Resource Circular National CGE modeling for Korean Economy: Environmental Policy for Economic Performance

Focusing…

1. **Waste flow by sector in Korea:**

    Generation/Treatment/Recycling

2. **Compilation of Recycling Waste in Flow into Economy by Types of Waste link to Economic Activities**

Jae Joon Kim and Sang In Kang
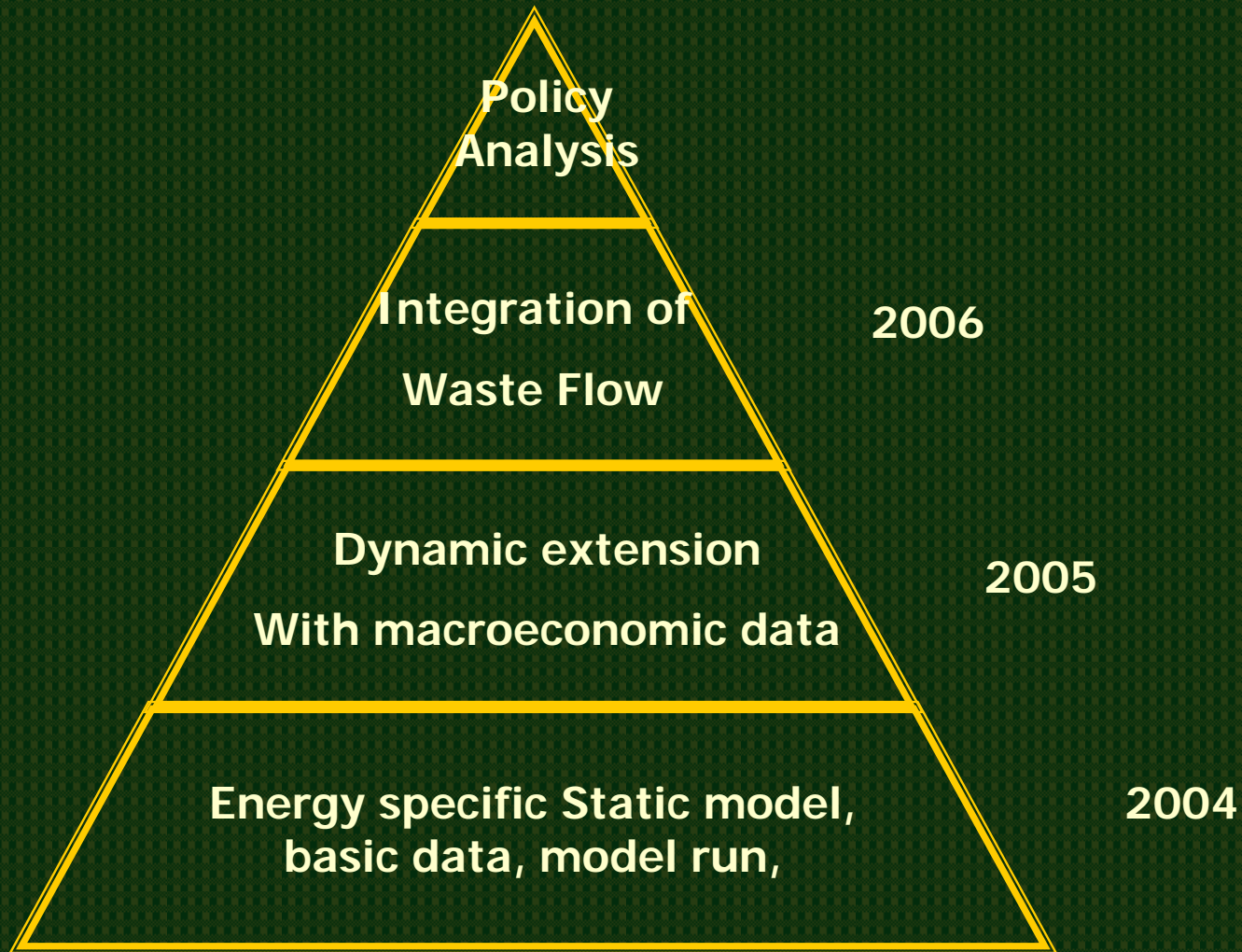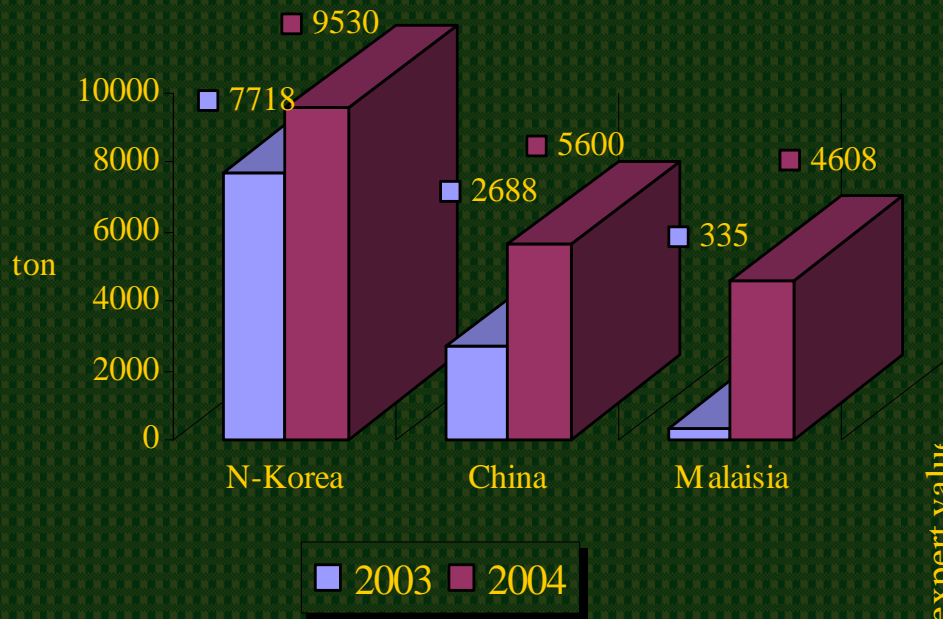
Korea Environment Institution

Content

- progress of modeling work: N-CGE with waste flow for Korea
- Waste Flow in Korea
- Data sources for Waste Flow
- Compilation of Korean Waste Flow
- Work to do

Progress in AIM/Material Korea

Waste Recycling Flow in Korea

export of recycling goods to major countries

Export trend of recycling good in Korea

Data sources1 and problems

1. Trend of total waste generation and treatment in Korea (KMOE, 2001)

   Official Publication data iii

2. Waste Statistics survey in Korea (KMOE, 2001) by regions and simplified waste type

   Total waste generation : conducted by KEI

   No industrial waste flow data

   => choose Total waste generation : T_indw

3. Waste Recycling Statistics (Korea Resource Corporation)

Data sources 2 and problems

2. Waste Census in Korea (KMOE, 2001) conducted by KEI

Industrial waste generation data (KSIC) by detailed waste type

Industrial Treatment data by waste type in unit value: kg/person/day

But...   Total Generation not equal to total management

Need to calculate

→ Coef A_i = ind sec i / total industrial waste

→ Coef b_{ij}^k = treatment method k in waste j, industry i

/ total treatment of industry i

Simple structure of data source 2

```
IND ──┬── GEL ──┬── COM ──────────────┐
      │         ├── In COM ───────────┤
      │         └── CONS ─────────────┤
      │                               ├── Waste Type ──┬── Self management ──┬── Inciner ation
      └── SPE ──┬── COM ──────────────┤      ...       │                     ├── Land fill
                └── In COM ───────────┘      ...       │                     ├── reuse
                                             ...       │                     ├── Dump to sea
                                             ...       │                     └── others
                                             ...       │
                                             ...       └── Outside management ──┬── Local gov ──┬── inciner ation
                                             ...                                │               ├── Land fill
                                             ...                                └── firm ───────┤
                                             ...                                                ├── reuse
                                             ...                                                ├── Dump to sea
                                             ...                                                └── others
```

Generation part

Treatment part

Data sources 3 and problems

3. **Waste Recycling Statistics (Korea Resource Corporation)**

Industrial waste generation data by most disaggregated waste type
Reuse and Recycling data, unit: ton/year by KSIC- large and
But...

Missing industry: agriculture, forestry, mining, a lot service sectors

Need to calculate

➔ Coef a_{ij} = waste i in industry j/ total waste in sector j

Compilation Korean Waste Flow Korea

T_indw

Ind (i)	T_indw * A(i)

	Indw(j)	
Ind(i)	T_indw * A(j) * a(ij)	

		Treat_A	
		Treat (k)	
Ind(j)	Indw(j)	T_indw*A(j)*a(ij)*b(ijk)	

Recycling input link with commodities and sectors in Korea

Ind_w	Treat	Self management		By gov…	
		recycling	D-disposal	…	
sectors	waste				
A01	B01				
	B02	△ -			
	…				
A02…	B04…				

Substitution effects ->>

		Recycled waste commodity		
		A01a	A01b	A02…
	B01			
	B02	- △		
	B02…			

		Commodities substituted by recycling goods		
		A01a	A01b	A02…
	A01	- △		
sectors	A02			
	A03			

Used by input factor

Future work

- Fine Tuning of AIM/material Korea model
  - Macroeconomic data with Waste in-flow
  - Scenarios, Policy Implications
- Revision of Applied CGE modeling
  - Substitution and non-linearized price effect
    - Pricing of Material goods
    - Elasticity of Substitution