

Institute for Global Environmental Strategies

Impact of East Asian Economic Integration over resource demands and 3R policy of end of life products

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The 3rd International Conference on Waste Management and Technology, November 5-7th 2008, Tsinghua University, Beijing, China

Institute for Global Environmental Strategies (IGES)



- Founded in 1998 with supported from the Government of Japan,
- Policy research institute working to promote SD in the Asia-Pacific region, involved in a number of policy processes such as 3R Initiative and APFED,
- 7 Project Areas: Climate Policy, Biofuel, Forest Conservation, Fresh Water, Waste and Resources, Capacity Development and Education, Business and Environment.
- 2 teams for inter-project collaboration: Policy and Governance Team and Economic Analysis Team
- 60 full time researchers
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Outline of the presentation

1. Internationalization of waste and recycling-related issues
2. Limitation of nation-based recycling system
3. Modeling analysis of impact of regional economic integration (2001-2020)
4. Four strategic options
5. Regional recycling mechanism as a strategic option

1-1. Internationalization of waste and recycling –related issues in Asia

Waste and recycling issues have been internationalized; they can no longer be addressed by domestic measures alone

A. Problems from economic integration

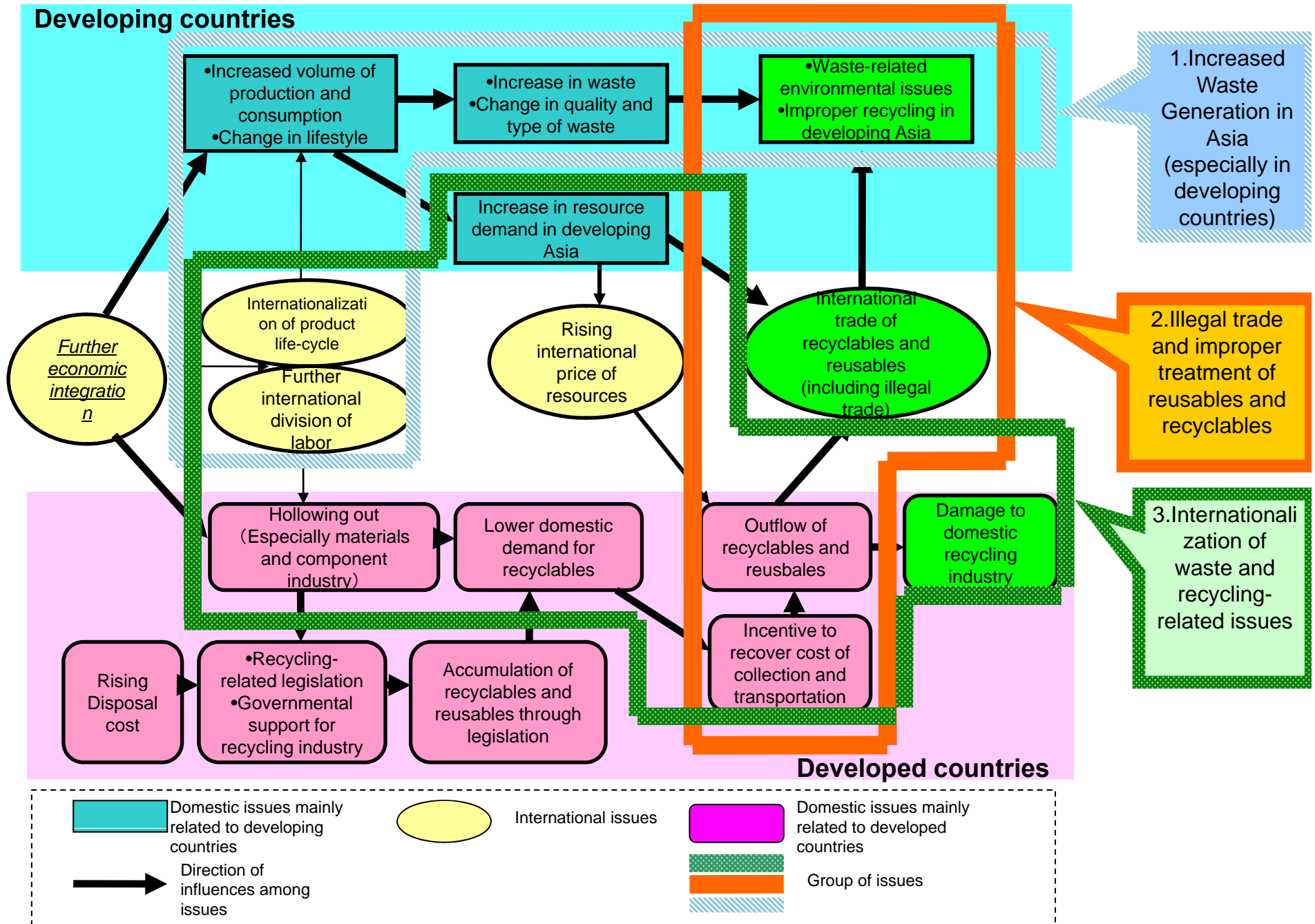
- Increased waste generation (quantity and complexity)
- Increased illegal waste trade, trade in recyclables, improper recycling
- Environmental damage from improper recycling and illegal and open dumping
 - Especially air, water, & soil contamination
 - Especially toxic and hard to manage materials from e-waste

B. Opportunities from economic integration

- Opportunity for increased efficiency and specialization in recycling (increased efficiency of resource utilisation)
- Increasing needs for regional policy response

See more detailed argument in Hotta and Elder et. al. (2008), "Policy Considerations for Establishing an Environmentally-Sound Regional Material Flow in East Asia." *The Journal of Environment & Development.*, March 2008

1-2. Internationalization of waste and recycling-related issues in Asia



Source: Hotta, Elder et al. (2008)

2. Policy implications of internationalization of waste and recycling-related issues: a case of Japan

Under expected further economic integration of East Asia and Southeast Asia, the following issues will become more prominent than now;

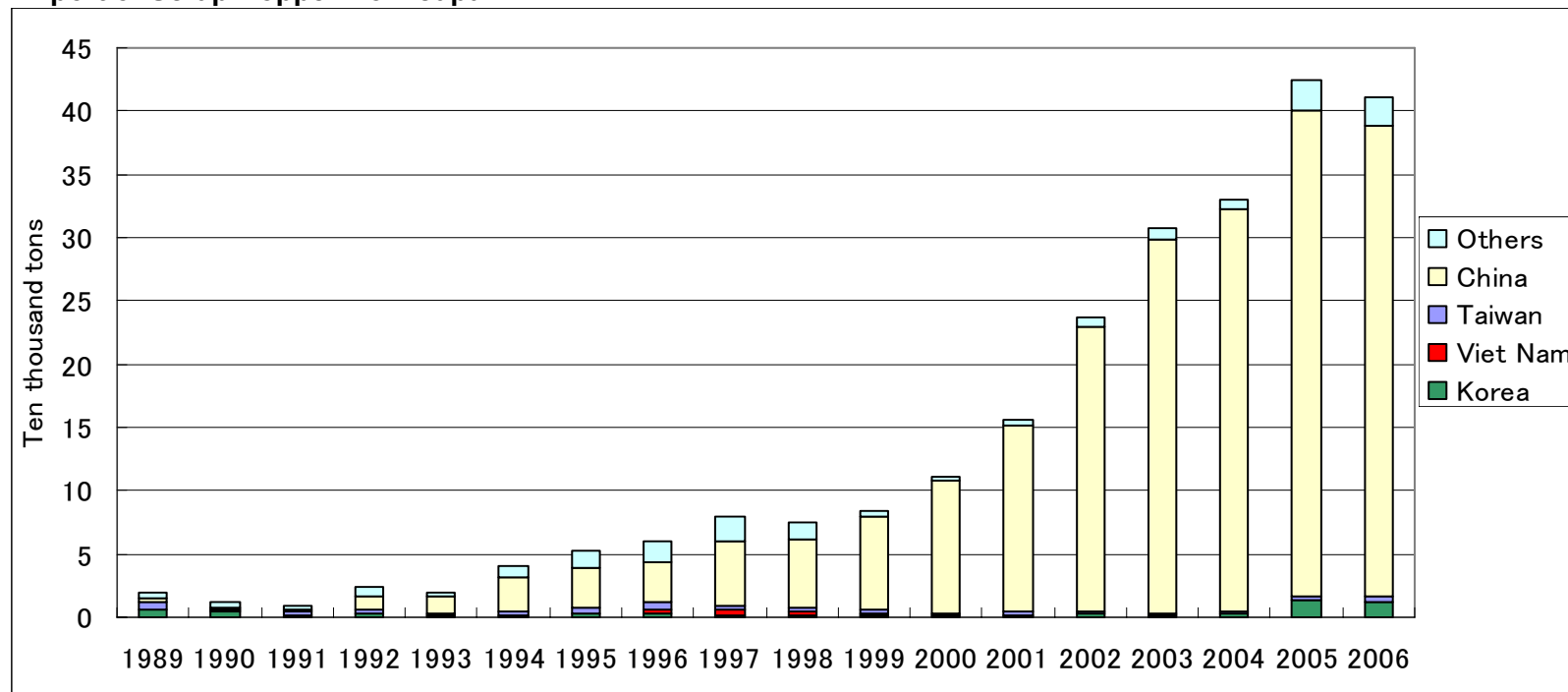
- Further outflow of recyclable resources
- Further expansion of foreign market of secondhand goods
- Increasing demand for rare/precious recyclable resources

2-1 Further outflow of recyclable resources

Outflow of Japan's recyclable materials is basically a regional issue based on structural change in East Asian Economy.

More than 90% of the export of scrap plastic and scrap copper is to China and Hong Kong.

Export of Scrap Copper from Japan



Note: For Scrap Copper, the chart is based on HS Code (7404).

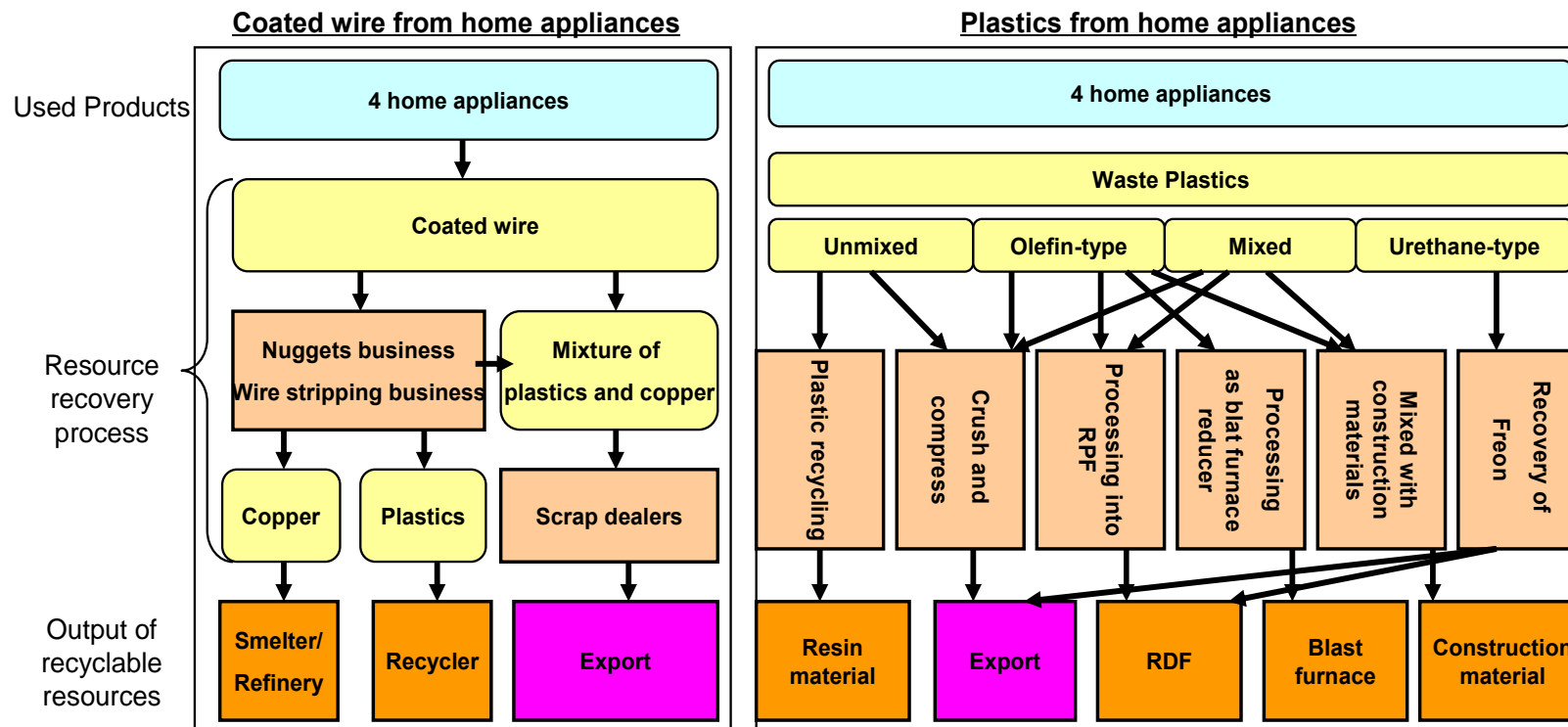
Source: Calculated from Trade Statistics of Japan (

<http://www.customs.go.jp/toukei/info/index.htm>)

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Mixed low quality material which can not be recycled in economically feasible manner tend to be shipped to developing counties.

Around 33.7% (7.71 million units) of total estimated discharge (22.87 million units) of used four-types of home appliances from house and business facilities are shipped outside of Japan either as reuse purpose (around 26.0% of total estimated discharge) or for resource recovery (around 7.7% of total estimated discharge).



2-2 Further expansion of foreign market of secondhand goods

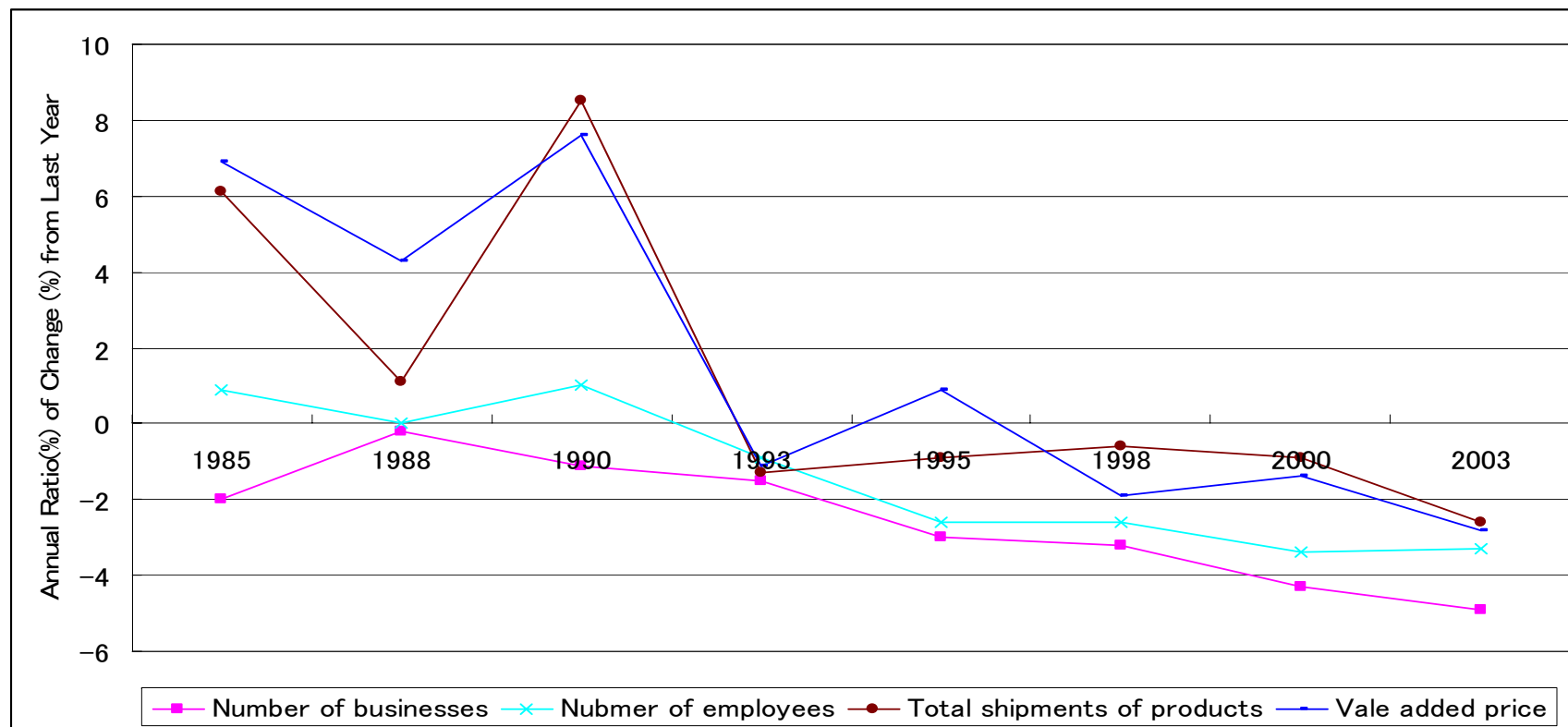
For reuse purpose, 5.94 million units; around 26.0% of total estimated discharge has been shipped outside of Japan since the introduction of home appliance recycling law.

Through further economic integration, trade of second hand goods in addition to new products will be increased. This can facilitate disguised trade without regional policy response to control trade of secondhand goods.

2-3 Increasing demand for rare/precious recyclable resources

In the long trend, Japan's manufacturing industry, especially material industry, has been decreased in number of businesses, employees, annual shipments, and total value added.

Changes in annual ratio of increase/decrease in number of businesses/ employees/ total shipments/ and total value added price in Japan's industrial sector



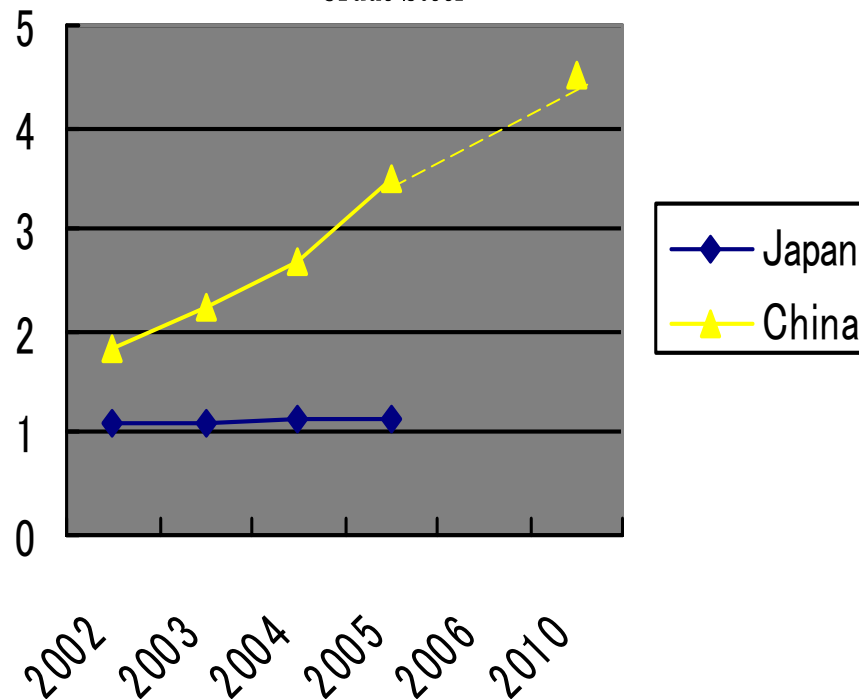
Source; METI (2006), 'Industrial Sector of Japan 2006'

2-3 Increasing demand for rare/precious recyclable resources

In contrast, production of materials industry in developing Asia has been increasing in recent years.

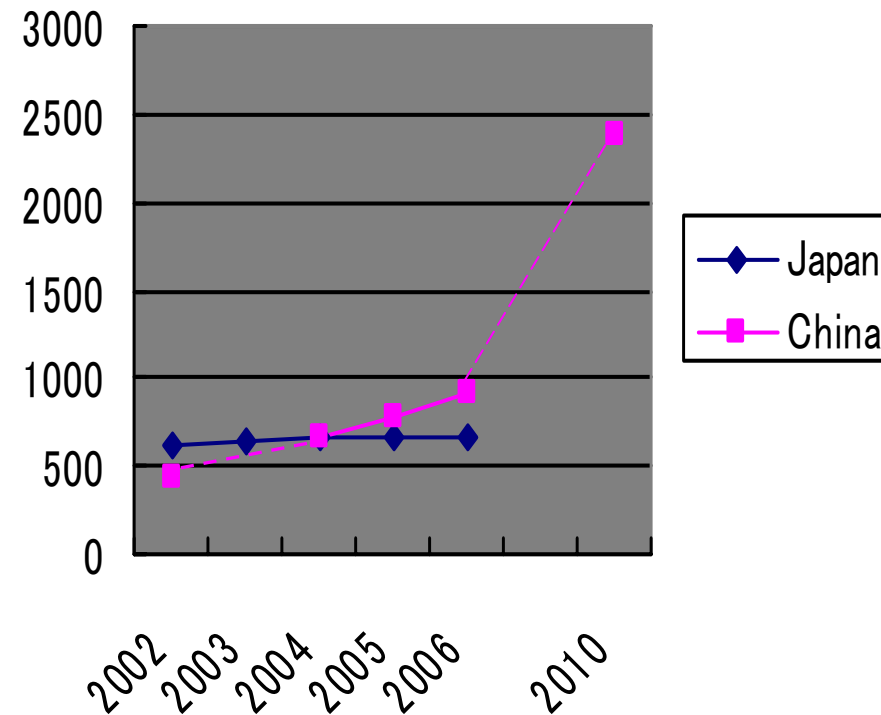
(Production amount, 0.1 billion ton)

(Graph) Production of Crude Steel



(Production amount, 10 thousand ton)

(Graph) Production of Aluminum



Note; Production in 2010 of China is based on an estimate by Takeda (2006). See; Katsutoshi Takeda (2006), "Risk Management in Chinese Business", Mitsubishi Corp www.gsc-asiabusiness.jp/workshop/2006/asi_15_03.pdf

For crude steel production and aluminum production in China, the figures are based on JOGMEC(Japan Oil, Gas and Metals Corporation)'s database.

http://www.jogmec.go.jp/mric_web/kogyojoho/2003-05/2003-05-01.pdf

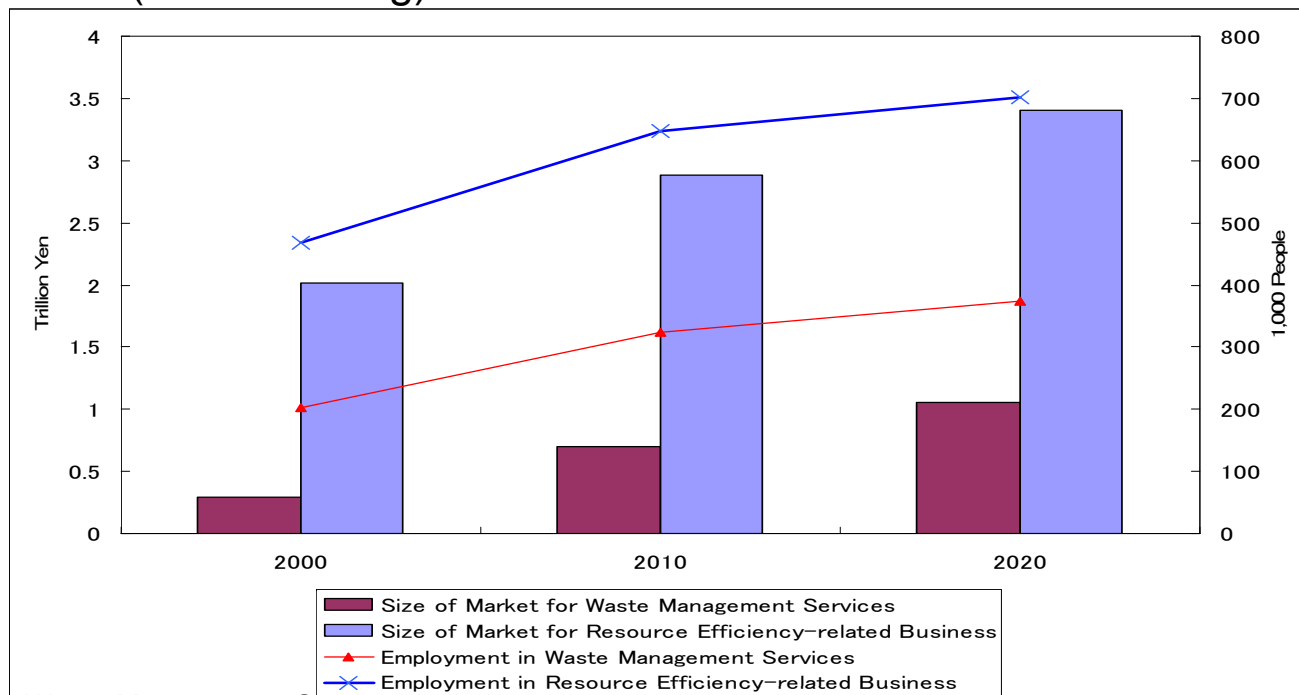
2-3 Increasing demand for rare/precious recyclable resources

- Longer trends shows decreasing demands of comparatively low quality materials such as recyclable resources in Japan.
- Ironically, this hollowing out of materials industry was the major incentive for Kawasaki and Kita-kyushu to start Eco-towns project of developing recycling/environmental industry by utilizing the existing infrastructure of environmental management and legacy of environmental technology of heavy industry.

2-3 Increasing demand for rare/precious recyclable resources

New business for materials industry(“urban mining”, “eco-facturing”)

- Higher rate of precious material content in used electronic and electric goods than ore.
- Cost recovery by providing waste processing/treatment services for toxic substances.
- If high-tech manufacturing industry remains in Japan, the domestic needs for rare metals continue to exist.(Urban mining)



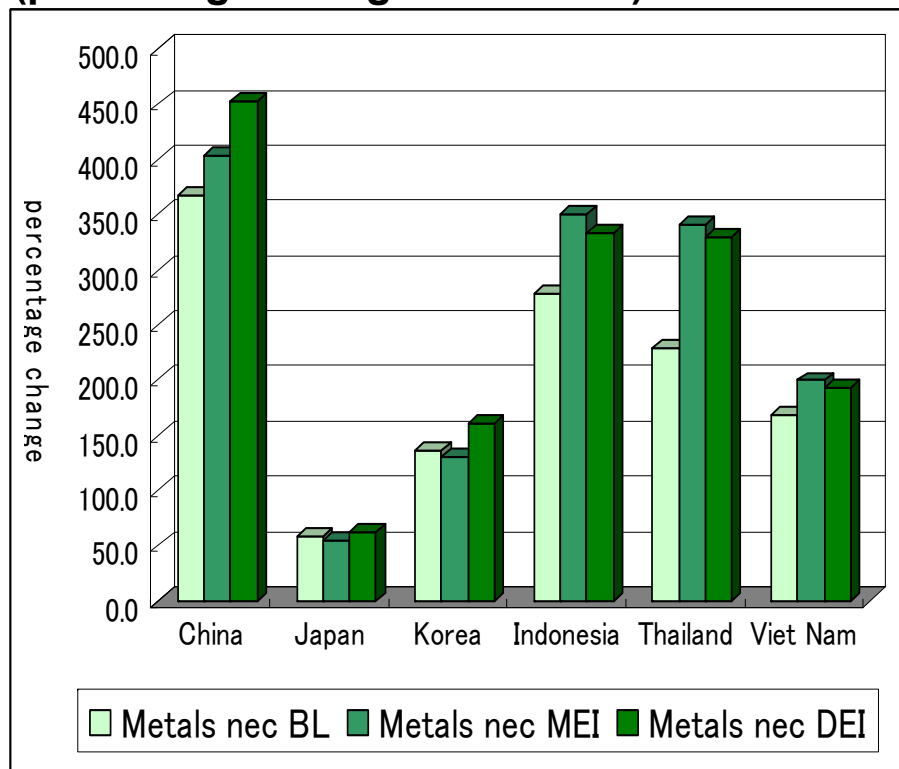
Note; Waste Management Services include;

Source; estimate by MOEJ in 2003. The date is cited from MOEJ website.

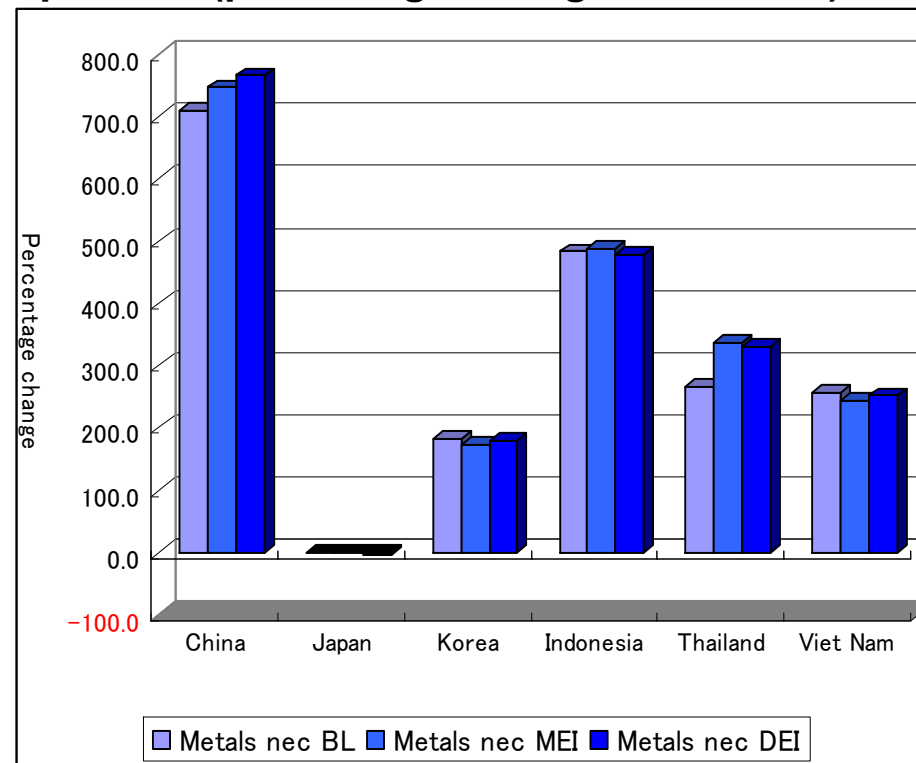
See http://www.env.go.jp/press/file_view.php?serial=4625&hou_id=4132

3-1. Example of Analysis of Impact of Prospective Regional Economic Integration (2001-2020): Demand of metal materials (import and domestic)

Electronics sector's demand for imports (percentage change 2001-2020)



Electronics sector's demand for domestic product (percentage change 2001-2020)



- Huge increase in electronics industry's demand and trade of metals (also consumption of electronic goods) =>
- Huge increase in potentially hazardous e-waste

3-2. Analysis of Impact of Regional Economic Integration (2001-2020)

1. The above result is to get some indirect suggestions on how economic integration drives increasing demands in potentially hazardous recyclables.
2. It assumes that metal demands in electronic sectors may drive more trade in mixed and potentially risky materials including non-ferrous/rare metals such as e-waste.
3. Metal needs for electronics will increase much higher than needs for construction sector.
4. Thus, the result can conclude demand for imports of potentially hazardous recyclables which includes metals will be significantly increased in developing Asia.
5. However, domestic consumption of materials continues to increase. Thus, trade measure may not be enough for proper management of used products with hazardous substances.
6. Modeling analysis does not directly reflect “resource availability” and “trade in recyclables”. Thus, reflecting these aspects would be a potential future task.

4-1 Four Strategic Options for Sound Material Cycle Society in Asia

Strategic option	Characteristics	Pros	Cons
A. Status-quo	<ul style="list-style-type: none"> •No significant effort since 2005. •Waste trade is regulated, but not well enforced •No regional coordination for capacity and infrastructure building 	<ul style="list-style-type: none"> •Requires no additional effort 	<ul style="list-style-type: none"> •Environmental problems from improper management, etc.↑ •Effectiveness of domestic policy ↓ •Political pressure from non-OECD to OECD countries↑ •Incentive for illegal trade ↑ •Outflow of materials from OECD countries
B. Basel ban amendment	<ul style="list-style-type: none"> •Regional ban of export of hazardous waste for recycling purpose from OECD to non-OECD countries 	<ul style="list-style-type: none"> •Illegal trade ↓ •Political pressure from non-OECD to OECD countries ↓ •Outflow of materials from OECD countries ↓ 	<ul style="list-style-type: none"> •Difficult to enforce •Efficient use of resources ↓ •No regulation for south-south trade •Obstacle to companies efforts ↑ •Consumption of virgin materials ↑ •Incentive for technology transfer↓ •Resource prices ↑
C. Free trade of waste and recyclables	<ul style="list-style-type: none"> •Reduction of trade barrier •Market forces determines environmental impacts from recycling and waste trade 	<ul style="list-style-type: none"> •Optimization of material supply↑ •Reduction of trade barrier 	<ul style="list-style-type: none"> •Environmental problems↑ •Difficult to enforce regulations •Political pressure↑ •Vulnerability of domestic recycling mechanism to price change↑
D. Regional recycling mechanism	<ul style="list-style-type: none"> •Stronger management of trade in recyclables by introducing incentive mechanism •Promotion of sound and efficient trade under Basel framework 	<ul style="list-style-type: none"> •National capacity↑ •Technology transfer↑ •CD of recyclers↑ •Improper recycling ↓ •Builds on existing policy framework 	<ul style="list-style-type: none"> •Transaction cost without central authority in the region↑ •Needs for cost sharing mechanism↑ •Effectiveness without enforcement?

4-2 Lessons from Japan's experience

Policy	Lessons
Eco-town (subsidized development of recycling industries)	<ul style="list-style-type: none"> • Needs <u>constant, stable and large supply of recyclables</u>. Eco-towns constructed <u>near large cities tend to be more successful</u>. • Needs <u>materials industry as well as manufacturing industry</u>. • Successful in <u>developing nation-wide role sharing</u> for recycling as well as technical and technological capacity • Back-up from <u>product-specific recycling legislation</u> is necessary. • <u>Location and transportation are very important</u> for cost effectiveness. • To stabilize periodic supply distortions, <u>networking of these facilities</u> can be one option.
EPR-based obligatory recycling scheme	<ul style="list-style-type: none"> • Does <u>not directly contribute to prevention of pollution</u> • Needs to <u>identify producer and importers</u>. • Needs <u>many supporting mechanisms</u> • <u>Cost effective</u> for increasing recycling capacity • <u>Trade of secondary materials as loophole</u> • Some kind of regional cooperation, <u>other than EPR-based recycling policy, are necessary to prevent loopholes</u>. • <u>EPR from cost sharing to information sharing</u>
Certification scheme for good recyclers and traders	<ul style="list-style-type: none"> • Different type of certifications are possible: formal/obligatory registration, quasi-formal and voluntary. • Need to identify <u>who pays cost</u> • Burden may be <u>higher for small recyclers</u>; easier for larger ones • Major cost may be <u>transaction costs</u> • Needs <u>information sharing mechanism</u>

5. Regional recycling mechanism as a strategic option

	Institutional development	Infrastructure development	Information and knowledge development
Overall regional policy option	Regional Recycling Mechanism		
Regional Policy	<ul style="list-style-type: none"> •International burden sharing for difficult to manage materials •International financial support for domestic infrastructure/information development 	<ul style="list-style-type: none"> •Networking of eco-towns/eco-industrial park through recycling port 	<ul style="list-style-type: none"> •Information sharing between upstream and downstream on valuables and hazardous substances in the products •Certification for good recyclers/traders
National Policy	<ul style="list-style-type: none"> •EPR-based obligatory recycling mechanism 	<ul style="list-style-type: none"> •Promote development of domestic recycling capacity through eco-towns/eco industrial parks policy 	<ul style="list-style-type: none"> •Statistical information •Development of inventory •MFA

Both regional and national policies are necessary, in Asia