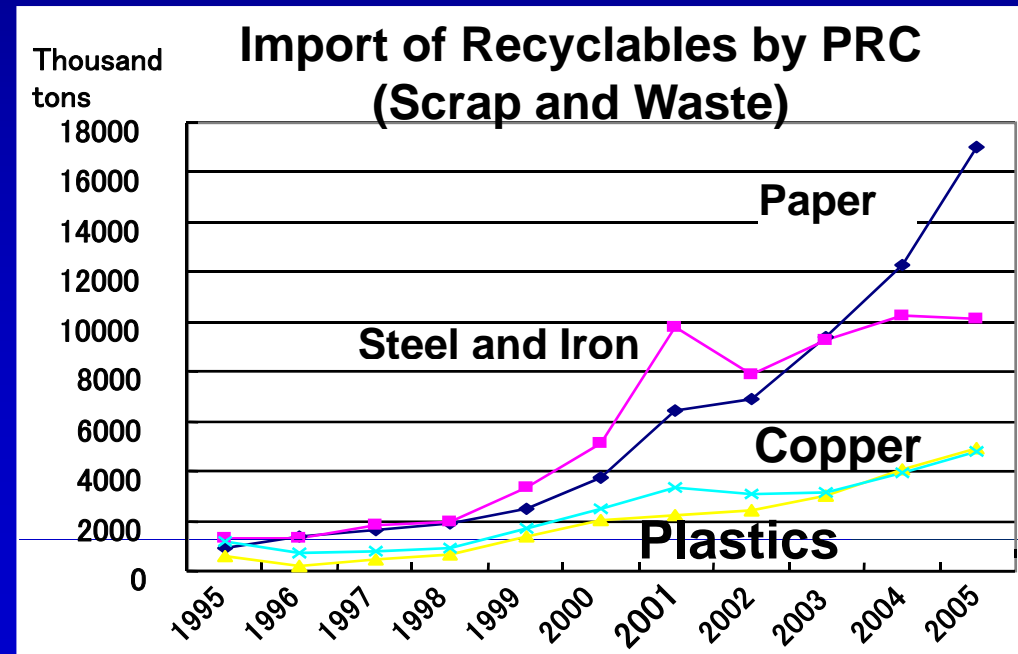
# Transnational Movement of Recycled Materials, Reusables, and Wastes

- Trade in recyclable materials is rapidly expanding among several countries
  - Fulfill high increasing demand along with economic growth
  - Development of collection system of recyclables in developed countries

International Trade of Iron Ore, Steel, and Scrap Iron in Asia (2003)



Source: Yuichi Moriguchi and Seiji Hashimoto(2006), "Material Flow Databook –Third Edition— World Resource Flows around Japan", Center for Global Environmental Research of NIES



# E-Waste Issue

- E-Waste is transferred beyond boarder and inappropriately processed for material recovery, causing serious pollution and health risks.
  - Domestic E-Waste generation is also increasing.



*Photo: M. Kojima*

## Inappropriate Resource Recovery:

- Manually dismantling w/o protection gear
- Open burning (electric wires, circuit board, etc.)
- Backyard smelter of heavy metals or even in house burning
- Residue goes to open dump

# Key Messages:

1. Increasing waste generation/inefficient resource consumption threatens sustainability and prosperity in the region.
2. Rapid reform to resource efficient society with 3R principles is essential. (material, energy & water)
3. Huge opportunities lie in ahead.
4. Several actions have been initiated, and need to be further accelerated/disseminated.
5. Governmental roles are important to realize opportunities.
6. Emerging trans-boundary movement suggests an opportunity in region wide efficiency, but it needs careful assessment, and enhanced responses to avoid environmental risks with regionally concerted efforts.



## For More Information

See "Toward Resource Efficient  
Economy in Asia and the Pacific"

- Reduce, Reuse, and Recycle -  
(to be released)

<http://www.adb.org/>

## For Comments & Inputs

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