Asian Network of Major Cities(ANMC)21

Promotion of Environmentally Sound Waste Management and Resource Recycling

Strategic Solid Waste Management In Developing Countries

田中　勝

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Collaboration

- Act of working together to achieve something.
- 3R society is the society which we like to create by 3R and proper disposal of solid waste .

(Reference) Overview of "Strategy for a 21st Century Environmental State"

Ministry of the Environment

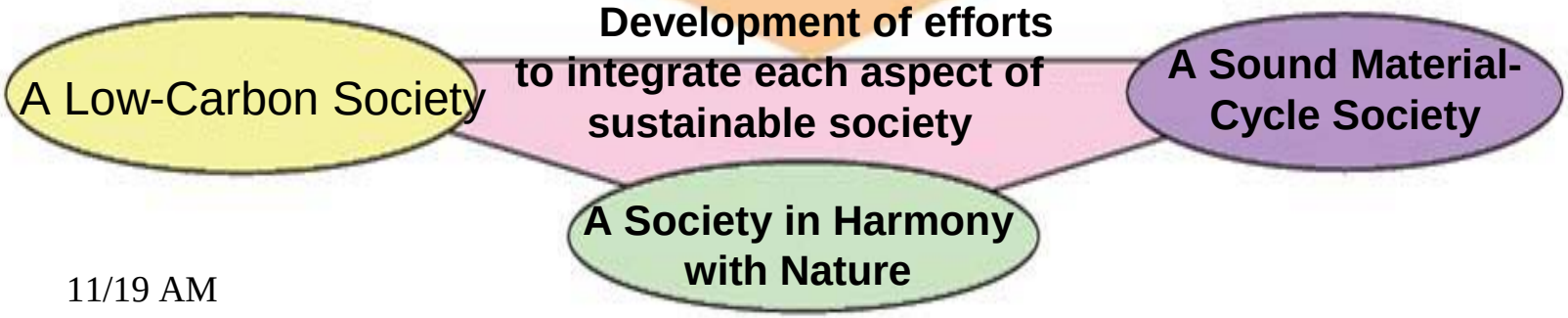
1. Current conditions and challenges of the global environment

Global Warming Crisis

Crisis caused by the Waste of Resources

Ecological Crisis

A sound and abundant environment is the product of an endless history. Its blessings should be passed on to future generations and shared between generations. However, environmental load has exceeded its capacity, and the balance once possessed by the global ecosystem has collapsed, and if left as is, there is concern regarding the difficulty of sustainable development in the social economy. Issues regarding the global environment are also closely related to issues regarding human security, and are the greatest test facing mankind.



① Collaboration of

- 3 different efforts to tackle for three major crises simultaneously.

化石燃料に頼らない新エネルギーに期待は高まる（島根県出雲市のキララ多伎にて）

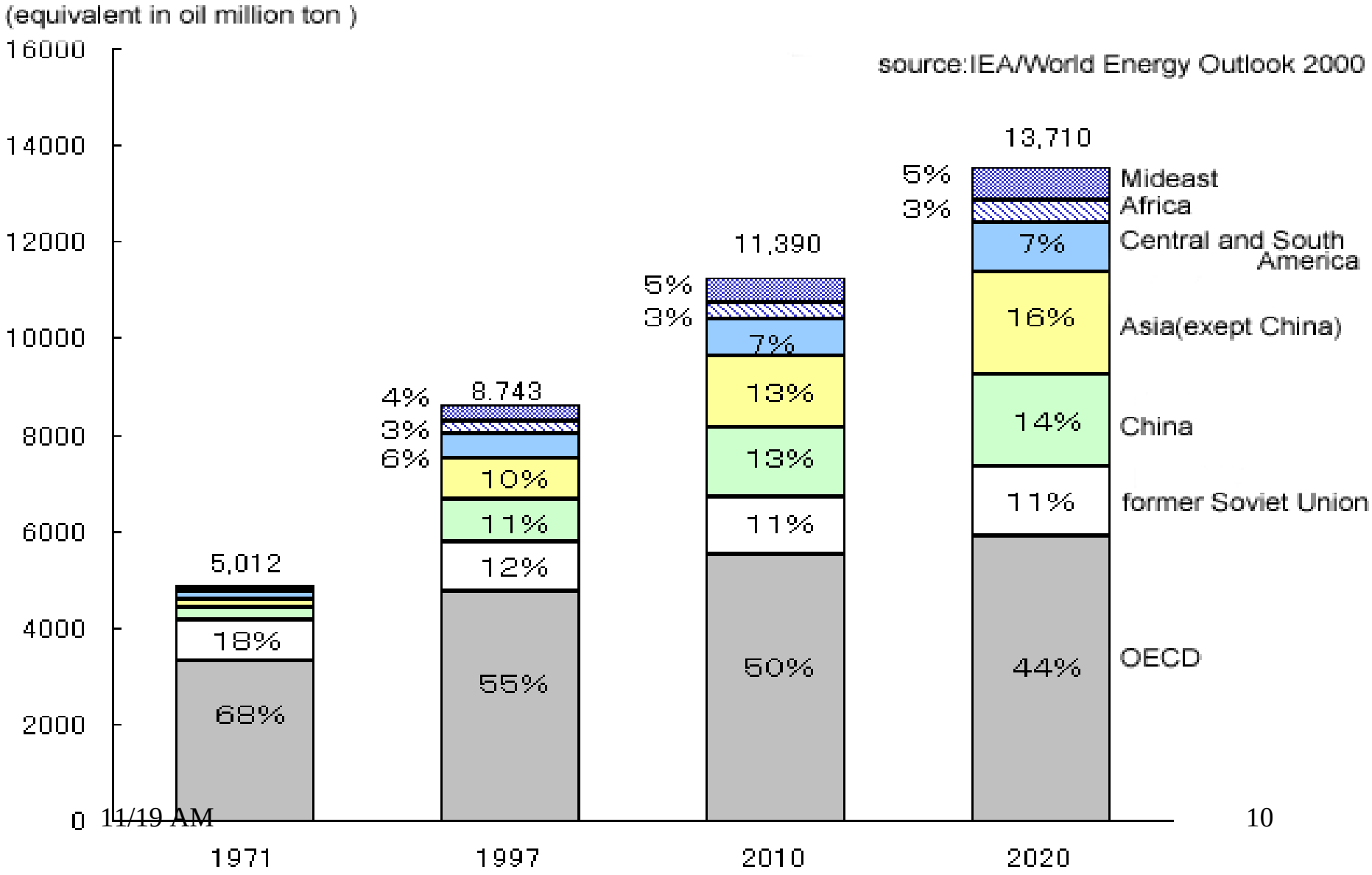
11/19 AM　　ごみ、下水汚泥からメタンガスを回収する資源化施設 (韓国プサン市）

School Bus Operated by BDF Processed by Used Cooking Oil

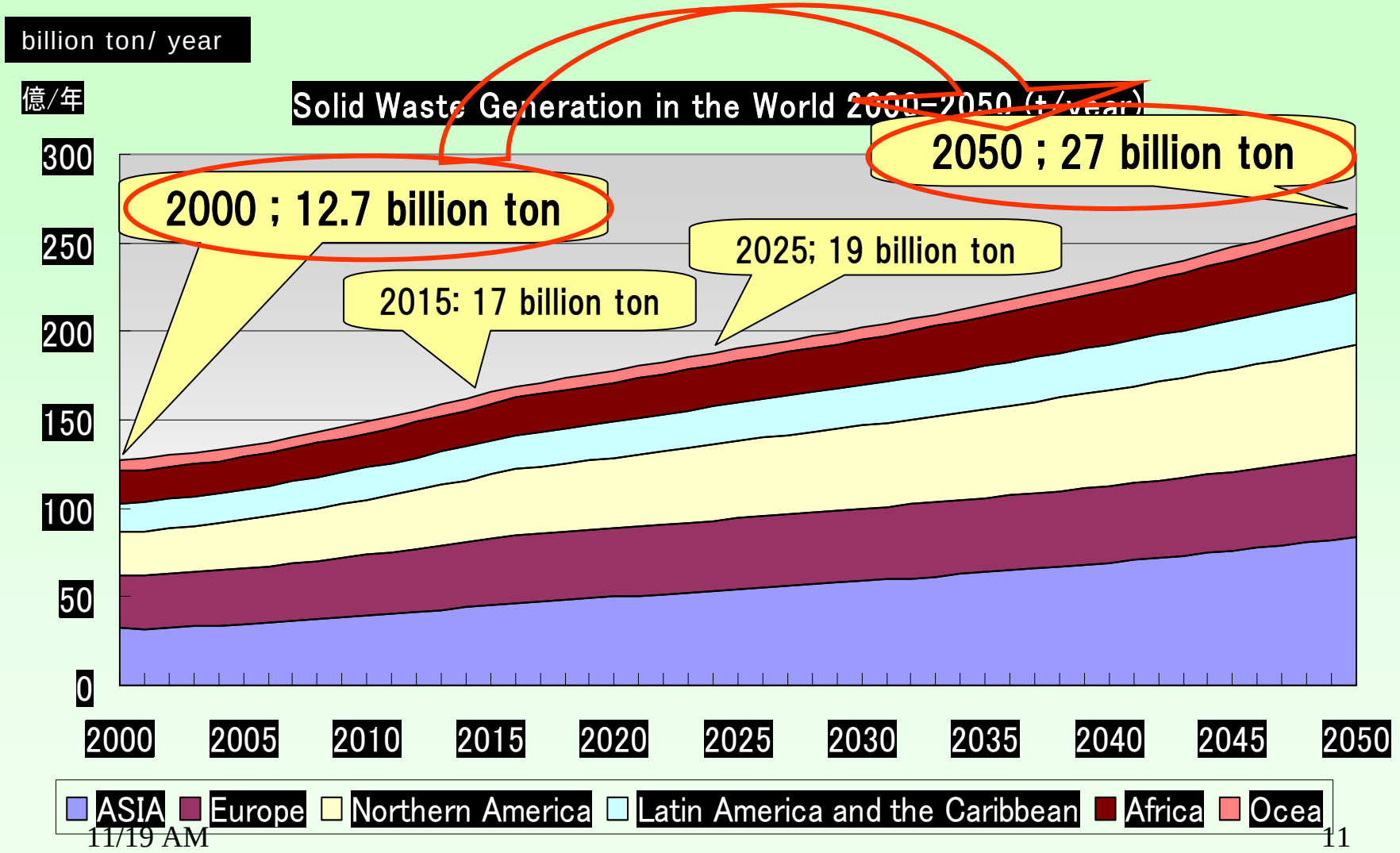
1. Issues concerning 3R society

Waste is index of resource consumption

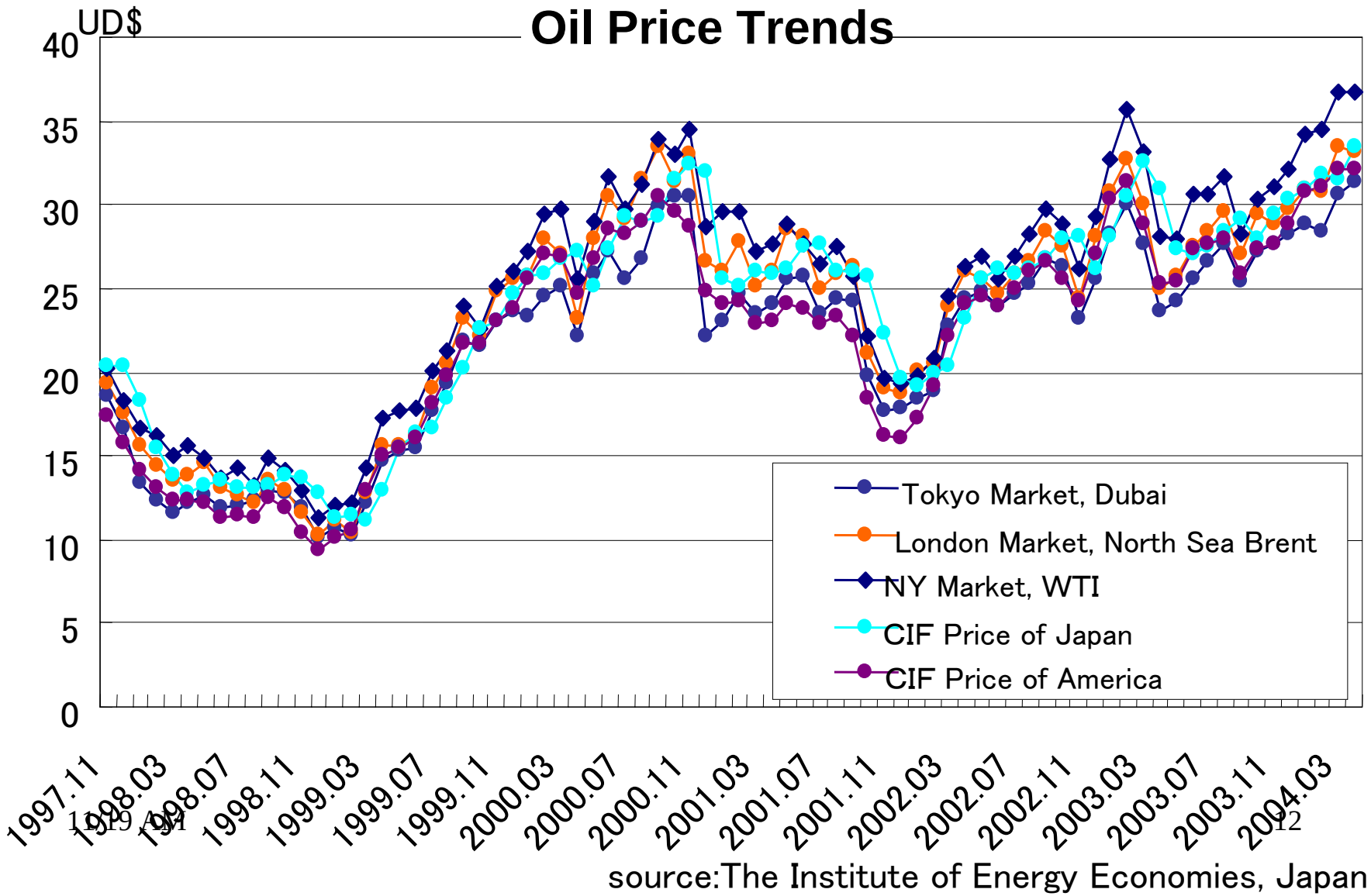
Consumption of Natural Resources



Solid Waste Generation in the World until 2050



Consumption of Natural Resources

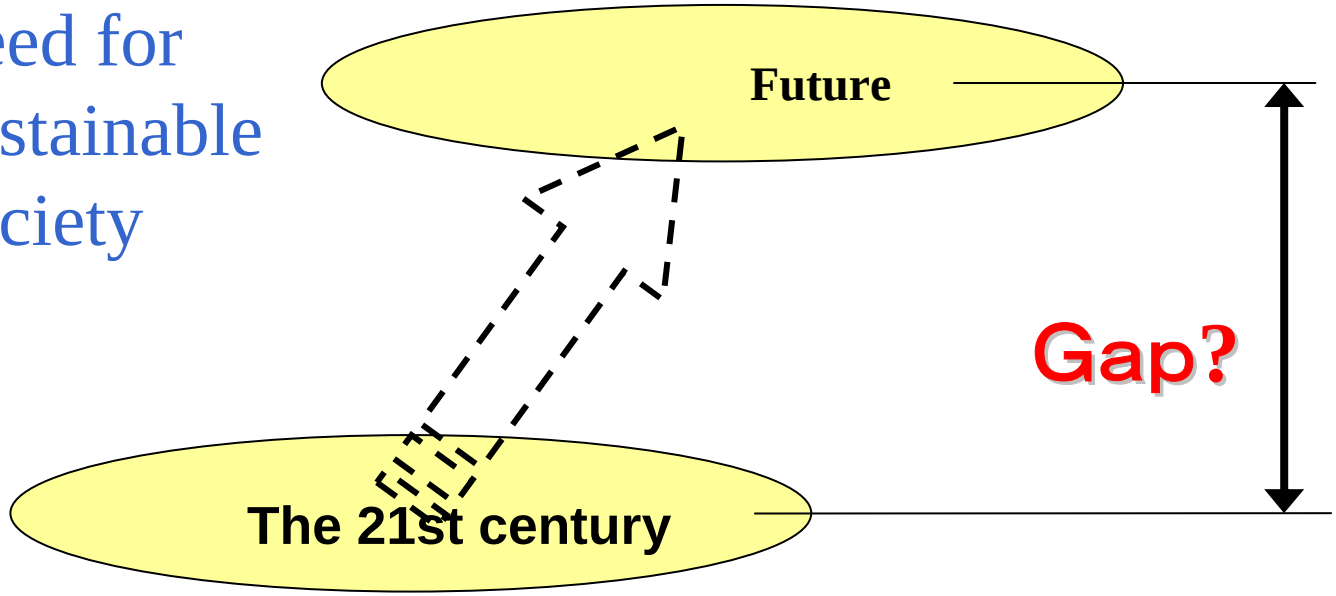


source:The Institute of Energy Economies, Japan

Good or Bad ?

• Bad Situation	Good Situation
• War	Peace
• Ill	Health
• Unhappy	Happy
• Poor	Rich
• Waste	Consumer Product

Need for Sustainable Society



Mass Production, Mass Consumption, Mass Disposal

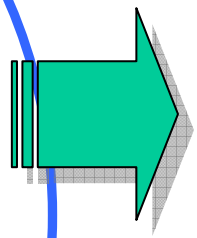
Conceptual view of 3R Society

From realization of a SMS to sustainable development

Realization of a SMS

SMS

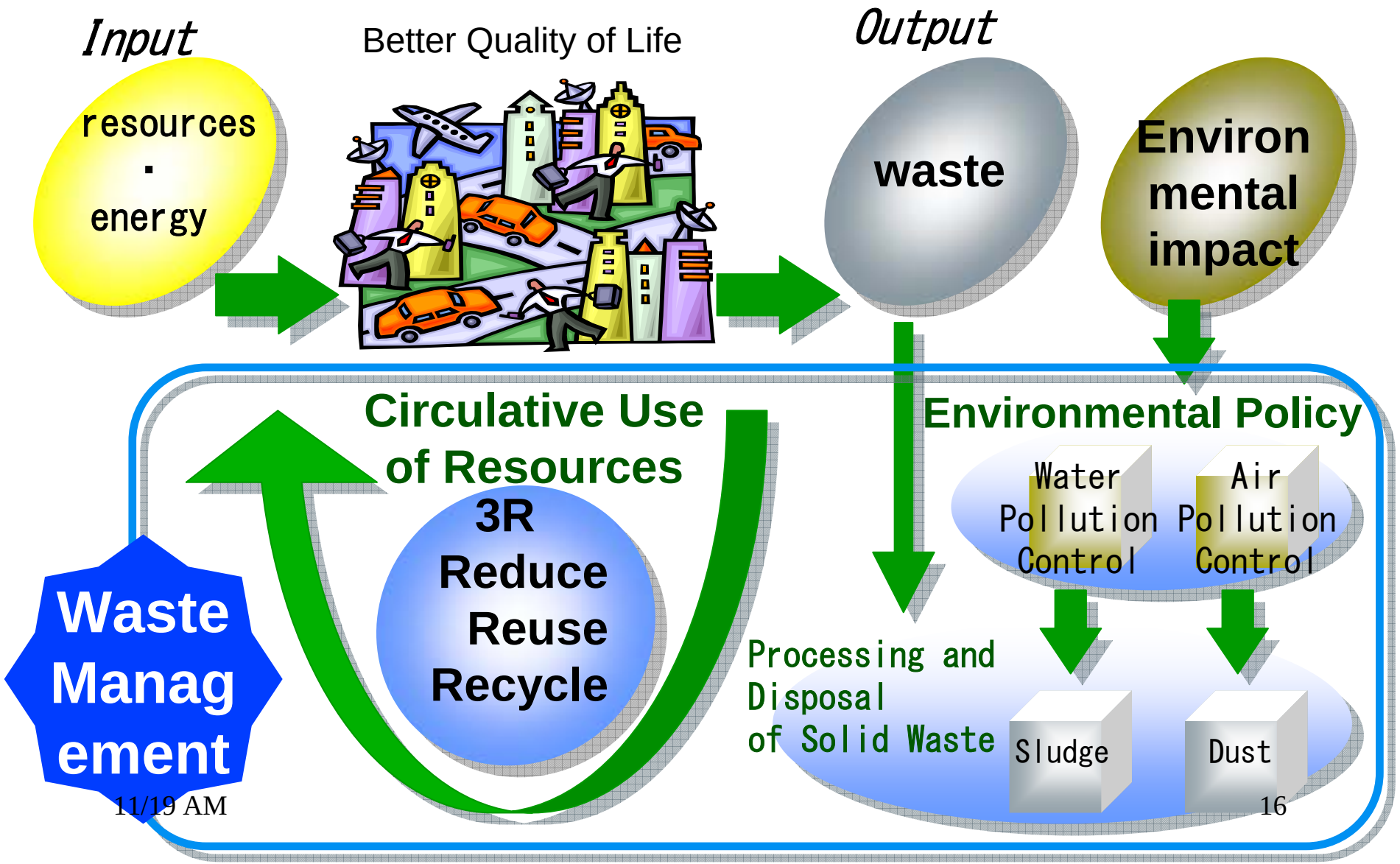
- The consumption of natural resources is minimized
- The environmental impact is reduced as much as possible
- Established by promoting reduction, reuse, recycling, heat recovery and appropriate disposal.



Realization of "sustainable development"

A SMS is a desirable state of socio-economic system that will realize "sustainable development", the world's common goal of environmental policies.

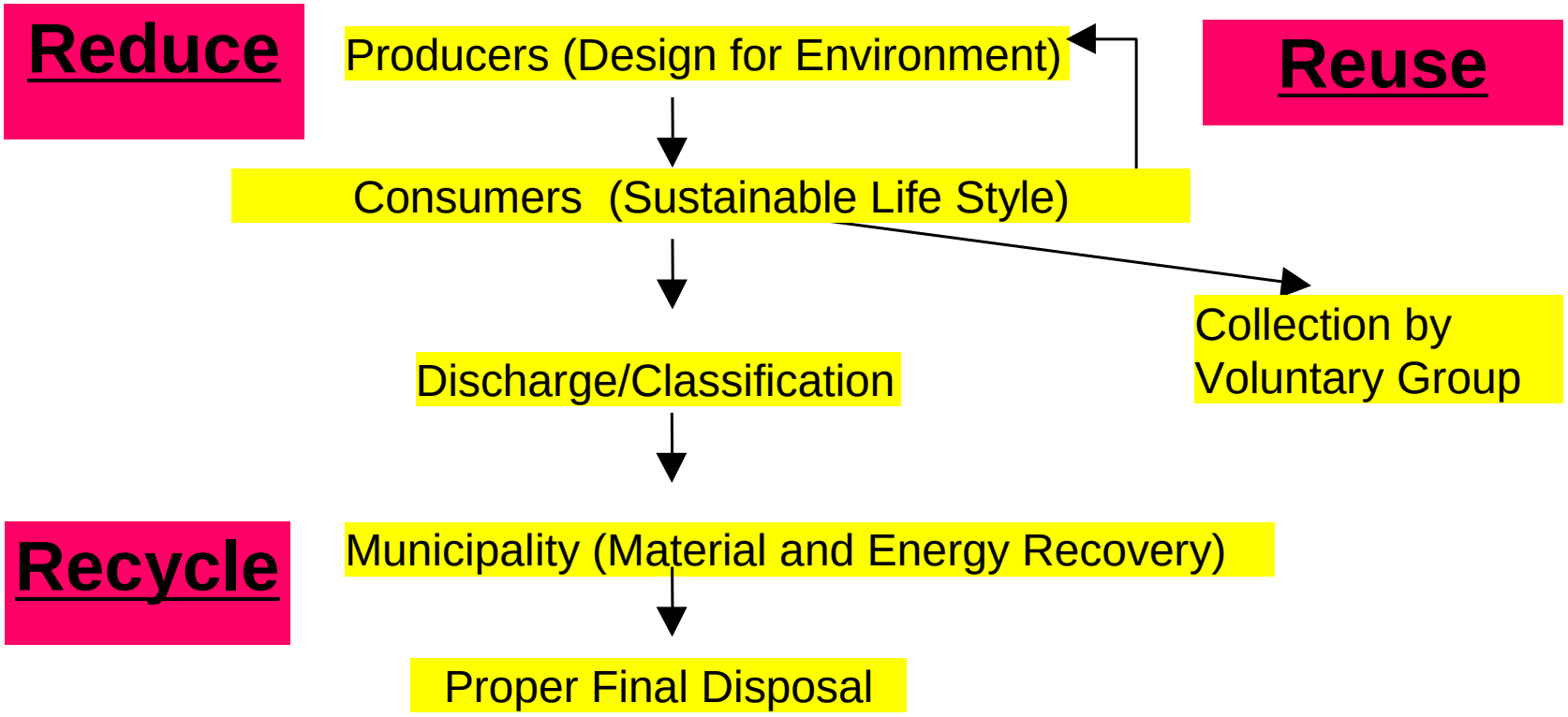
Sustainable Society and Waste Management



② Collaboration

- among effort for 3R and effort for proper waste disposal.

Basic Principle of Waste Management (3R Principles)



③ Collaboration among

- Reduce
- Reuse
- Recycle

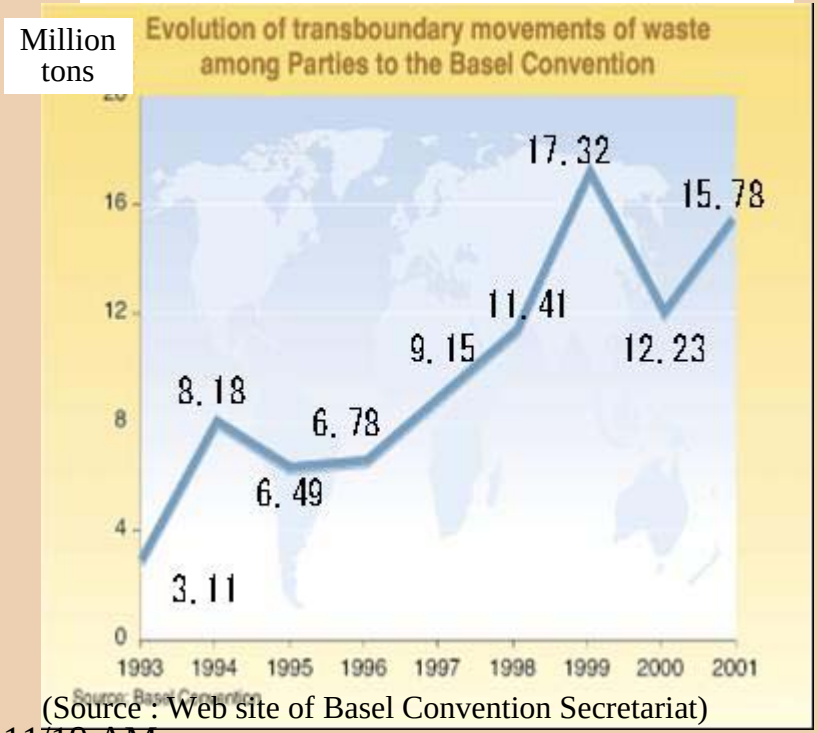
Current conditions of transboundary movement of circulative resources

Increase of the transboundary movement of "circulative resources" (CR)*

- Increased quantity of international transfers of hazardous wastes (increase 5 times in eight years)
- Increased quantity of CR exported from Japan (increase 9 times in ten years)

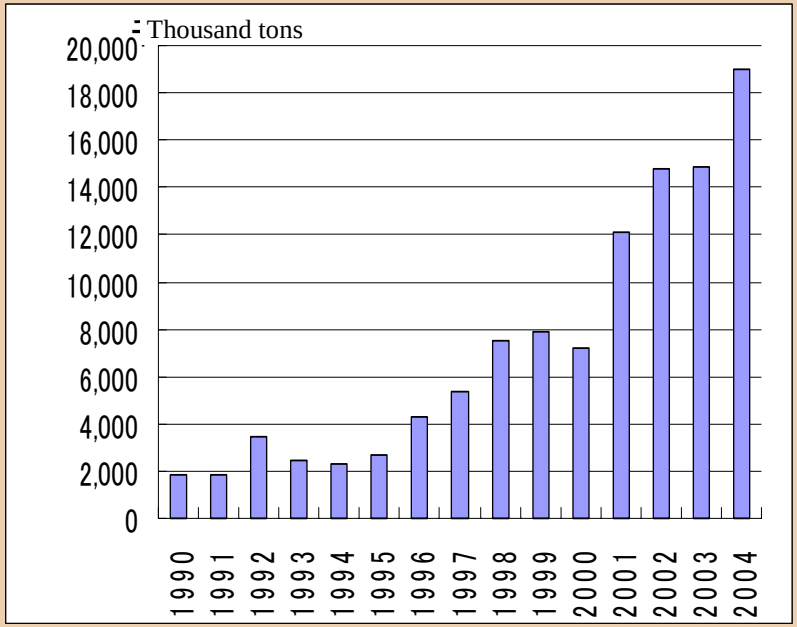
***circulative resources (CR) : include waste and other used things that are usable as resources.**

【Trend of trans-border transfers of hazardous wastes 】



(Source : Web site of Basel Convention Secretariat)

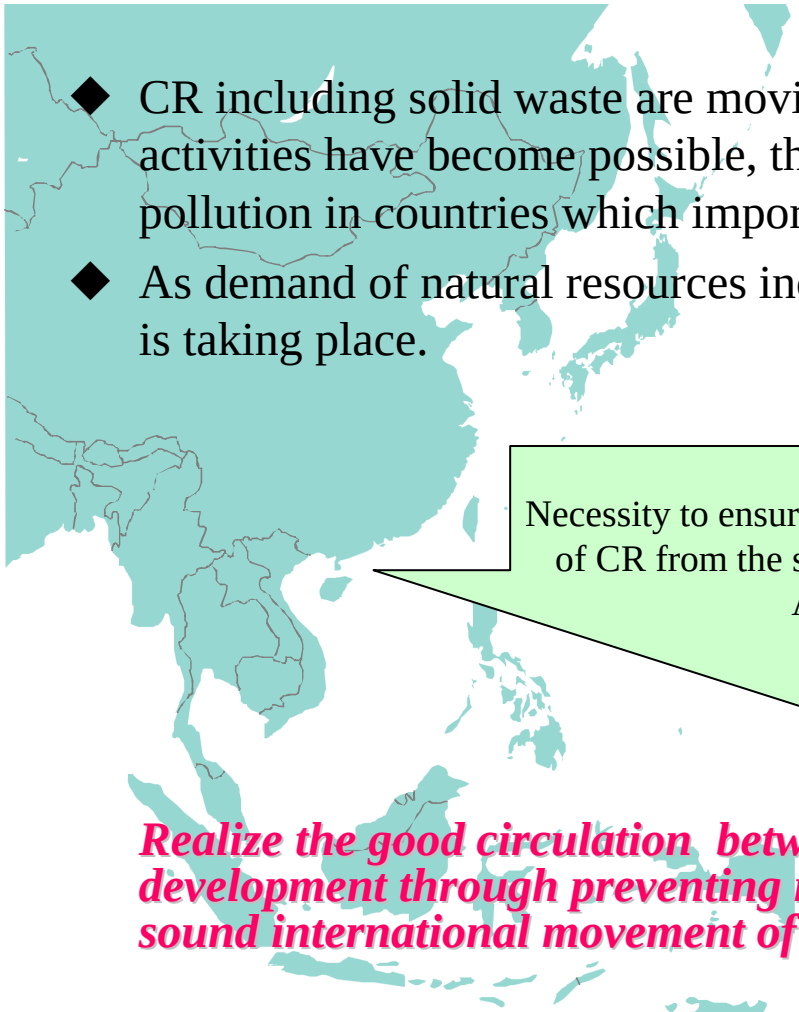
【Quantities of CR exported from Japan】



(CR include waste plastics and slugs, etc.)

(Source : Documents of recycling-oriented society planning division of the Central Environmental Council)

Discussion on construction of international 3R Society



- CR including solid waste are moving internationally. While transboundary 3R activities have become possible, there is a rising concern about environmental pollution in countries which import CR.
- As demand of natural resources increases, their prices are rising and resource shortage is taking place.

Necessity to ensure appropriate use and disposal of CR from the stand point of the entire East Asian region

Realize the good circulation between environmental conservation and economic development through preventing negative environmental impacts and securing sound international movement of CR.

Consideration of concrete policy measures in the Central Environmental Council (Discussion started in November, 2005)

2. Japan's experiences in waste management and 3R policies to be shared with other Asian countries

Japan's past conditions regarding waste issues

- Past policy measures of waste management were far from fundamental resolution; "Sweep the trouble under the carpet"
- "The chapter, the better" style prevailed in waste treatment. (Bad money drives out good money.)

Such insufficient management resulted in;

Huge-scale illegal dumping of waste such as in Teshima case

Accumulation of hazardous waste such as PCB

[Improper waste management by open incineration]

[Huge-scale illegal waste dumping]

[Improper storage of PCB waste]

Source: data by Ministry of the Environment

Progress of waste treatment

- Introduction of continuous-type furnaces in waste incineration facilities contributed to reducing gas emission
- Liner sheet and effluent treatment facilities are utilized in sanitary landfill sites

1960s

Present

1970s

Present

For Better Waste Management

Refuse Collection Coverage ↗

↓

Open Dumping → **Sanitary Landfill** ↗

↓

Incineration Rate for Combustible Waste ↗

↓

- Landfill Disposal Rate ↘
- Recycling Rate ↗
- Waste Generation Rate ↘

Basic Principle Underlying Waste Disposal

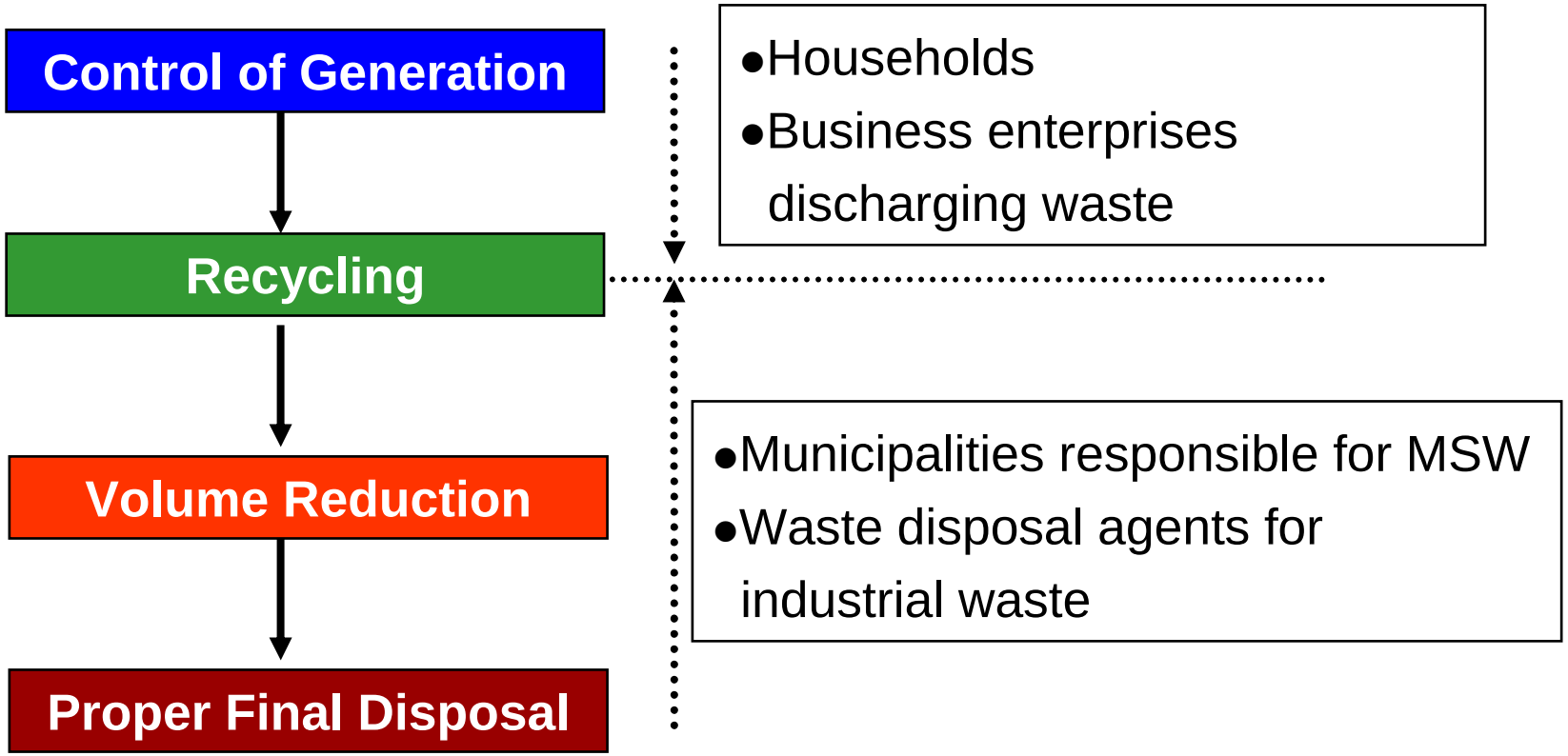


Table 1 History of waste-related legislation

Year	Purpose	Law
1900	Public hygiene measure	・Dirt Removal Law
1954	Living environment preservation	・Public Cleansing Law
1970	Domestic environment preservation	・Waste Disposal and Public Cleansing Law
1991	Global environment preservation	・Amendment of Waste Disposal and Public Cleansing Law ・Law for Promotion of Resource Recycling and Reuse
1995	Extended Producer Responsibility	・Law for Promotion of Separate Collection and Recycling of Packaging Waste (Package Waste Recycling Law)
1997	Proper disposal of industrial waste	・Amendment of Waste Disposal and Public Cleansing Law
1998	Extended Producer Responsibility	・Law for Recycling Specific Home Equipment Into New Products (Home Electric Appliance Recycling Law)

Extended Producer Responsibility

Production/ distribution stage	Consumption stage	Waste disposal stage
• Safety of workers • Prevention of the emission of a pollutant from a production process to the environment and general management • Financial and legal responsibility for full industrial waste control	Civil-law responsibility associated with a dangerous product	Financial and physical responsibility for post-consumption product management
← Scope of manufacturers' and distributors' responsibility in the past →		Scope of the administrative authorities' responsibility in the past →
← **Scope of EPR** →		

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

Significance of Reduction, Recycling and Effective Use

Separate Collection and Groups Collection

Approximately 1,300 municipal governments (approximately 40% of all) are collecting cans, bottles and used paper as recycled .

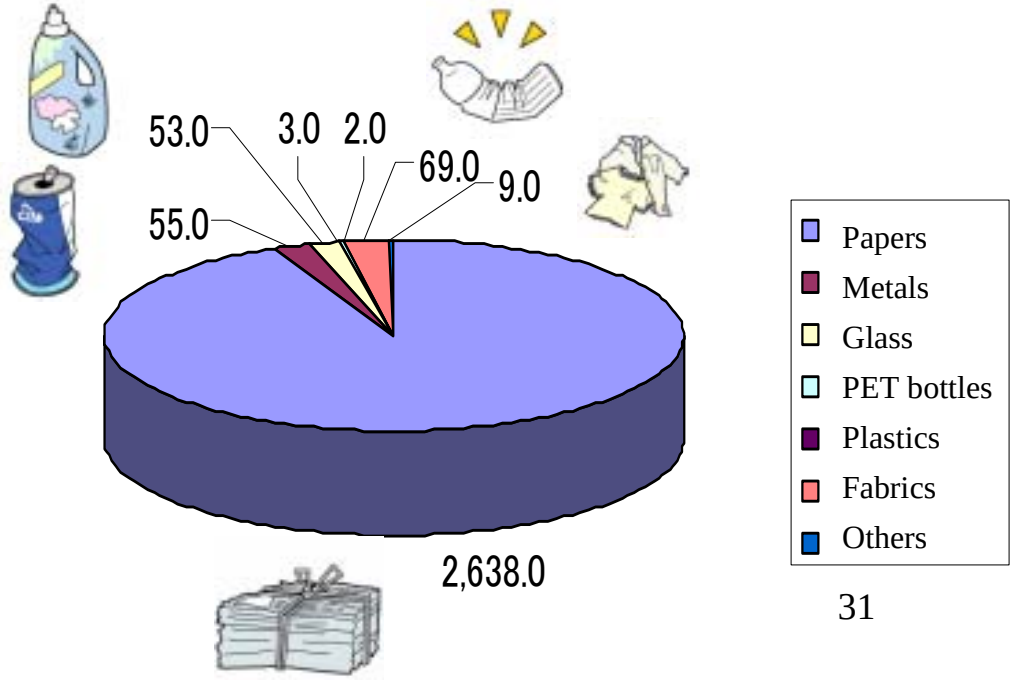
Group collection is a system under which local organizations, such as town associations, children's association and PTAs, collect recyclable wastes like metal scrap and glass bottles and deliver them to recycling companies with a view to efficient recycling. Revenues from such collection are used to fund local activities. Citizens' organizations registered for group collection numbered 82,000.

Promotion of a regional 3RSociety in collaboration of the local governments and NGOs/NPOs

Group collection of recyclable waste

- Local governments support activities to collect used papers, used magazines, used clothing, etc. by citizens' groups, NGOs/NPOs, etc. (group collection)
- ¥1～4/kg of collected recyclables are subsidized.
- About 3,000 tons/year of solid waste are recycled through this group collection

[Details of waste by group collection in Japan (thousand tons)]



Legislative framework to create 3R society

Basic Environment Law

Basic Environment Plan

Fundamental Law for Establishing a SMS (Basic Framework Law)

Securing SMS Restraining the consumption of natural resources Reducing environmental impacts

Fundamental Plan for Establishing a SMS:

Principles for other basic plans of the state government

<Appropriate treatment of waste>

<Promotion of recycling>

Waste Management and Public Cleansing Law

Law for the Promotion of Effective Utilization of Resources

Regulations according to the characteristics of individual items

Law for Promotion of Sorted Collection and Recycling of Containers and Packaging

Glass, bottles, PET bottles, etc.

Home Appliance Recycling Law

Air conditioners, refrigerators, freezers, TV sets, washing machines

Foods Recycling Law

Food residues

Construction Waste Recycling Law

Timbers, concrete, asphalt

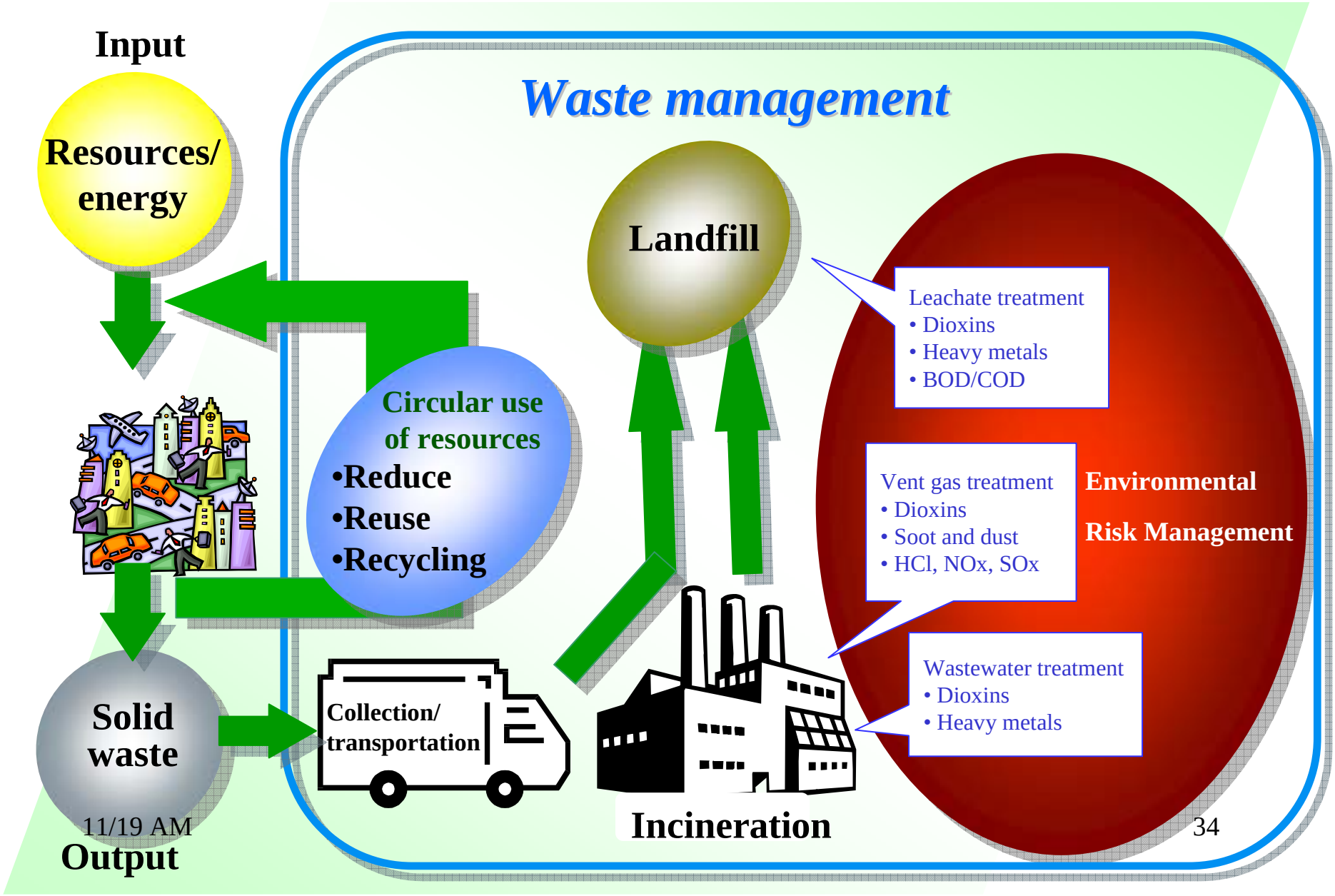
End-of-life Vehicle Recycling Law

Vehicles

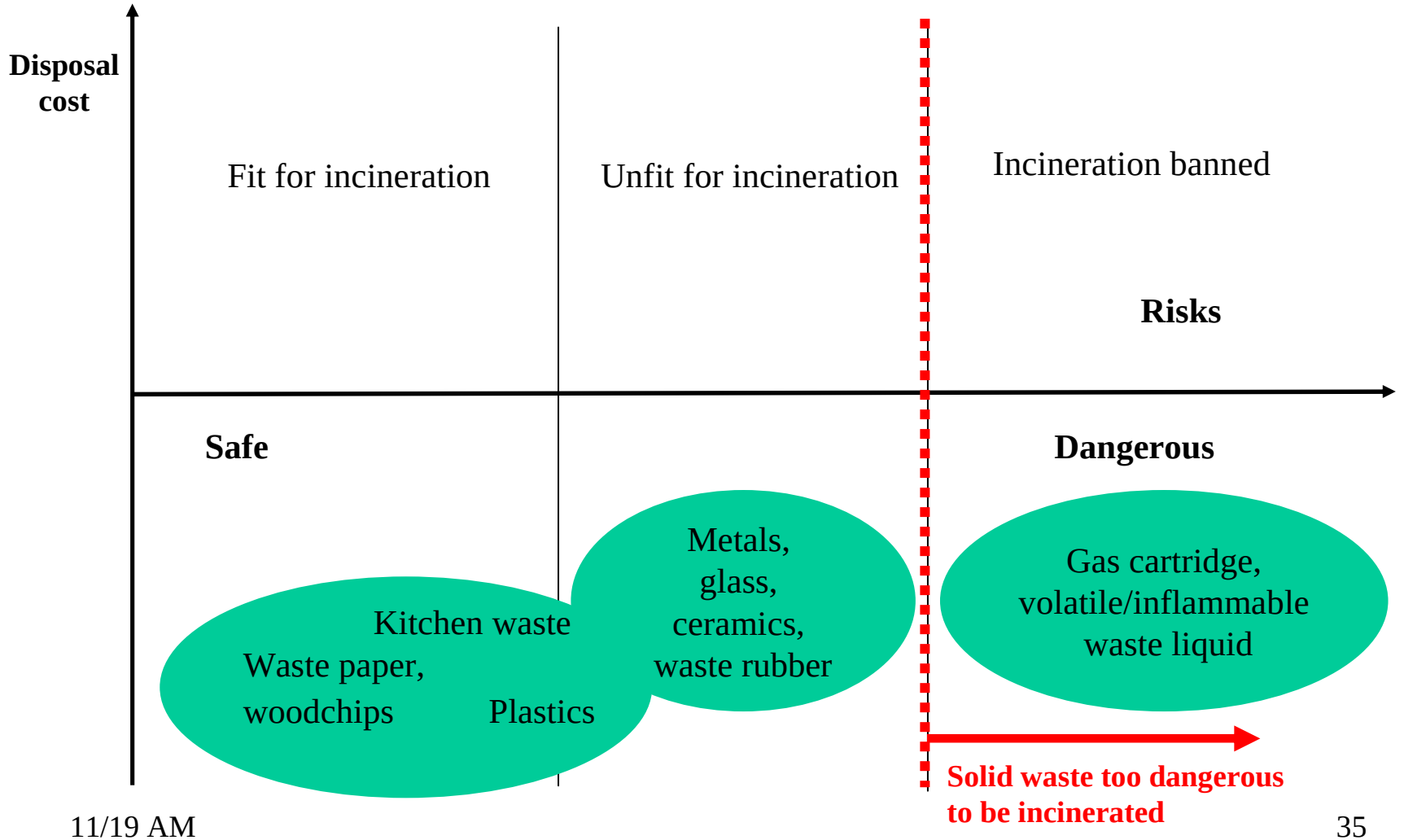
Law on Promoting Green Purchasing (the central government takes leadership in promoting procurement of recycled goods)

3. How safe is safe?

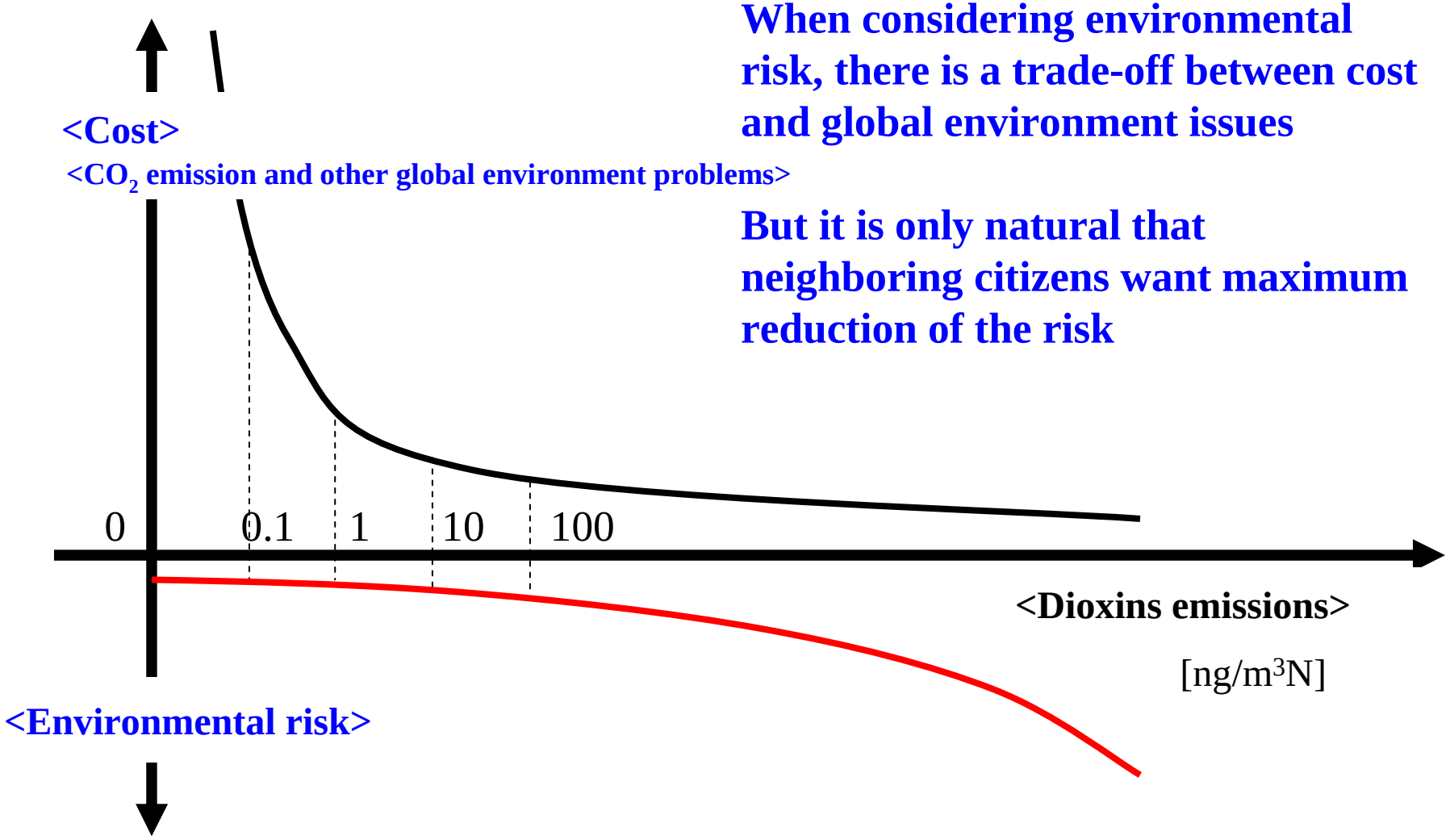
Waste Management and Environmental Risk Management



Solid Waste Classified in Terms of Risk Associated with Incineration



Zero risk is impossible

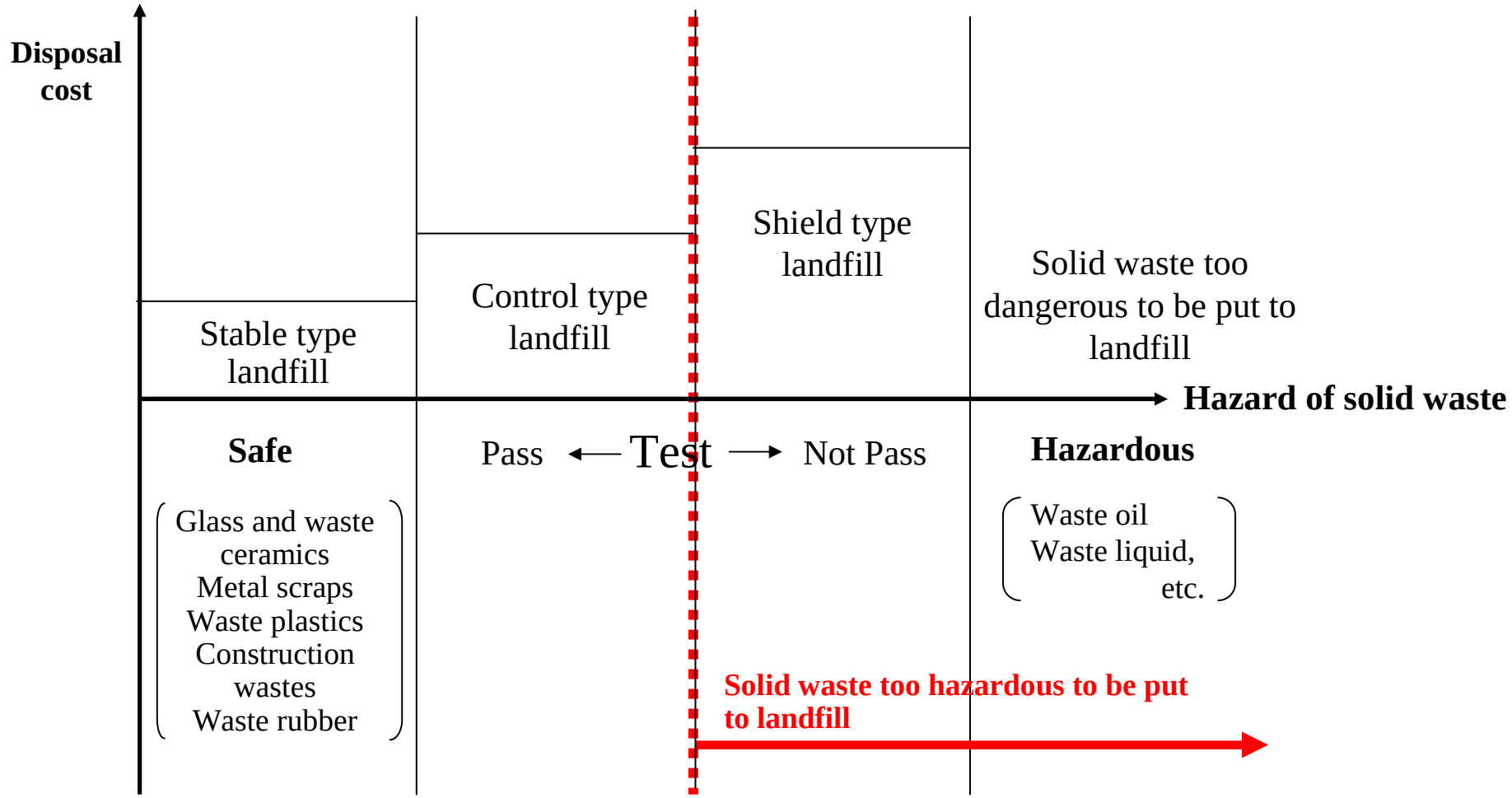


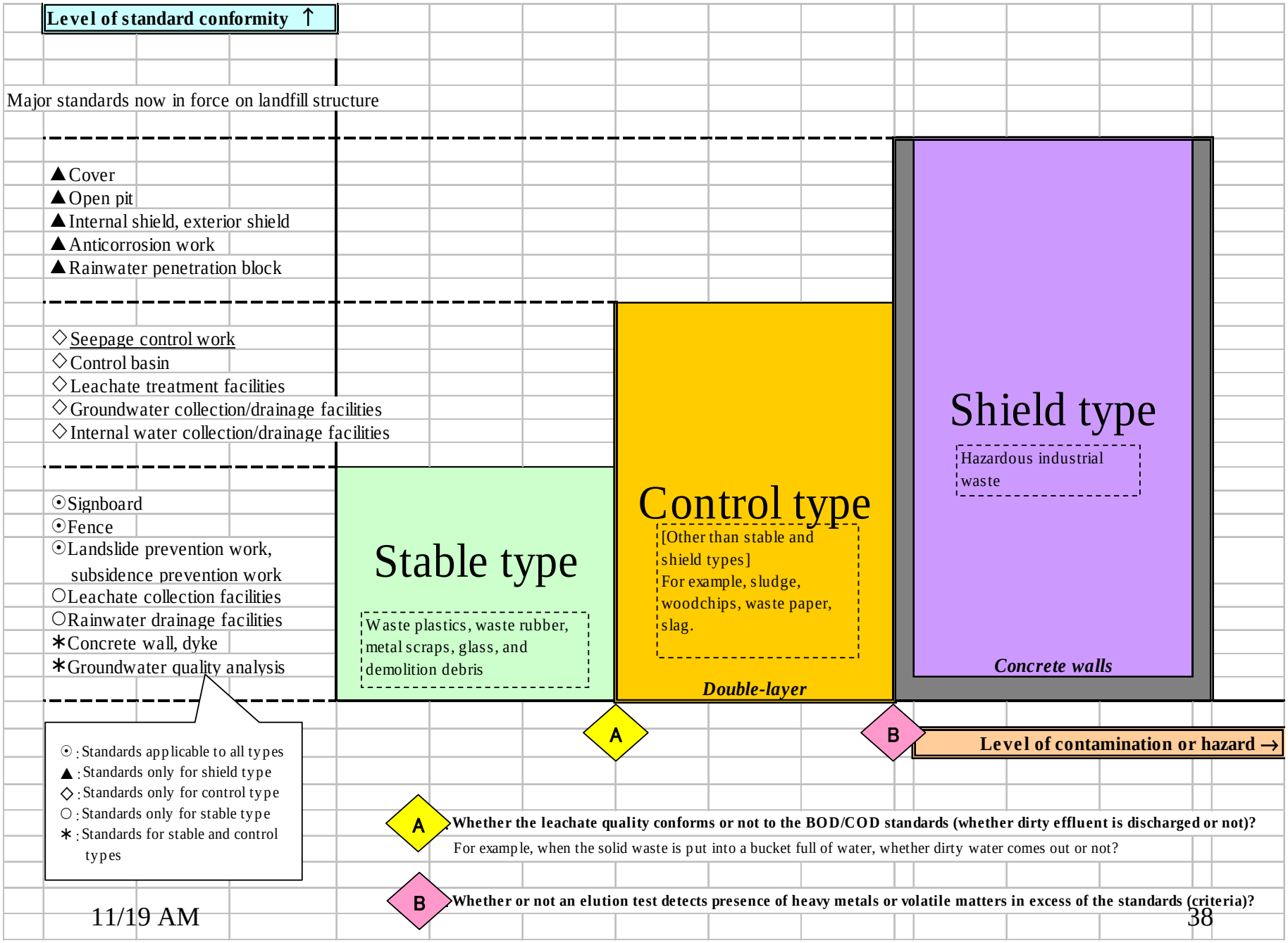
When considering environmental risk, there is a trade-off between cost and global environment issues

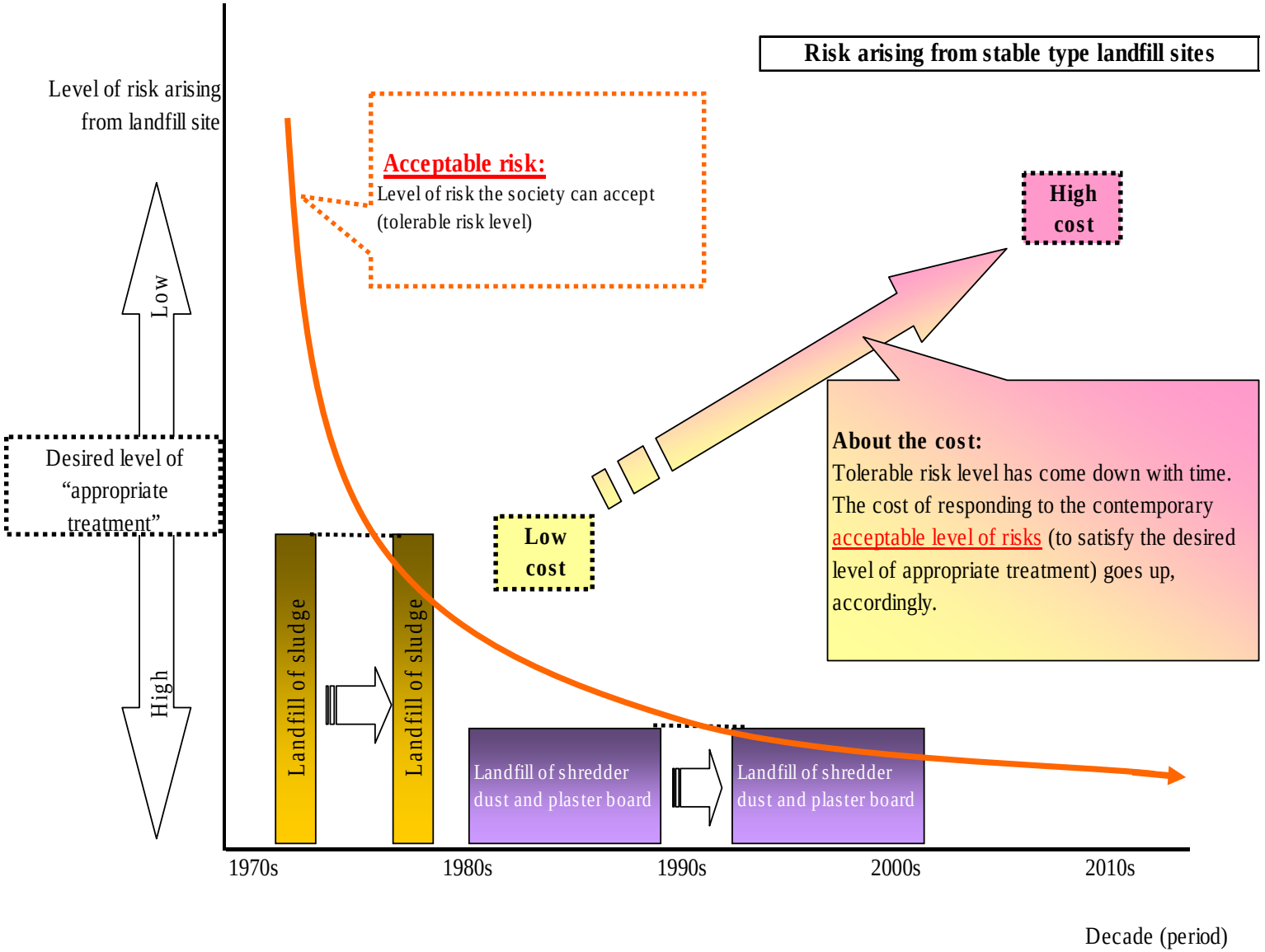
But it is only natural that neighboring citizens want maximum reduction of the risk

トレードオフの関係：
あっちをたてればこっちがたたず，こっちをたてればあっちがたたず，という関係

Solid Waste Classified in Terms of Risk Associated with Landfill




Level of standard conformity ↑
Major standards now in force on landfill structure
▲Cover
▲Open pit
▲Internal shield, exterior shield
▲Anticorrosion work
▲Rainwater penetration block
◇Seepage control work
◇Control basin
◇Leachate treatment facilities
◇Groundwater collection/drainage facilities
◇Internal water collection/drainage facilities
⊙Signboard
⊙Fence
⊙Landslide prevention work, subsidence prevention work
○Leachate collection facilities
○Rainwater drainage facilities
✱Concrete wall, dyke
✱Groundwater quality analysis
⊙ : Standards applicable to all types
▲ : Standards only for shield type
◇ : Standards only for control type
○ : Standards only for stable type
✱ : Standards for stable and control types
Stable type
Waste plastics, waste rubber, metal scraps, glass, and demolition debris
Control type
[Other than stable and shield types]
For example, sludge, woodchips, waste paper, slag.
Double-layer
Shield type
Hazardous industrial waste
Concrete walls
A
B
Level of contamination or hazard →
A Whether the leachate quality conforms or not to the BOD/COD standards (whether dirty effluent is discharged or not)?
For example, when the solid waste is put into a bucket full of water, whether dirty water comes out or not?
B Whether or not an elution test detects presence of heavy metals or volatile matters in excess of the standards (criteria)?


Risk arising from stable type landfill sites
Level of risk arising from landfill site
Acceptable risk:
Level of risk the society can accept (tolerable risk level)
High cost
Low
Desired level of "appropriate treatment"
High
Low cost
About the cost:
Tolerable risk level has come down with time. The cost of responding to the contemporary acceptable level of risks (to satisfy the desired level of appropriate treatment) goes up, accordingly.
Landfill of sludge
Landfill of sludge
Landfill of shredder dust and plaster board
Landfill of shredder dust and plaster board
1970s
1980s
1990s
2000s
2010s
Decade (period)

4. National Strategic Plan for Solid Waste Management

Characterizations of Waste Disposal in Japan

Physical Characterization

Country Area	Small
Population Density	High
Material Resource	little

Social Characterization

Anxiety for Dioxin Emission	Very High

Waste Disposal Facilities	Not easy to Secure
Waste Disposal Cost	High

World Summit on Sustainable Development 2002

- The Johannesburg Plan
- Frame work of programs to accelerate the shift towards sustainable consumption and production.
- Key Issues: LCA, Environmental Indicator, EPR

Japan The Basic Plan for Establishing a Sustainable Society 2003

- A national ten-year program to accelerate the shift towards
- Sustainable patterns of production
- Reduce of Natural Resource Consumption and Environmental Load
- Expanding reuse and recycling
- Promoting a less consumption-oriented lifestyle

Waste Minimization

Waste Prevention (Waste Reduction)

Prevention of generation at the source

Waste Recycling (prior to waste collection)

Recovery of Materials (by municipality)

Composting

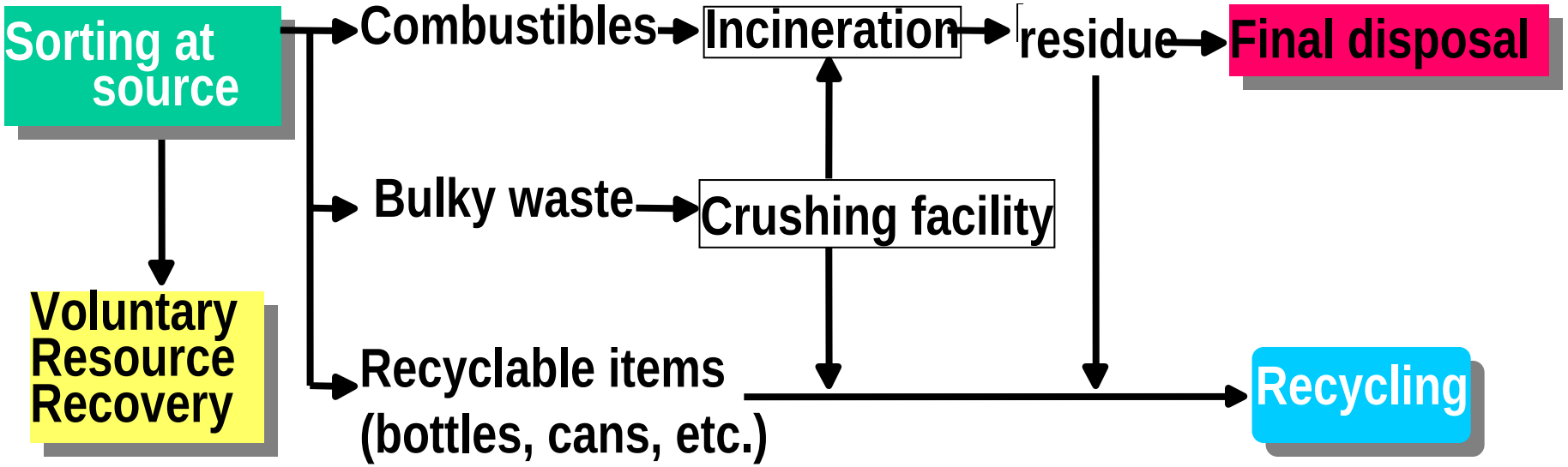
Volume Reduction

Bailing, Crushing, etc.

Incineration

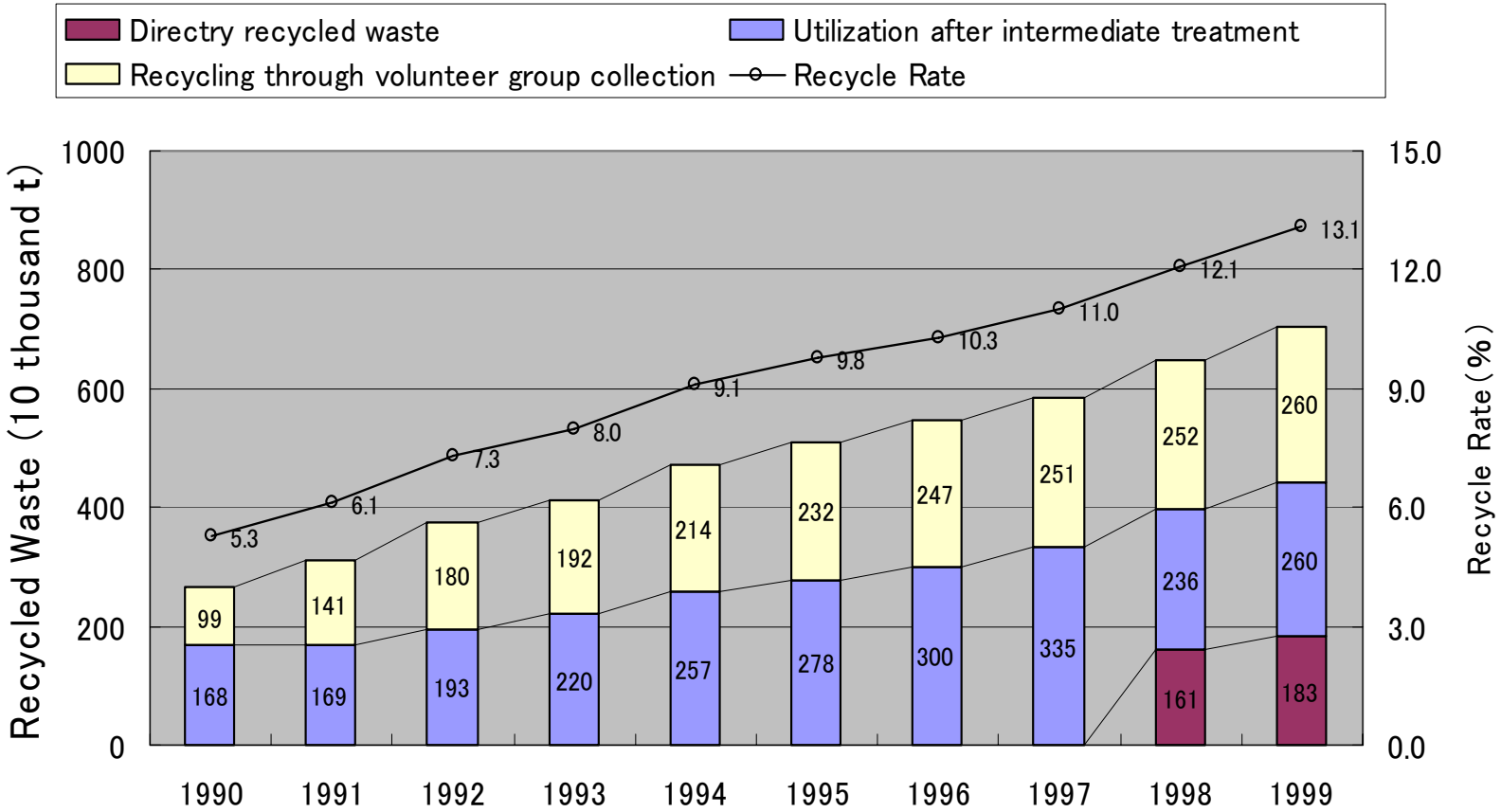
Different Policy Options for Waste Minimisation

Waste Minimization for Landfill

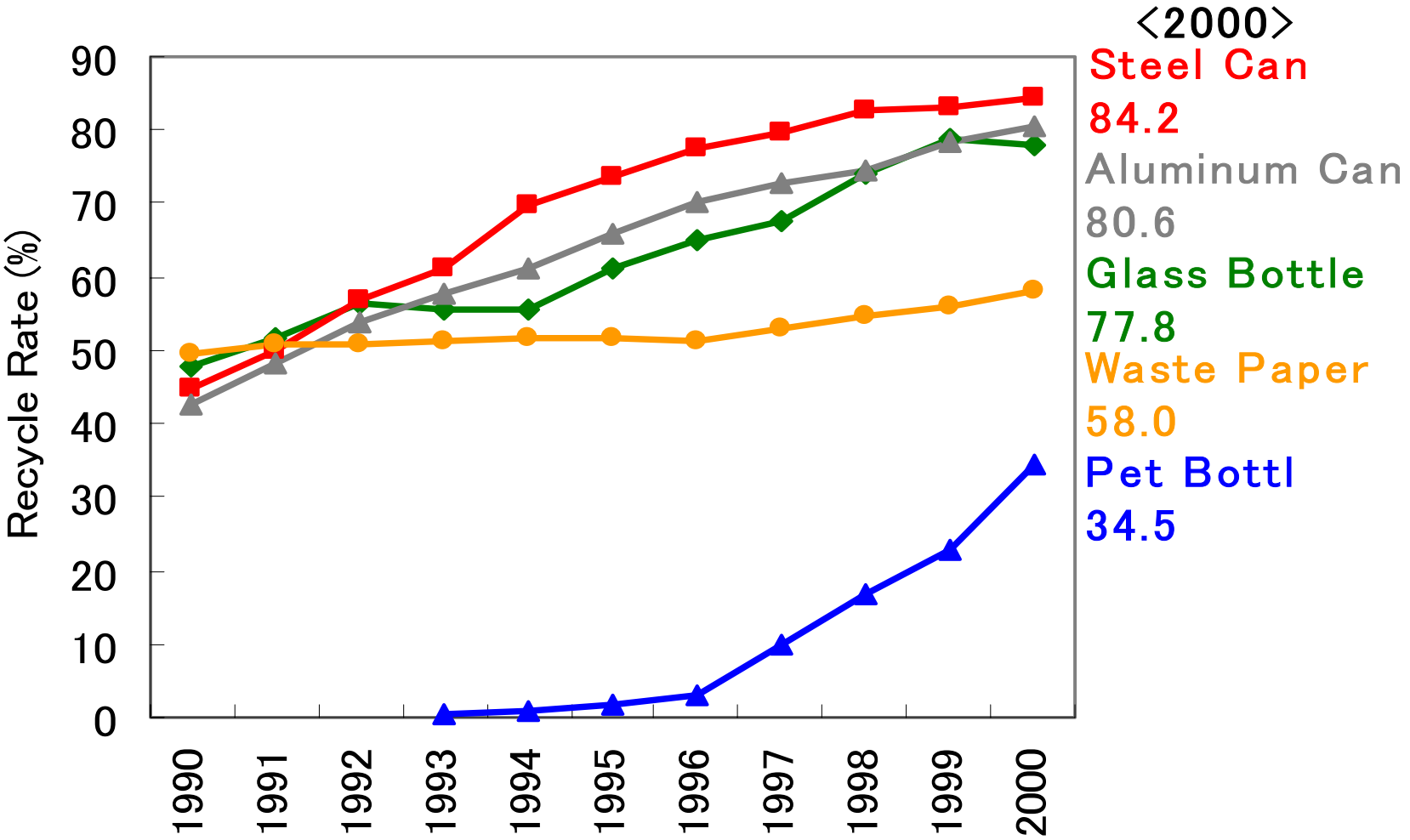


Promotion of Recycling at Municipal Level

Eco-Cement Plant in Santama, Tokyo



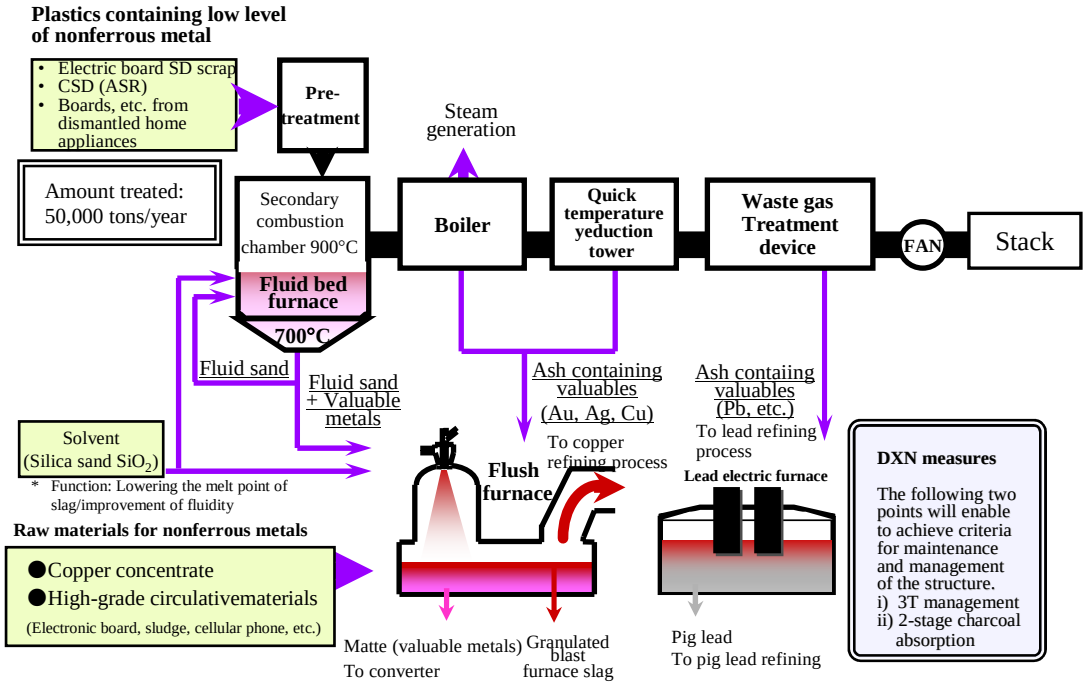
Recycled Waste and Recycle Rate



Recycle Rate of Paper, Cans and Bottles

Development of 3R promotive technology

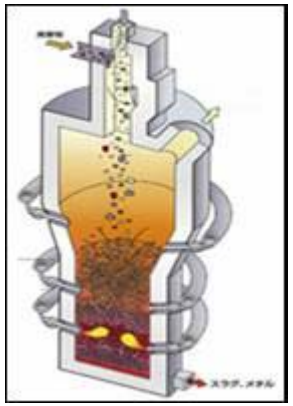
[Recycling technology]



Plant for recovery of rare metals

○Nonferrous metal refining plants enable efficient and sanitary recover of rare and valuable metals, such as gold, platinum, and indium.

[Incineration technology]



Gasification melting furnace

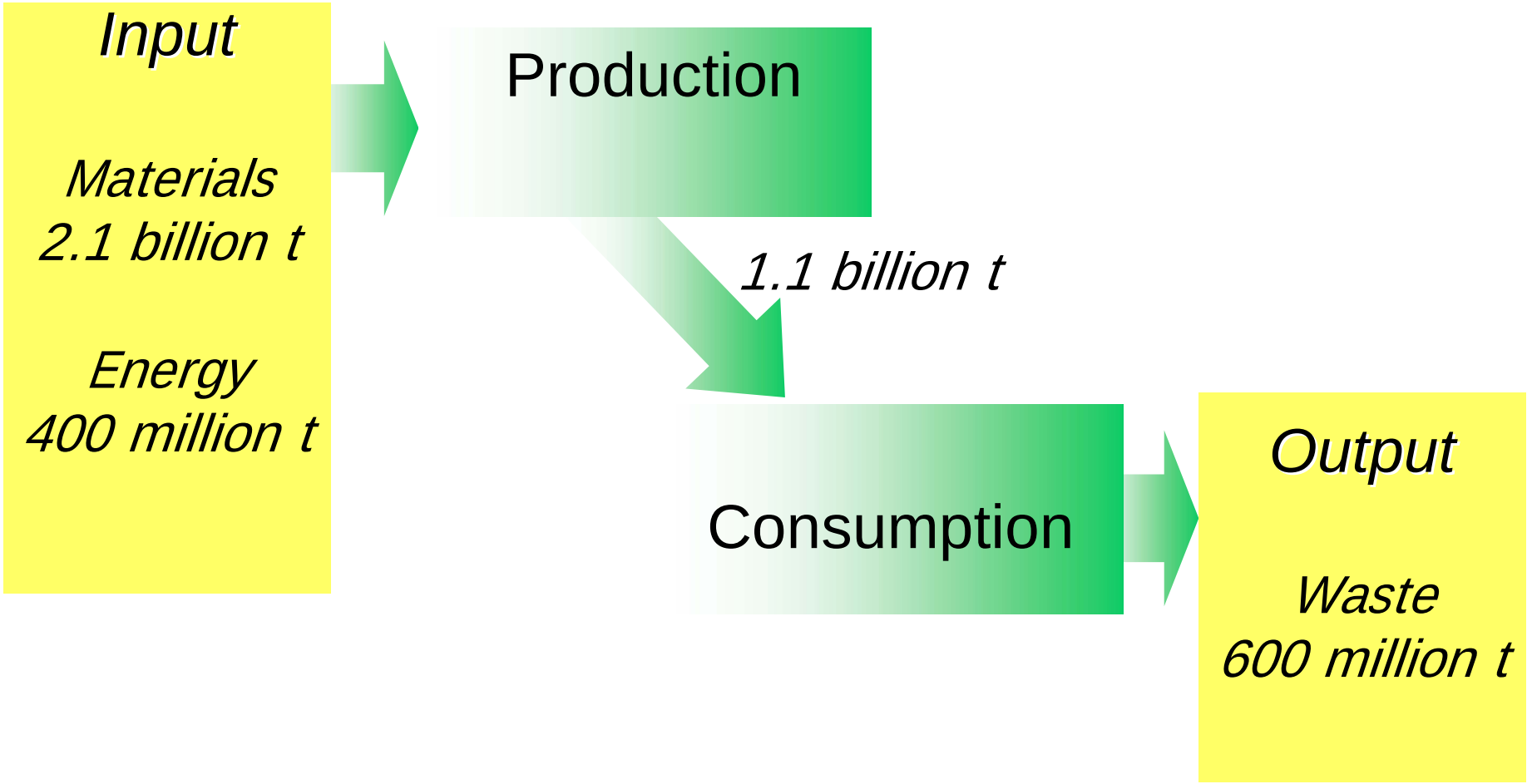
Melting slag

○Gasification melting furnace incorporates technology that excels in the quality of recovered metal and of the reduction of melting slag.

④ Collaboration among

- Soft technologies like collection policies, pay as you throw charging system
- Hard technologies like mechanical sorting, incineration, gasification melting process and high grade leachate treatment technology.

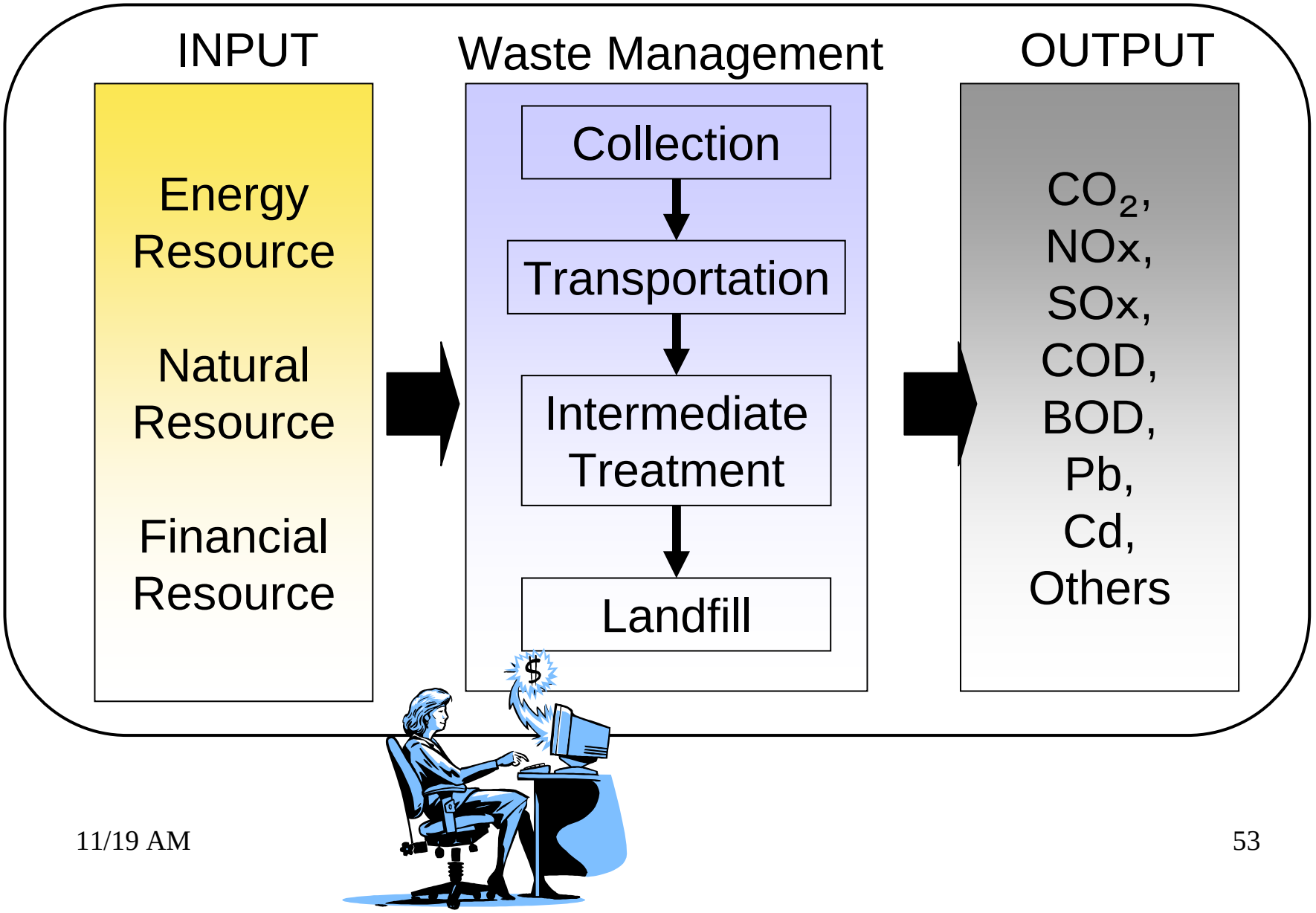
Material Flow in Japan (2000)



The 2nd BASIC PLAN for SMS

- Resource Productivity: GDP 420,000yen per ton of Resource in 2015 which is 60% higher than 280,000yen per ton in 2000
- Final Disposal Amount: 23million ton in 2015 compare to 56million ton in 2000 (60% reduction)

1. Development of WLCA Tool

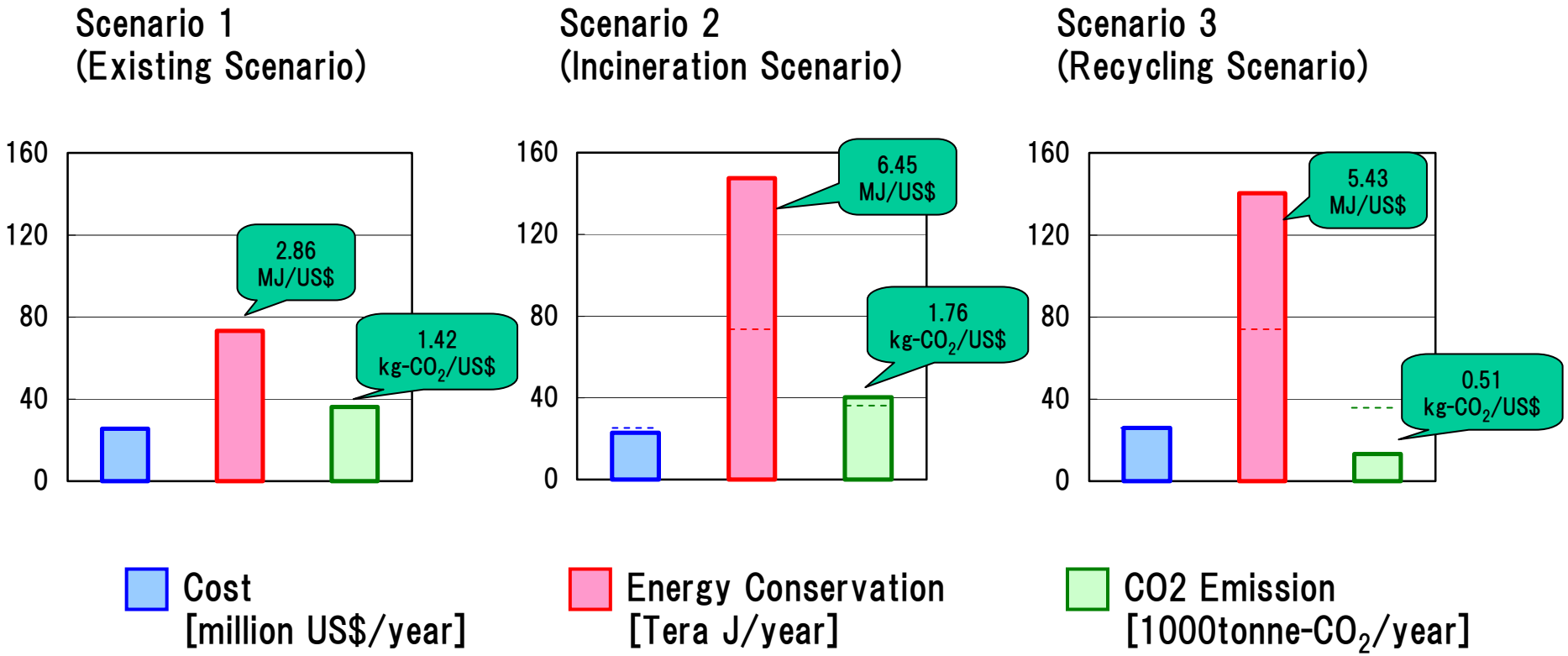


⑤ Collaboration

- Among different stages. Collection, transportation, intermediate treatment, and residue transportation and final disposal.

種類の多い分別回収で忘れてはならないのは収集運搬。
ここでも燃料消費し環境負荷をもたらす

Validation for Okayama City –Result1-



⑥ Collaboration of

- Among different evaluation factors, like economic factor, environmental factor and energy natural resource.
-

- Society of Solid Waste Management Experts in Asia ＆ Pacific Islands （SWAPI)

⑦ Collaboration

- Among all nations to tackle the global issues like sustainable society.
- Collaboration among federal government, local government, citizen and private sector.
- Collaboration among Different ministries
- Collaboration among politicians, researchers, governmental administrative officers, engineers and citizens.

PDM

- Pride
- Dream
- Mission