A Integrated Environmental and Economic Modeling in Korea : Based on AIM/CGE model

Focusing on…

- ✓ **difference between AIM CGE of Japan and Korea in Modeling - Method, Data, and Structure**
- ✓ **Future work - Dynamics and Policy Application**

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Intro - Background

- **Designed for the evaluation of environmental policy impacts on the national economy under the given environmental regulation scheme challenging global environmental issues**

Why we construct the integrated National CGE model?

- **Widely accepted as a quantitative tool for integrated environmental impact analysis**
- **An effective tool deal with price linkage system through feedback mechanism**
- **Can apply the impact of various environmental policy and regulation at National level**

Intro - Background

What's new in Korea model

items	AIM/material CGE	Korean version
Accounting in related to Environment	Environmental capital product Waste management service	Environmental investment Industrial waste management Material flow
Material Flow of emission	CO_2: material input Waste : material input	Co_2 : depend on fuel use Waste : depend on production level
Modeling technique	GAMS/MPSGE	GAMS algebraic subsystems : to solve the infeasibility

next

Modeling - method, data, and structure

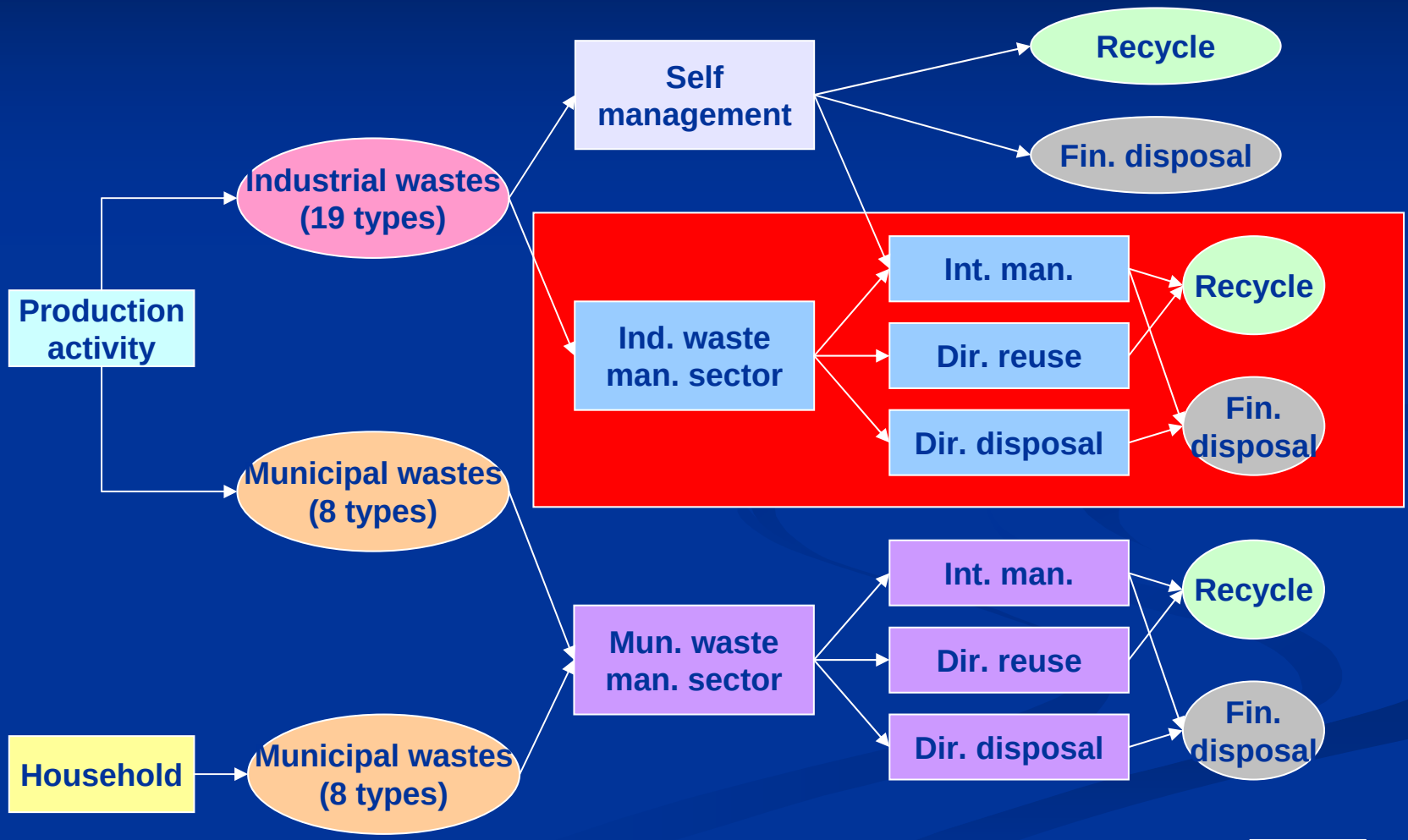
Simple Social Accounting Matrix

	Producer	market	factor	private	public	Capital (inv)	Foreign	total
Producer (40)								Sale
Market (40)				Consum	Consume	invest	Export	demand
Factor (labor, Capital)								Factor Demand
Private			income					Income
Public	Tax (indirect)	Tax on import		Tax (direct)				Revenue
Capital (saving)				Saving p	Saving G			Saving
Foreign		Import				closure		outflow
Total	Purchase	Supply	Factor supply	expenditure		Invest-ment	inflow	

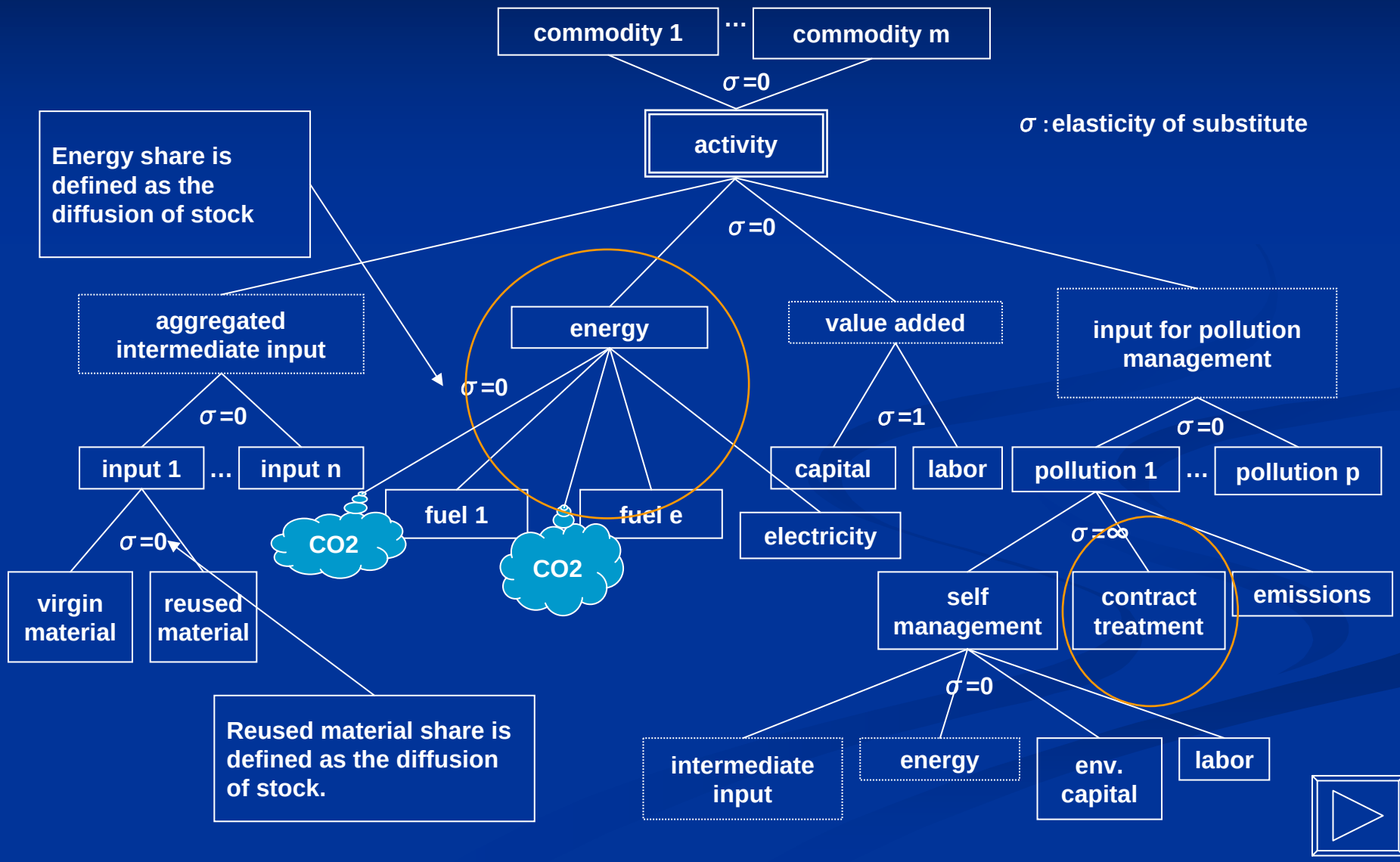
Industrial waste management service

Environmental investment

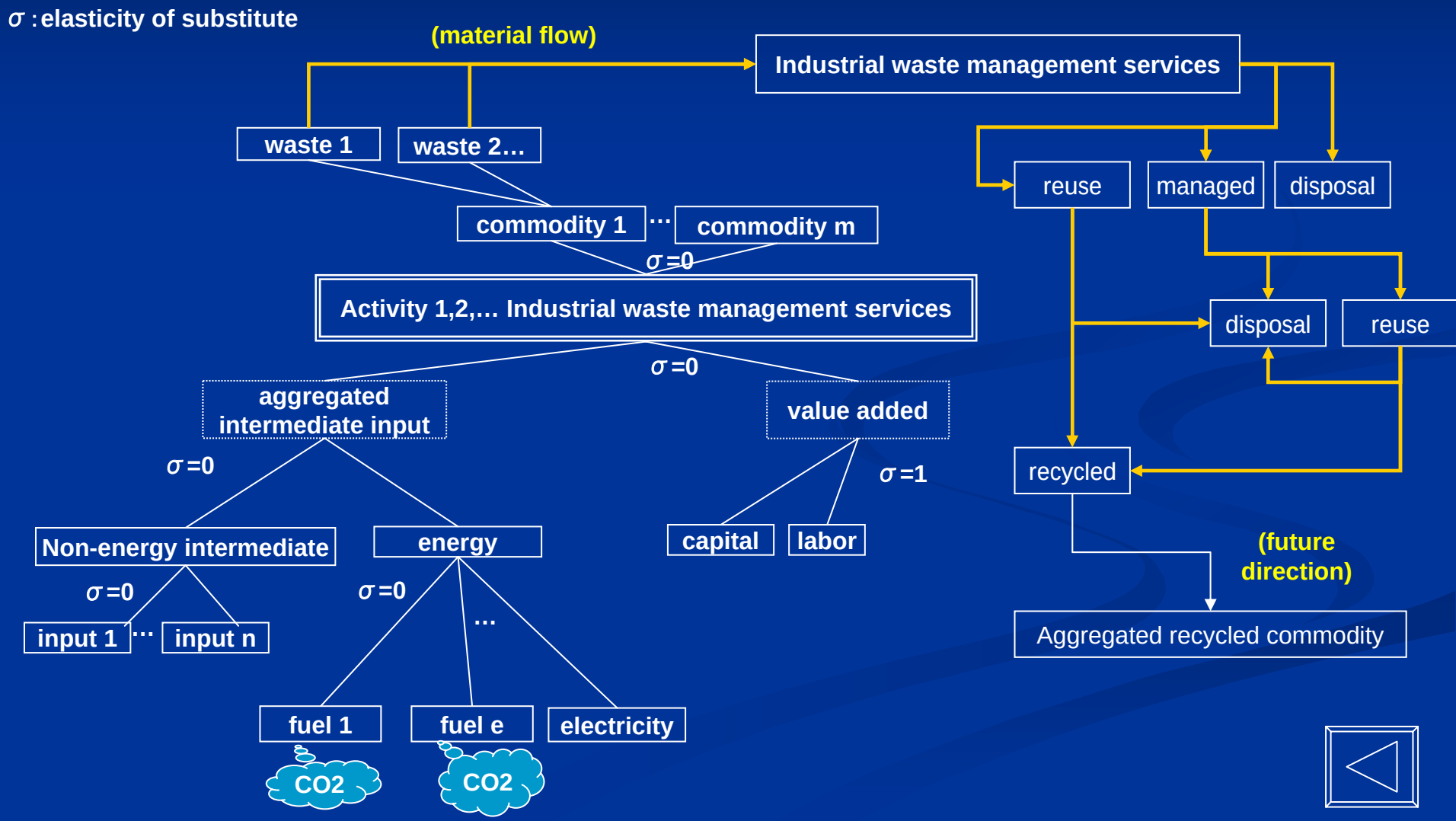
Modeling - waste flow structure



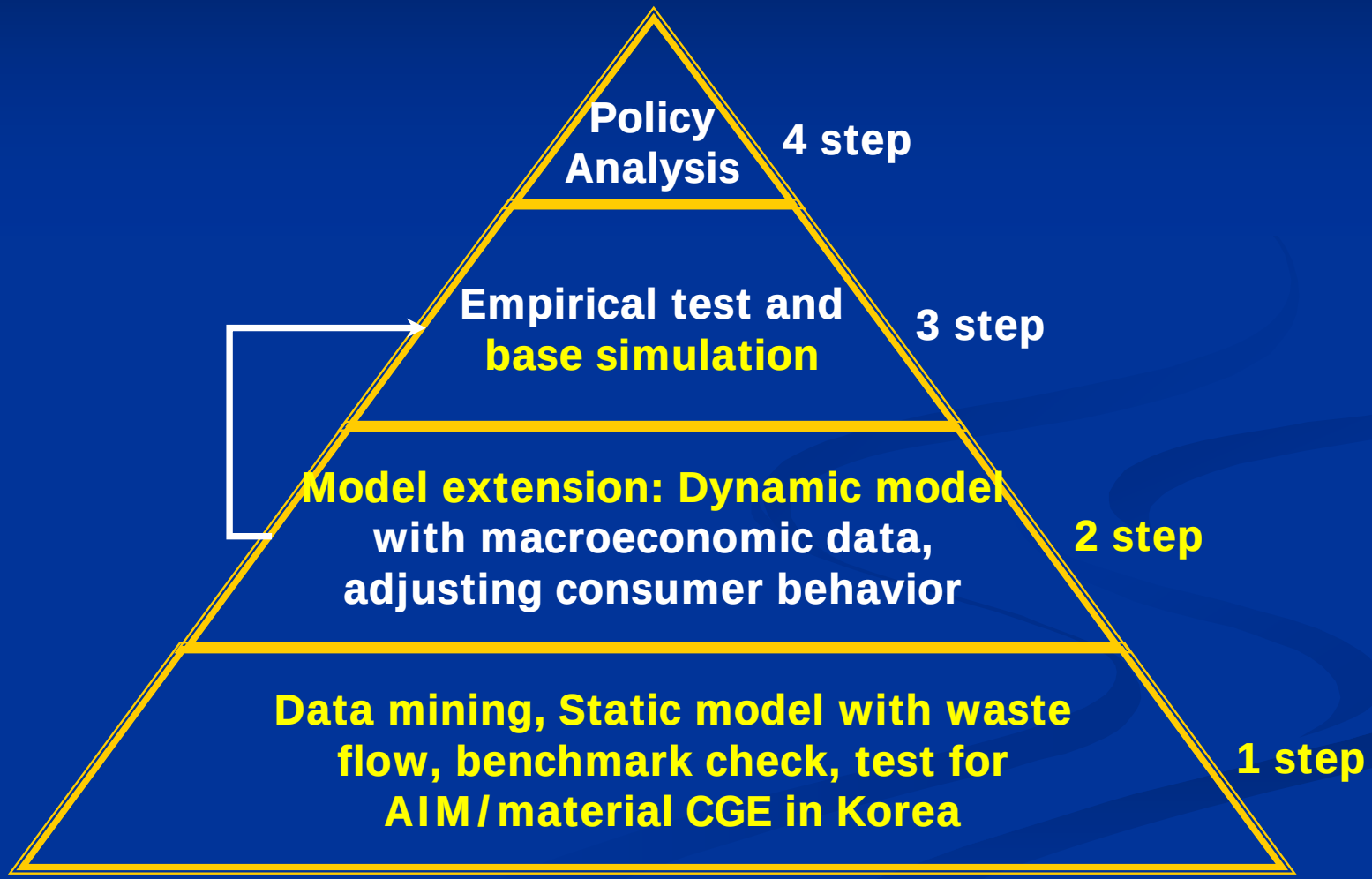
AIM/Material CGE Production structure



Modeling - Production structure

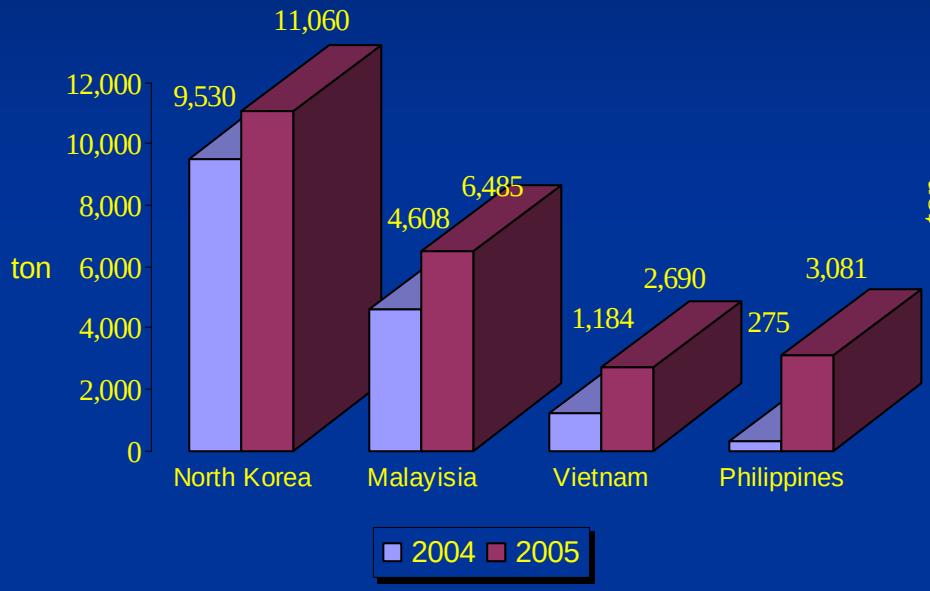


Intro - Progress in AIM/CGE Korea

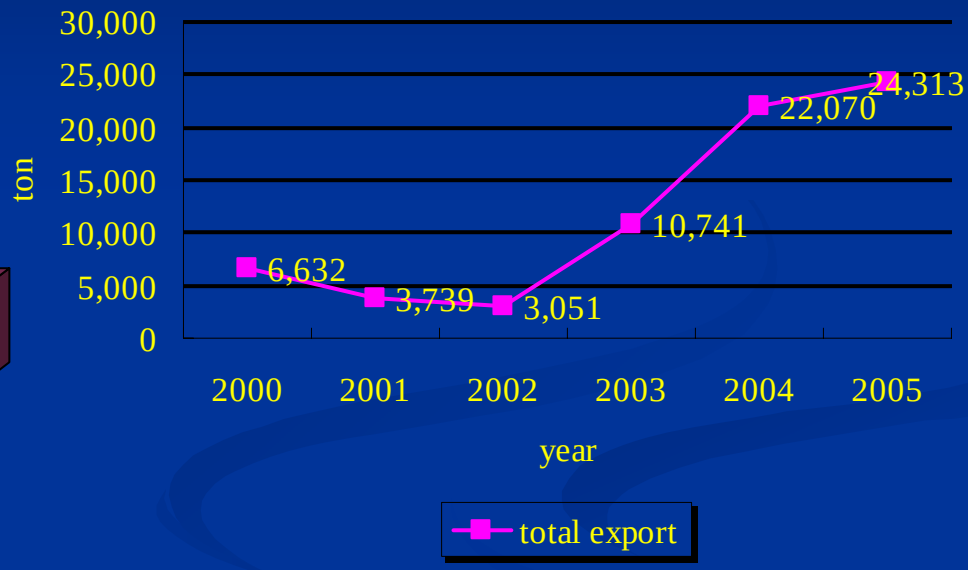


*Reference - Recycling goods in Korea

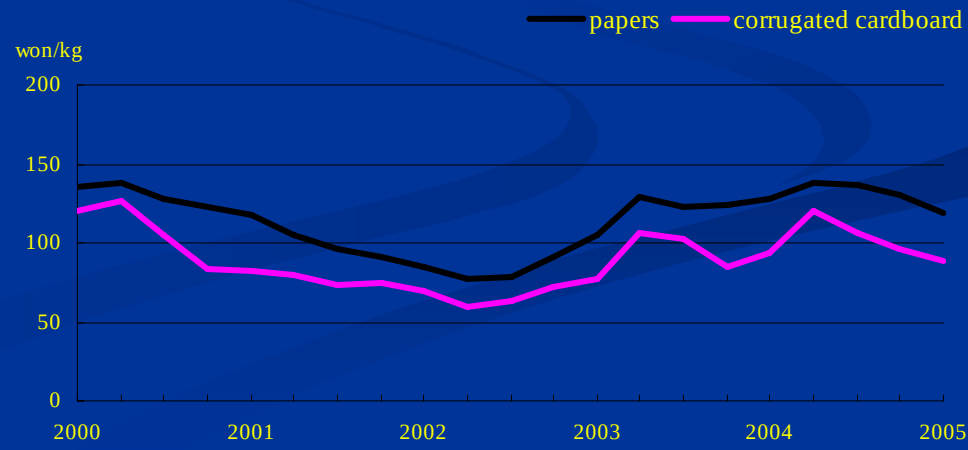
Export of Recycling Good to Major Countries



Export Trend of Recycling Good in Korea



Price Trend of waste papers



Source from:Korea Environmental and Resource Cooperation

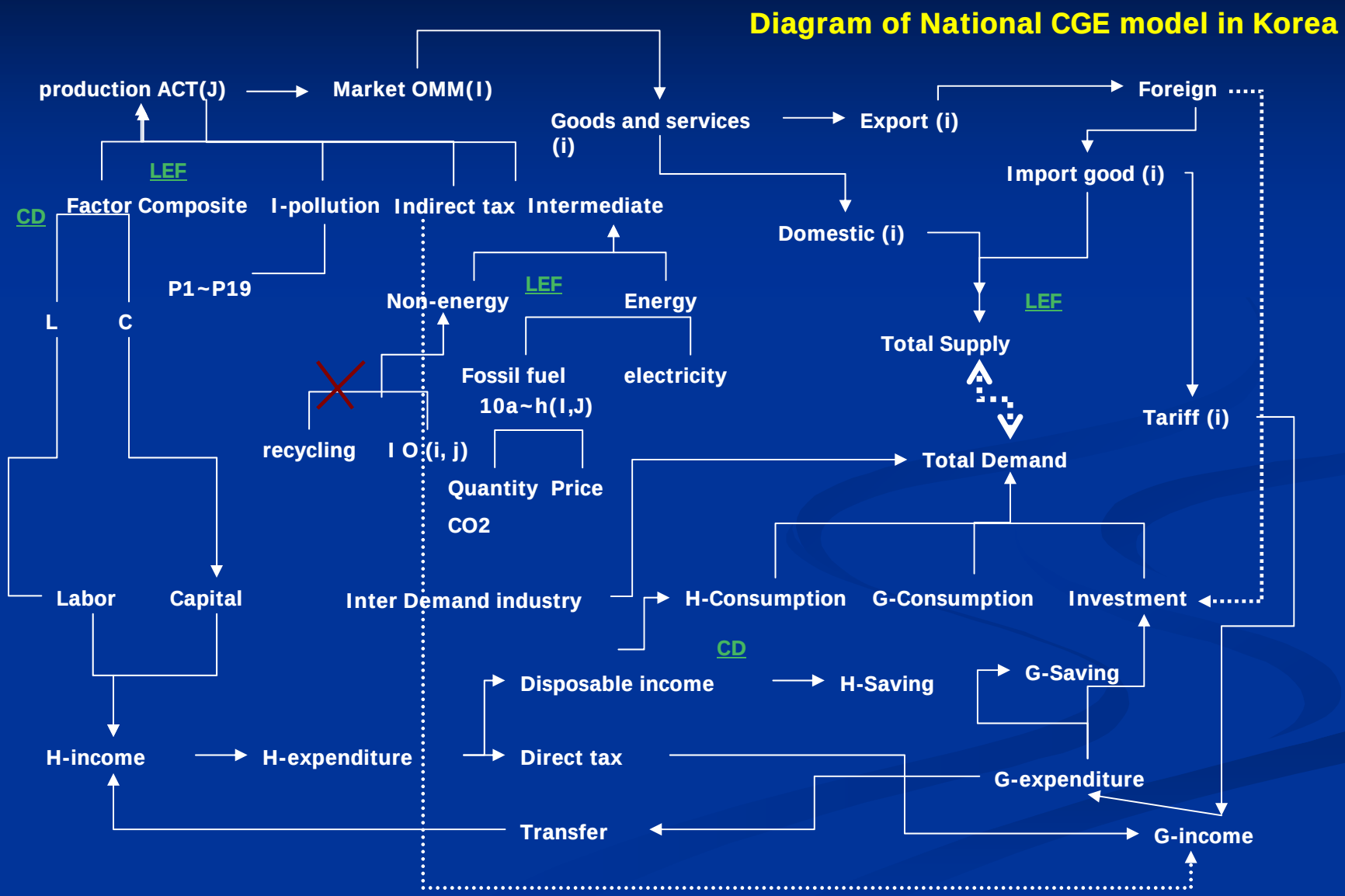
Modeling - method, data, and structure

- **Modeling procedures**
  1. **Gathering data**
     - ✓ **Set definition, define necessary datum, collect data**
  2. **Constructing Social Accounting Matrix (SAM)**
     - ✓ **Making supply and demand equilibrium = balanced SAM**
     - ✓ **Setting up waste material flow = balanced table, total generation = reuse (recycled+) + managed + dump**
  3. **Making Industrial waste flow linked with economic activity**
     - ✓ **Measured by using waste emission factor (source from KEI survey)**
  4. **Define functional relationship based on AIM/material structure**
     - ✓ **Focusing production activity**
     - ✓ **Assumed aggregate household consumption**
  4. **Benchmark check for static model**
     - ✓ **Adjusting for Balanced data, Construct and solve the program**

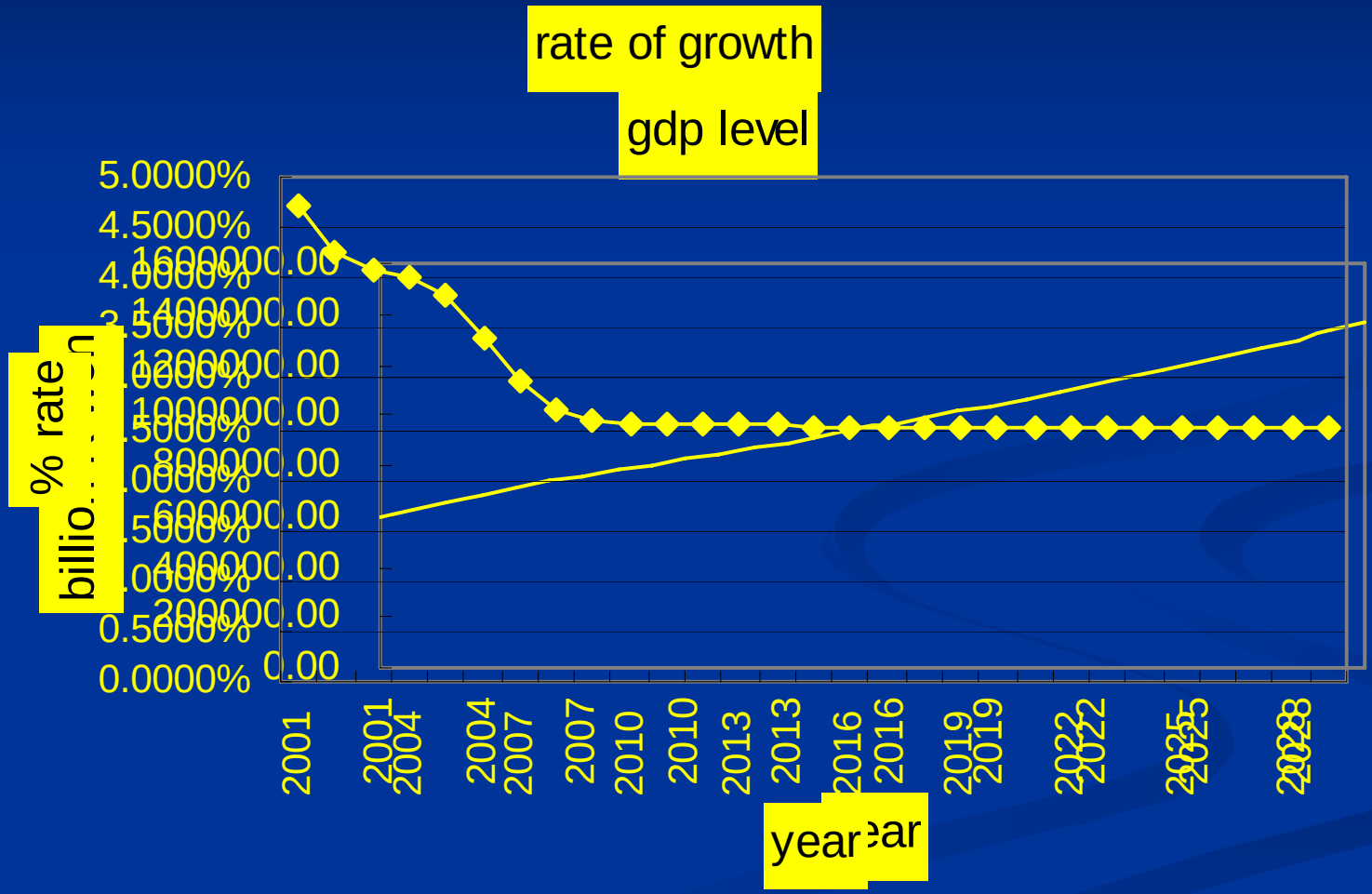
Modeling - method, data, and structure

Data	Source
• Input-Output Table(2000) – commodity flow • National Accounting(2000) – direct tax, saving • Environmental Protection and expenditure Survey(2000) - Environmental Protection activity	Bank of Korea
• Environmental Pollution Protection Industry Survey(2000) - Environmental Investment	Korea Environmental Industry Association
• Total waste Statistical Survey(2001) - Industrial waste generation per unit output (monetary term) • Waste generation and management(2000) - generation and management process, proportion etc..	Ministry of Environment
• Waste Generation and management	Korea Resource Cooperation
• Yearbook of Energy Statistical Survey(2001) - Energy Use (Quantity term), Carbon ton per unit Ton of Energy (www.keei.re.kr)	Korea Energy Economics Institute

Modeling - structure



Modeling - Empirical test



Future Work - Model Extension

1. **Modeling Recycling Market**
   - ✓ **Construct the price linkage system of the aggregated recycling goods**
   - ✓ **Collecting and adjusting data for recycling activity (intermediate input, value added, consumption, investment, tax, export and import etc..)**
2. **Revision of Applied CGE modeling**
   - ✓ **Make consumer transformation matrix (consumer behavior)**
   - ✓ **Introduce substitution and non-linearized price effect for sensitivity analysis**
   - ✓ **Construct policy scenario and analyze policy impact**

Thank you for your attention !!

Please feel free to contact us!

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