



# **New Activities of Emission Model**

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The background of the slide features a light blue map of East Asia, including the Korean Peninsula, Japan, and the Philippines. The word "Contents" is written in a blue, sans-serif font, centered in the upper half of the slide.

# Contents

- **Background**
  - Progress since Last Workshop
- **Structure of New Model**
  - Top-down General Equilibrium Model
- **Results of Preliminary Simulation**
  - Economic Effects of Recycling Policy
- **Conclusions**
  - Contribution to AIM Project

## Progress since Last Workshop

- Integration of 3 Approaches

- Top-down Approach

- Bottom-up Approach

- Material Balance Approach

- Expansion of Environmental Policy

- CO2 Reduction Policy

- Treatment of Waste Management

- Other Environmental Problems

## Model Overview

- Top-down Model
- Evaluate Environment and Economy in Japan
- Recursive General Equilibrium Model  
1990, 1995, 2000, 2005, 2010, ....
- 33 Economic Sectors Including Environmental Industry
- 31 Economic Goods and Services Including Environmental Services

## Definition of Environmental Industry

- US Services: analytical service, solid waste management, ....  
Equipment: air pollution control equipment, environmental instrument manufacturing, ...  
Resources: water utilities, resource recovery, ...
- Canada solid waste control, air pollution control, water treatment, land management and resource conservation, environmental health and safety, green products, and energy conservation
- Japan Industrial sectors with a potential to help reduce environmental burdens  
environmental conservation, waste disposal & recycling, environmental restoration,  
environmentally-friendly energy supply, products, & production process
- Germany producers of equipment for the protection of the environment as well as supplies of corresponding business services
- Italy a specific narrow sub-set of business operating in the design, production and supply of plant and equipment intended for the protection of the environment
- Norway water pollution & effluent treatment equipment, air pollution control equipment, maritime environment & security, monitoring & GIS, water management & recycling equipment

*Source: OECD(1996) The Environmental Industry The Washington Meeting*



“Environmental Industry” is defined as activities concerning the environmental conservation.  
ex. air pollution control, waste management, sewage, CO2 reduction activities, ...

## Economic Sectors and Goods

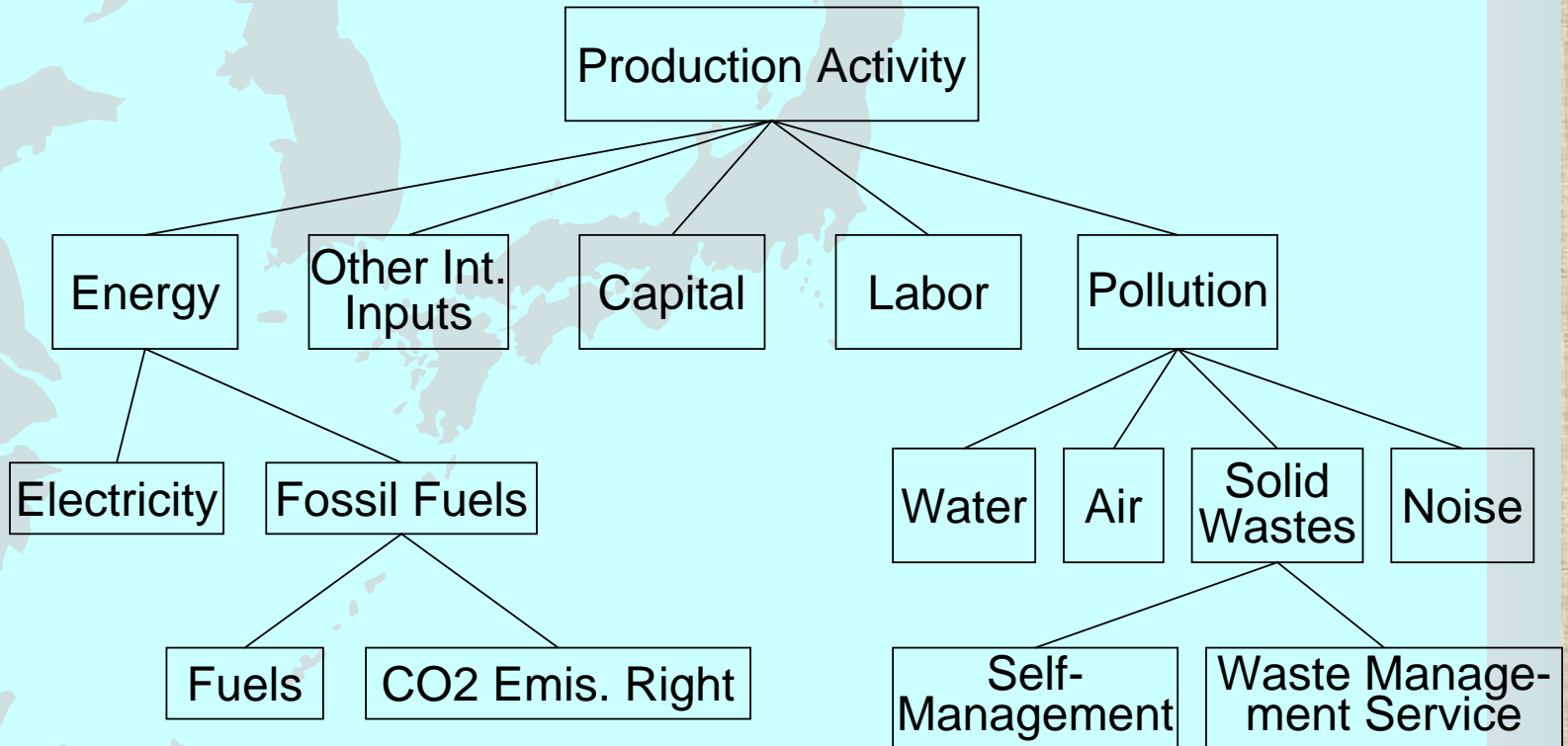
AGR	Agriculture, forestry and fishery	FIN	Finance and insurance
MIN	Mining	EST	Real estate
FOD	Food and beverages	TRS	Transportation and communication
TEX	Textiles	SRV	Services
PLP	Paper and paper products	GOV	Producers of government services
CHM	Chemicals	NPS	Producers of private non-profit services to households
NMM	Non-metallic mineral products		
BMT	Basic metal	EMC	Environmental capital products
FMT	Fabricated metal products	SEW	Sewage sector
MCH	Machinery	DWM	Domestic waste management sector
ELM	Electrical machinery, equipment and supplies	IWM	Industrial waste management sector
		COL	Coal production and refinement
TRE	Transport equipment	OIL	Oil production and refinement
PRI	Precision instrument	GAS	Gas production
OTH	Others	THE*	Thermal electric generation activity
CNS	Construction	HYD*	Hydro power generation
WTR	Water supply	NUC*	Nuclear power generation
SAL	Wholesale and retail trade	ELE <sup>+</sup>	Electricity supply

\*: only activity, +: only goods

## Environment Problems Treated in This Model

Water Pollution	COD	
Air Pollution	SO <sub>x</sub>	
	CO <sub>2</sub>	
Noise	Noise	
Solid Wastes	ASH	Ash, combustion residue
	SLD	Sludge
	WOL	Slush, waste oil
	WAC	waste acid
	WAL	waste alkali
	WPL	waste plastics
	WPP	waste paper
	WWD	waste wood
	WTX	waste textile
	WAP	Animal and plants wastes
	WRB	waste rubber
	SCM	scrap metal
	WGC	glass and ceramics wastes
	SLG	slag
	WCT	construction waste
	DST	soot and dust
EXC	animal excrement	
CRC	animal carcass	

# Structure of Production Activities





Environmental Education	Income Trend
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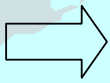
Preference



Households

Final Consumption

Constraint



Pollutants

Industry Sector

Waste

Recycling Goods

Waste

Inputs

Environmental Investment

Waste Management Sector

Waste

Recycling Goods

Environmental Equipment Production Sector

Environmental Investment

Final Disposal

Constraint

- Economic Policy
- Environmental Policy
- Technology Improvement

Model Structure

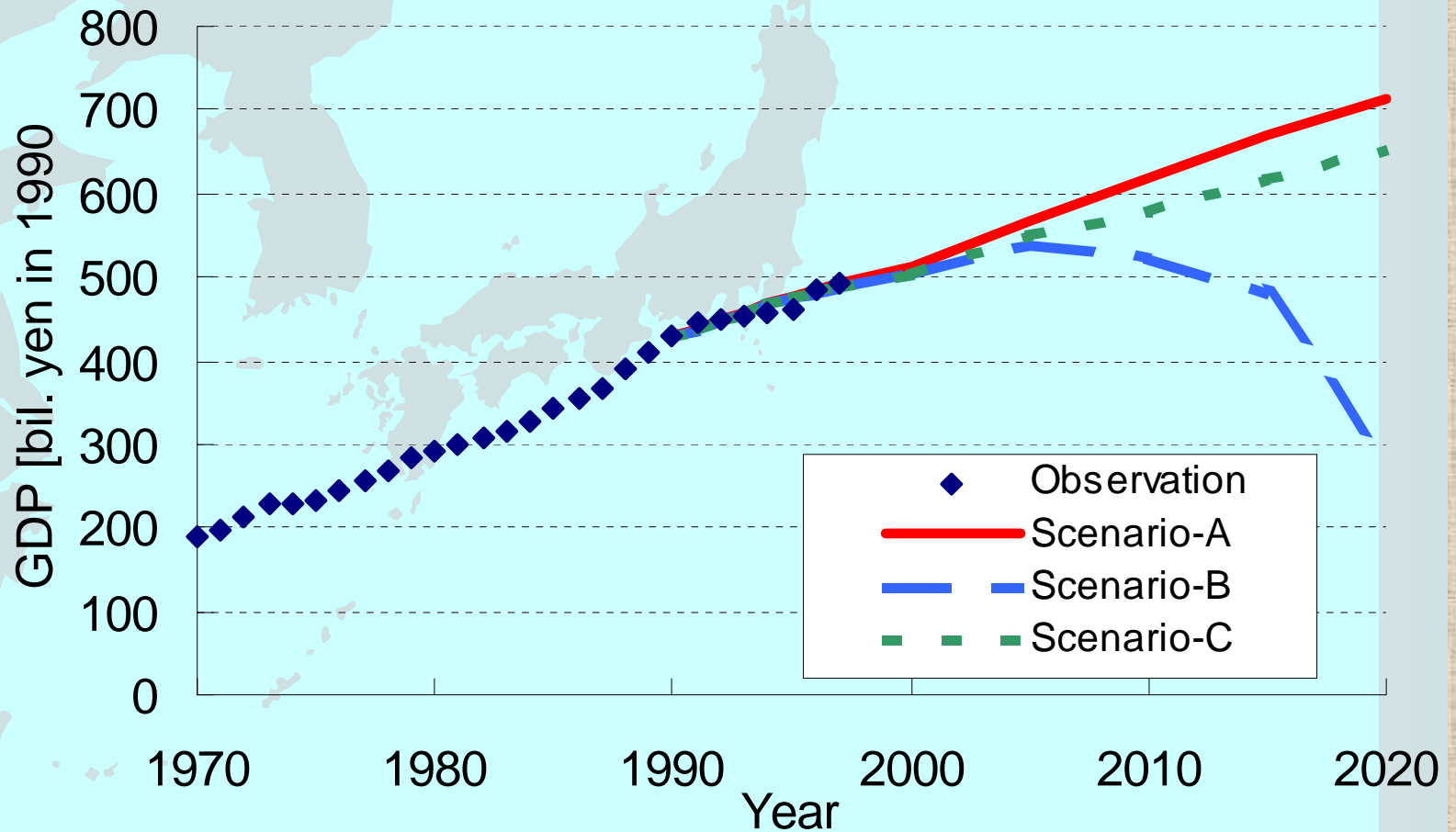
## Scenarios

- Scenario-A** No Environmental Constraints Scenario
- Scenario-B** Environmental Constraints Scenario without Technology Progress
- Scenario-C** Environmental Constraints Scenario Introducing Technology Progress & Recycling Promotion Policy
- Scenario-D** Scenario-C + Expansion of Recycling Paper Use

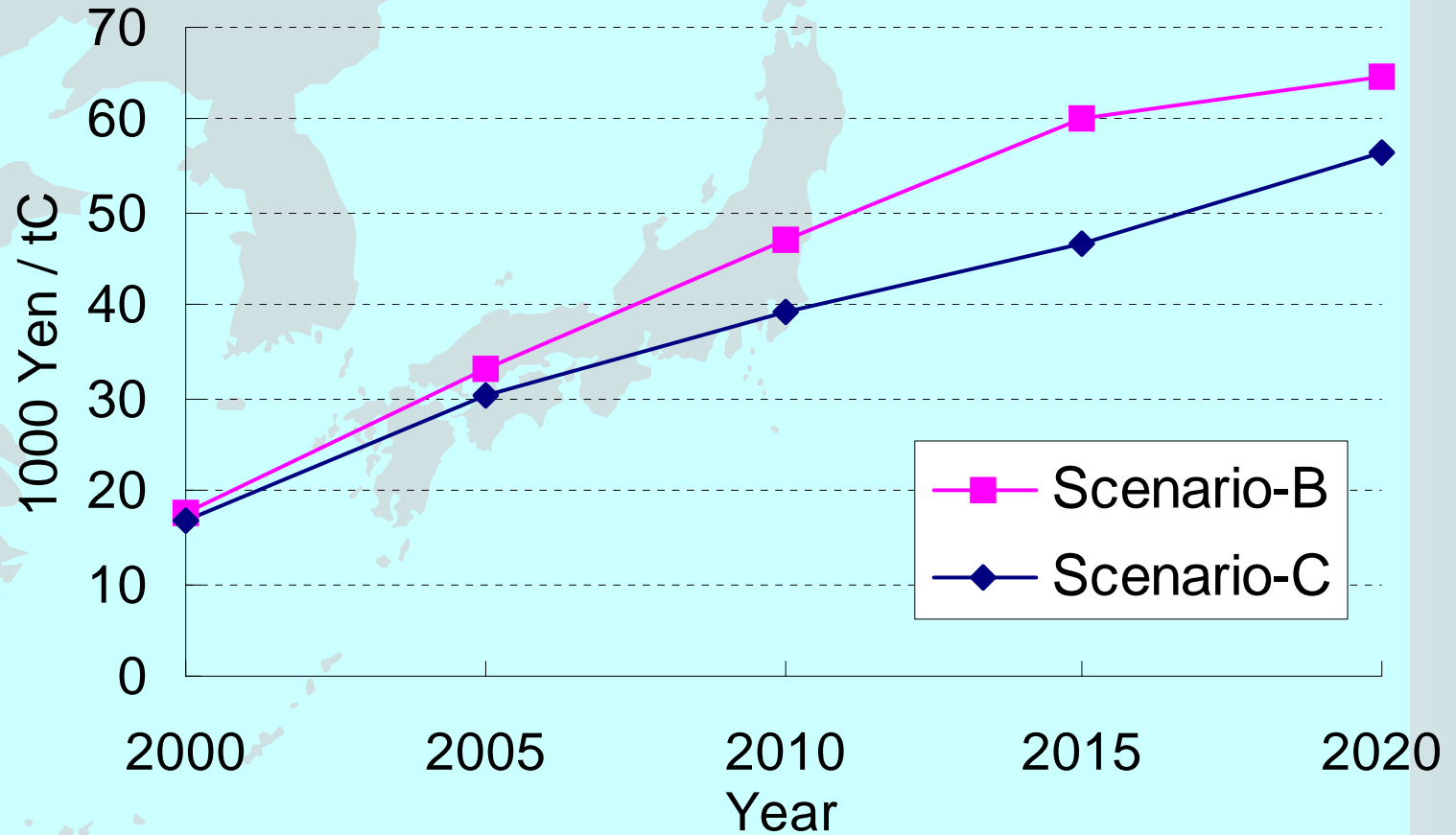
### <<Environmental Constraint>>

- **CO2 emissions** in 2010 are reduced 6% compared with those in 1990
- Mass of **final disposal** in 2010 is half of that in 1996.

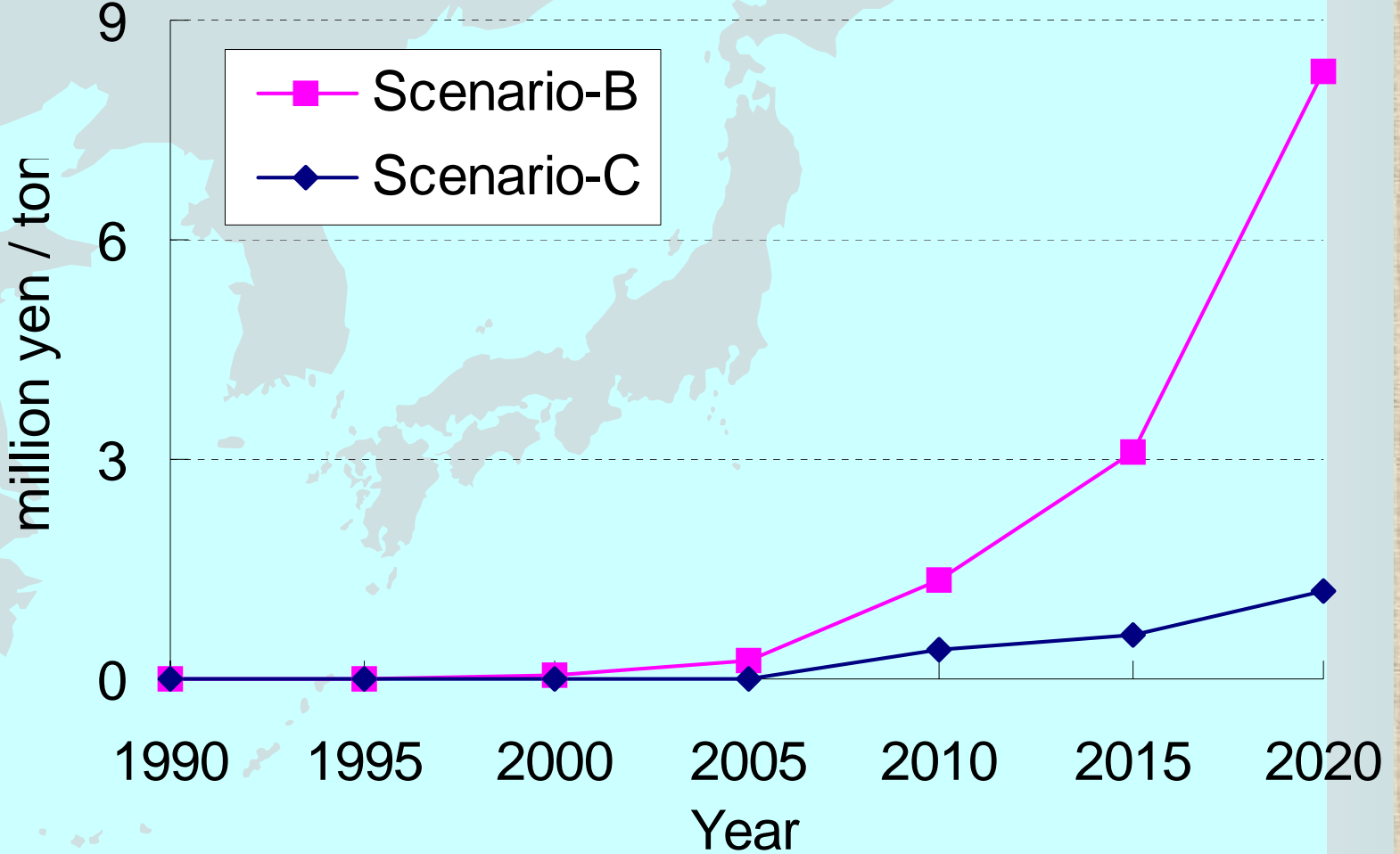
### Simulation Results of GDP



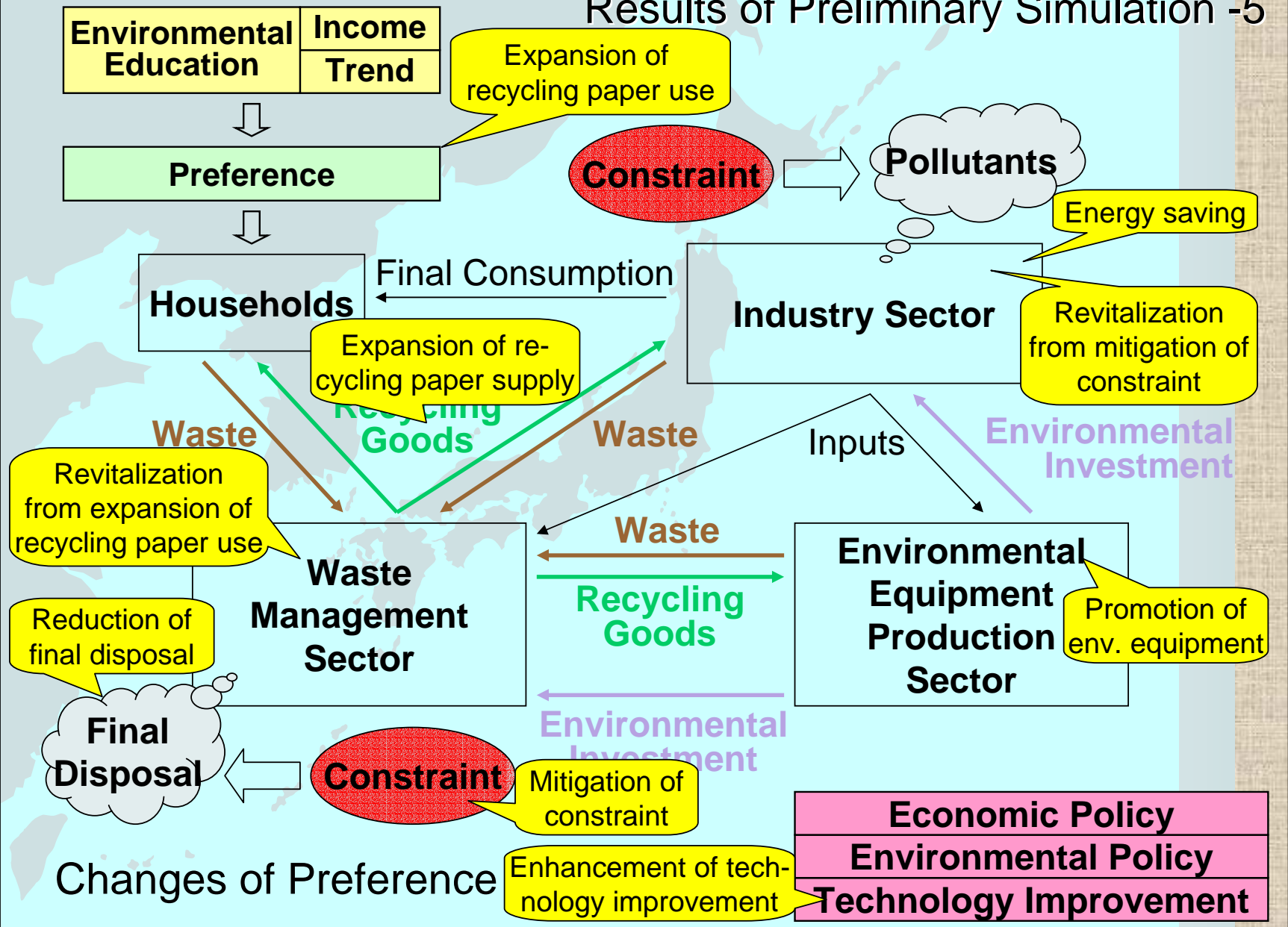
### Simulation Results of Marginal Cost of CO2 Reduction



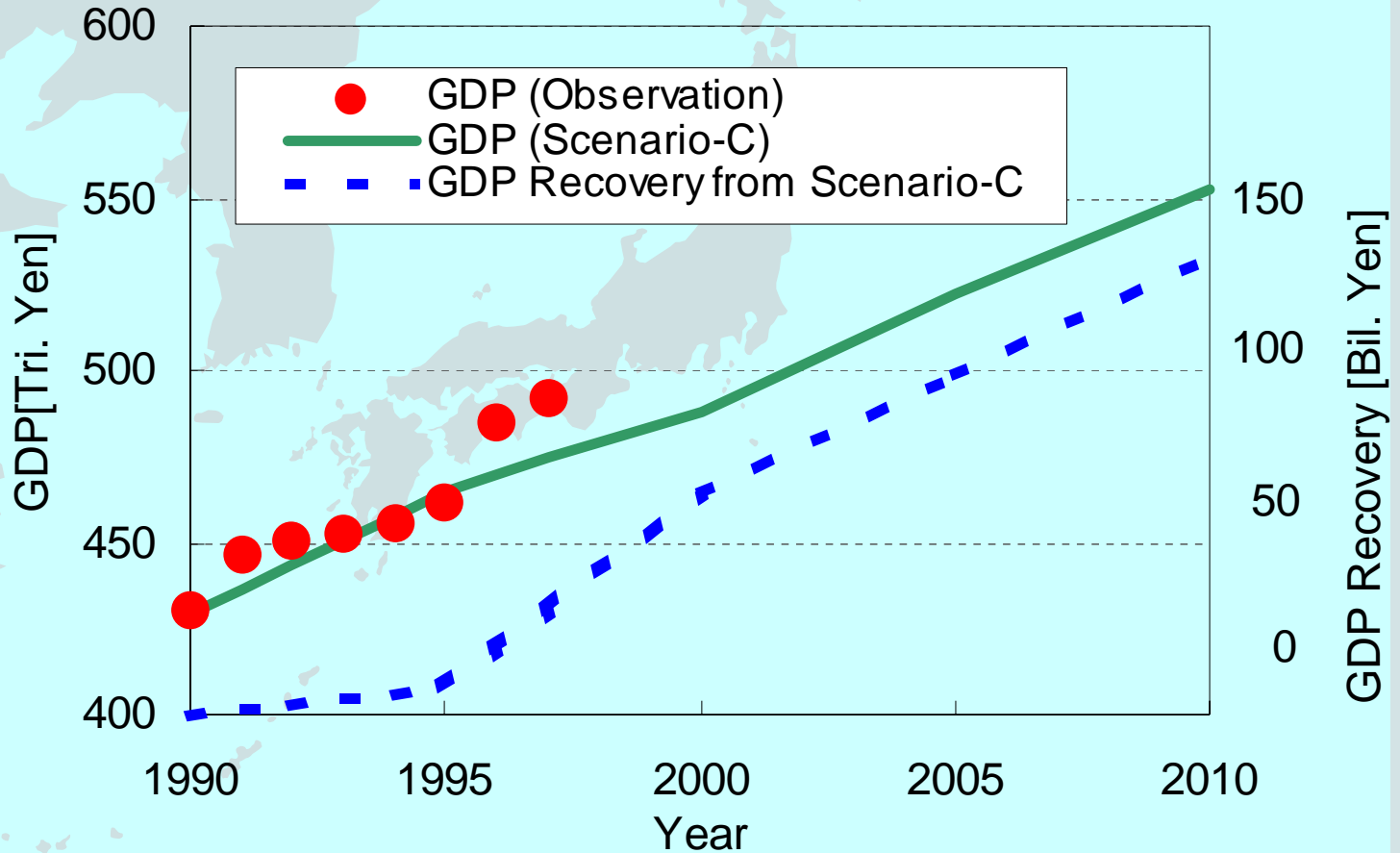
### Simulation Results of Marginal Cost of Final Disposal Reduction



# Results of Preliminary Simulation -5



## Simulation Results of GDP Recovery by Changing Paper Demand Preference



## Conclusions

- **Environmental industries** have big potentials of not only **environmental preservation** but also **economic development** under the **environmental constraints**.
- **Changes of preference** from conventional consumption to **green consumption** also bring the **economic benefits** under the **environmental constraints**.
- **Environmental industries** and **green consumption** can help to **mitigate the environmental constraints** and to **promote the activities of the related industries**.



## Future Works

### **Database Construction**

Environmental Industries

Inputs for pollution abatement (end-of-pipe & cleaner technology)

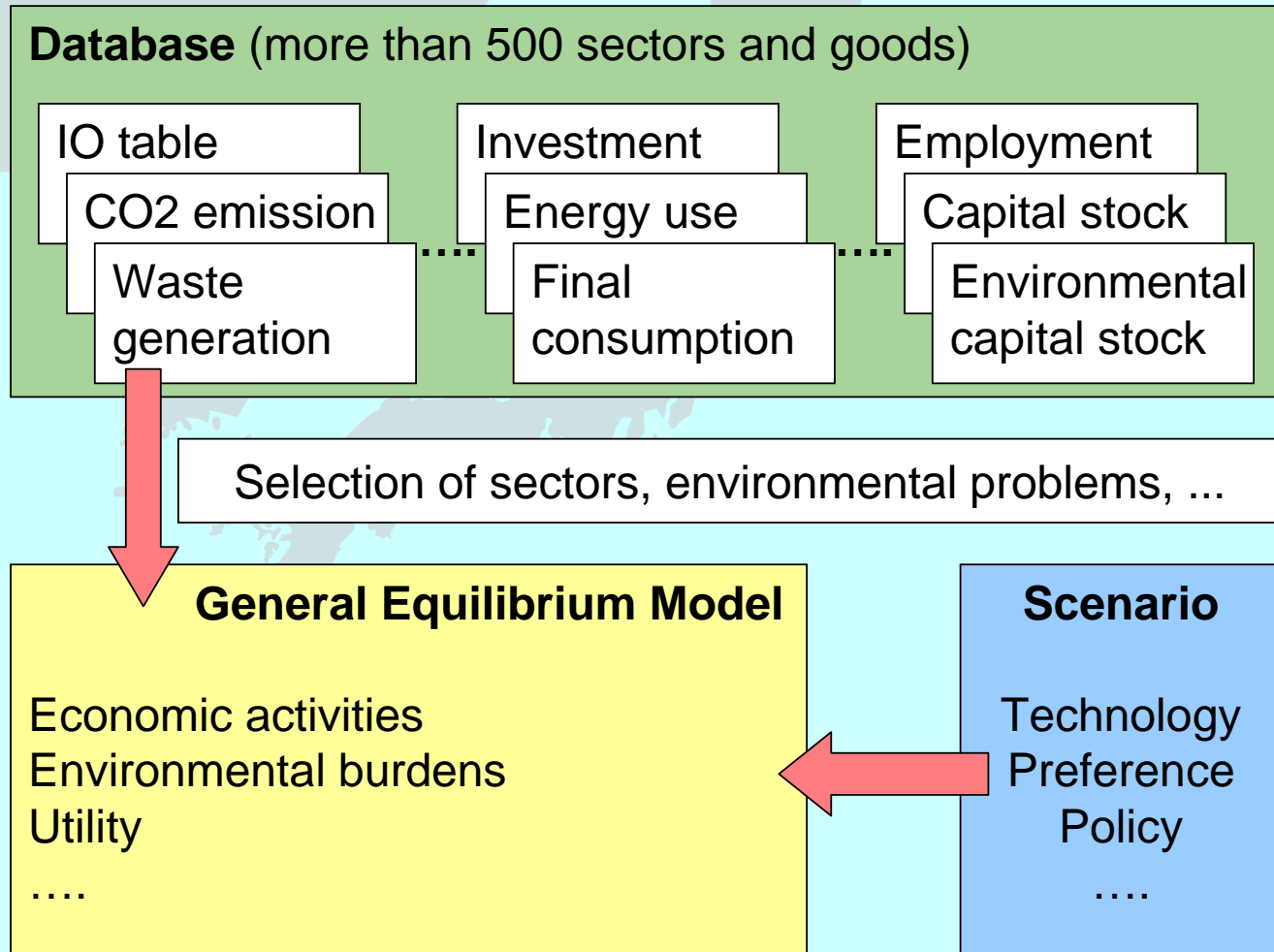
Detailed economic database (more than 500 sectors)

### **Establishment of Flexible Model Structure**

Flexible mechanism (changes of economic sectors and goods)  
to meet each analysis

### **Development and Integration of Bottom-up Model and Material Balance Model**

## Connection between database and model



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