AIM/Material Model

Application to India and Japan

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Coverage in this workshop

- **Summary (Session 4)**

  For understanding AIM/Material model

  - ***What is AIM/Material model?***
  - ***Model formulation***
  - ***Necessary data for simulation***
  - ***Future scenario***

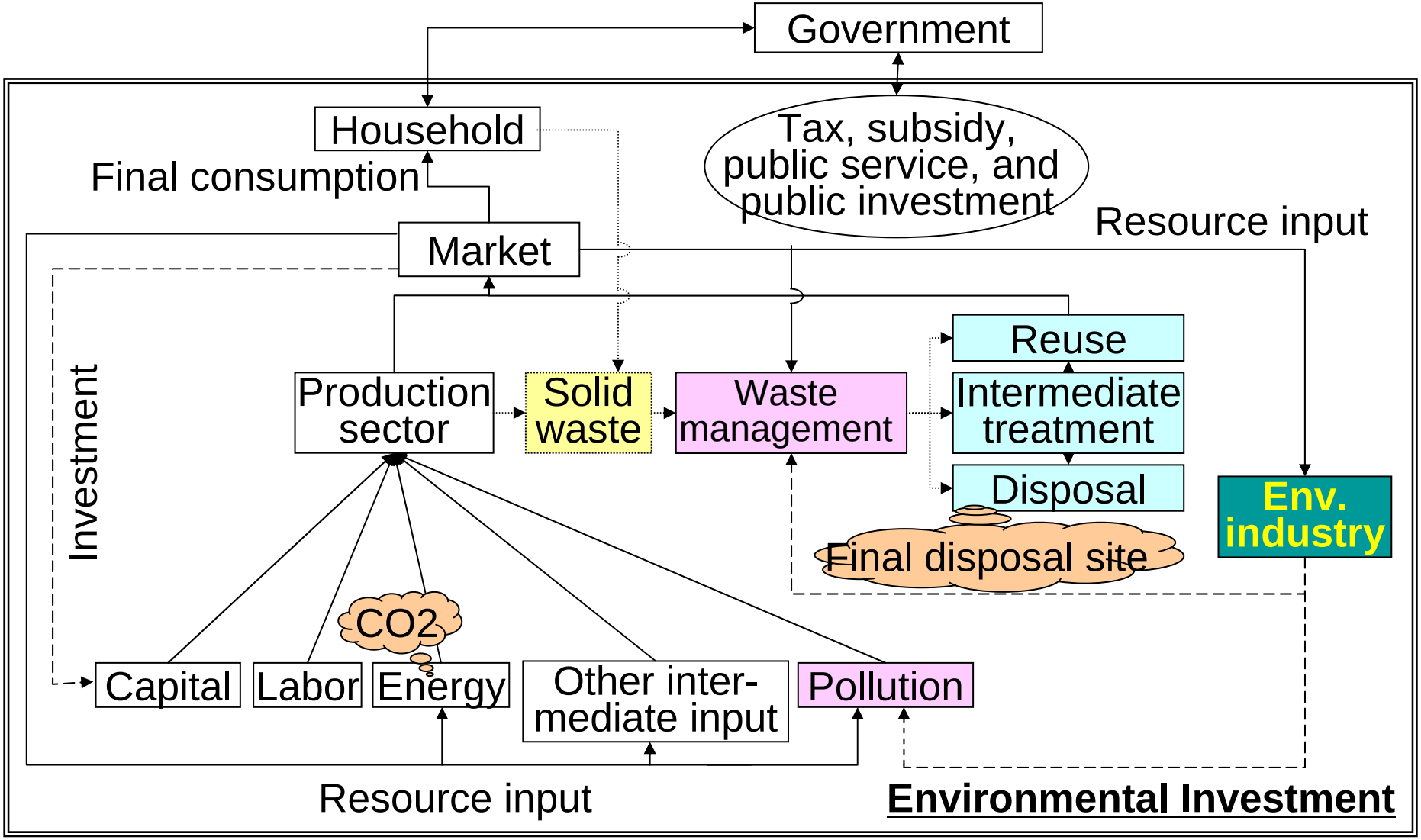
- **Training (Session 5)**
  - ***Operation of AIM/Material model***

- **Application (This session)**
  - ***Application of AIM/Material model to India and Japan***

Application of AIM/Material model

- **Model**
  - ***Basic economic structure is the same as the training model***
  - ***The differences are as follows;***
    - ***Disaggregate the environmental industry***
    - ***More detailed solid waste type***
    - ***Three types of waste treatment: direct final disposal, direct reuse, and intermediate treatment.***

Overview of complex model



Application of AIM/Material model

- **Application to India**
  - **simulation of toxic waste reduction**
  - **simulation of mitigation of economic impact by introducing countermeasures**

- **Application to Japan**
  - **simulation of CO2 reduction (Kyoto target)**
  - **simulation of final disposal of solid waste**
  - **simulation of mitigation of economic impact by introducing countermeasures**

Sectors of AIM/Material [India]

ID	Sector/Commodity	ID	Sector/Commodity
AGR	Agriculture, forestry, fishing	WTR	Water supply
MIN	Mining	SRV	Services
FOD	Food	MWM	Municipal waste management
TEX	Textiles	IWM	Industrial waste management
PLP	Paper and pulp	EMC	Environment industry
CHM	Chemicals	GOV	Government service
NMM	Non-metallic mineral products	COL	Coal
BMT	Basic metals	OIL	Oil
FMT	Fabricated metals	GAS	Gas
MCH	Machinery	HYD^{+}	Hydro power generation
ELM	Electrical machinery	THE^{+}	Thermal power generation
TRE	Transport equipment	NUC^{+}	Nuclear power generation
OTH	Other manufacturing	ELE*	Electricity
CNS	Construction		

* Only Commodity
$^{+}$ Only Sector

Waste categories of AIM/Material [India]

Ash	Waste plastic
Sludge	Waste paper
Waste oil	Waste textile
Waste wood	Animal and plant waste
Slag	Scrap metal
Construction waste	Waste glass
Dust	Other waste
Toxic waste	

Left column represents industrial waste classification.
Right column represents both industrial and municipal waste classification.

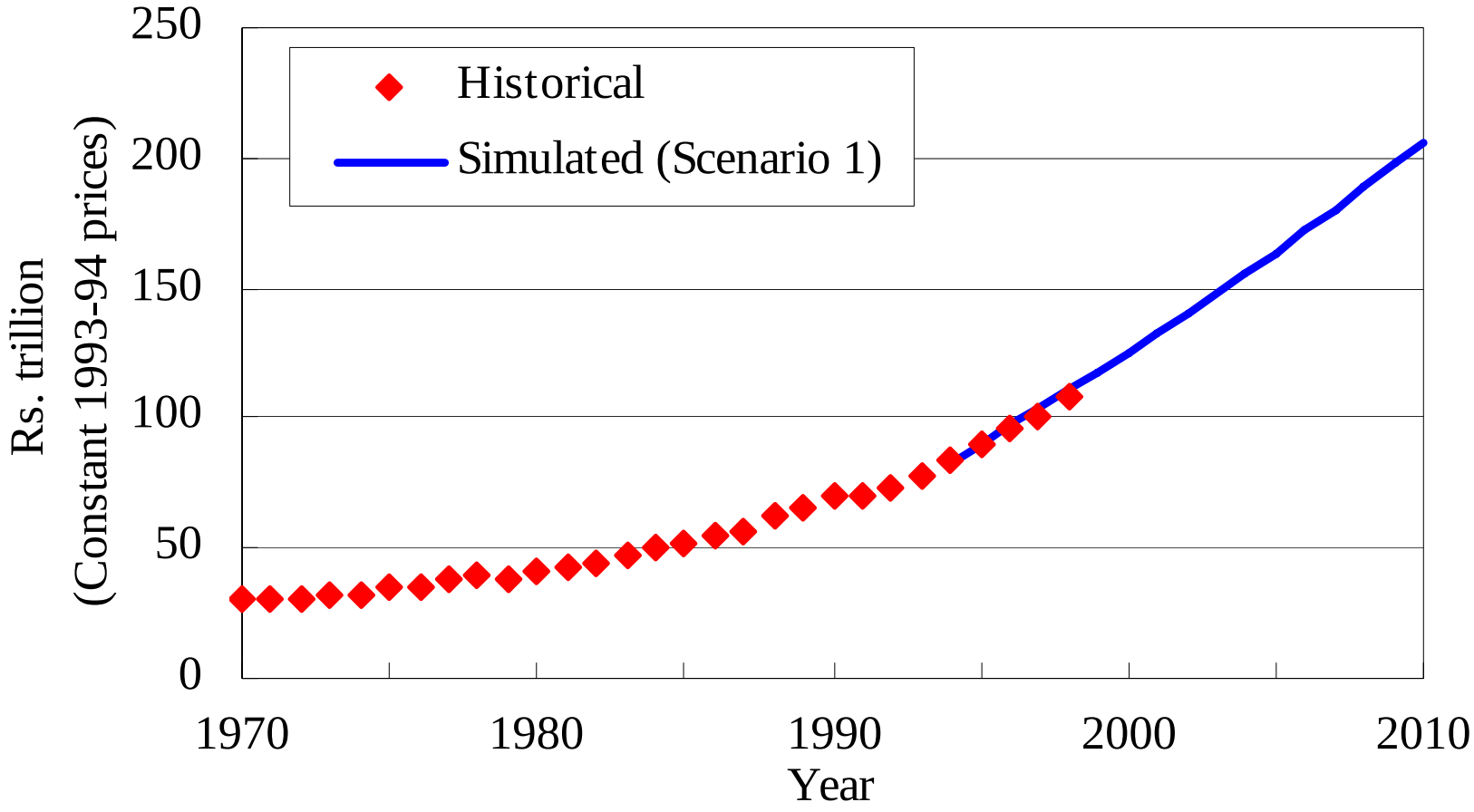
Waste to goods in AIM/Material [India]

	AGR	TEX	PLP	CHM	BMT	OTH	NMM	FMT
ASH	■					■	■	
SLD					■			
WOL				■				
WPL				■				
WPP			■					
WWD			■					
WTX		■						
WAP	■							
SCM					■			■
WGC							■	
SLG						■		
WCT						■		
DST						■		
WZZ						■		
WWT							■	

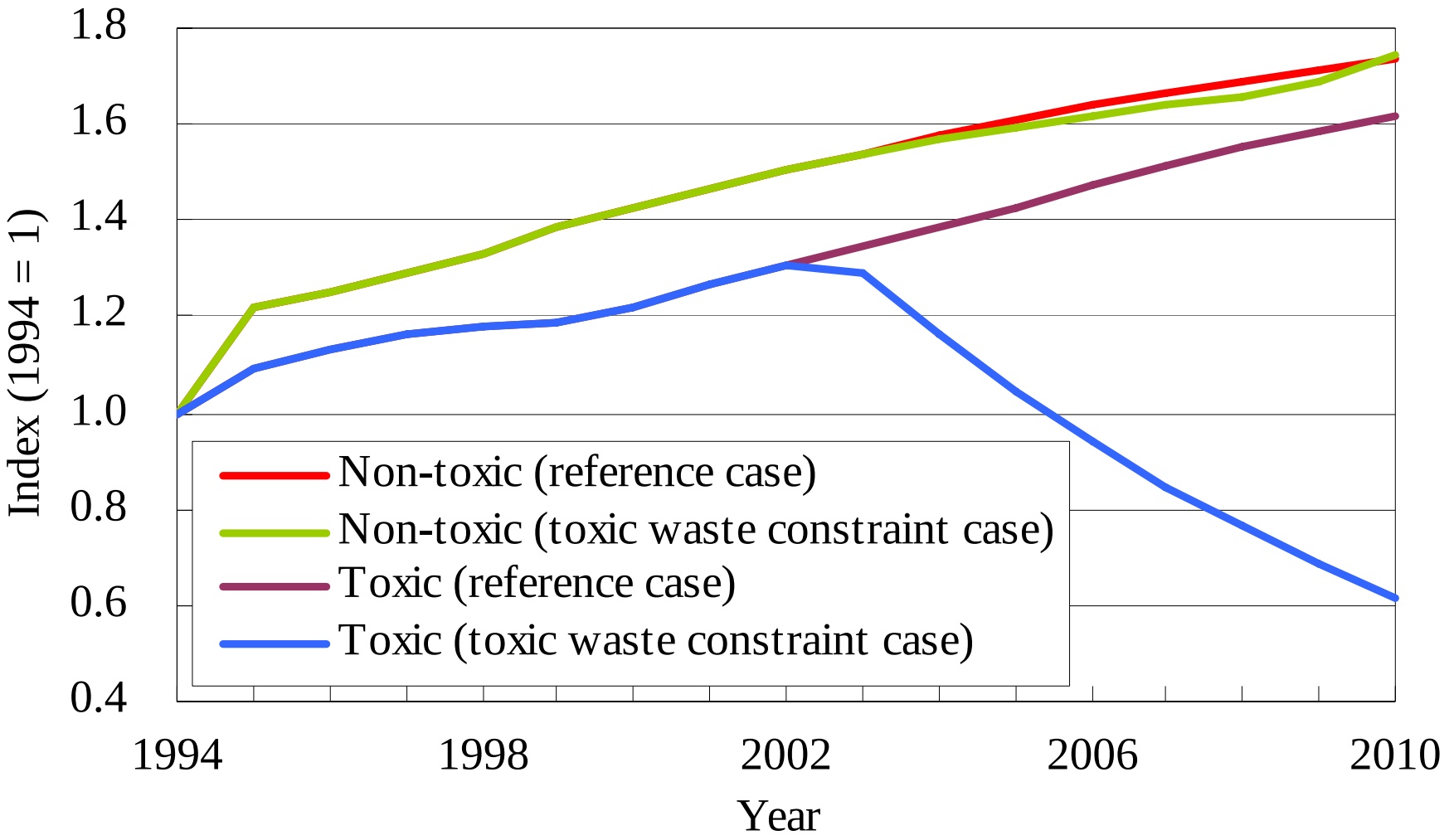
Scenarios for policy analysis using AIM/Material [India]

- **Scenario 1**
  - **Reference scenario – no interventions**
- **Scenario 2**
  - **Toxic Constraint Scenario – limit the discharge of toxic wastes.**
- **Scenario 3**
  - **Countermeasures – environmental investment with waste management efficiency improvement**

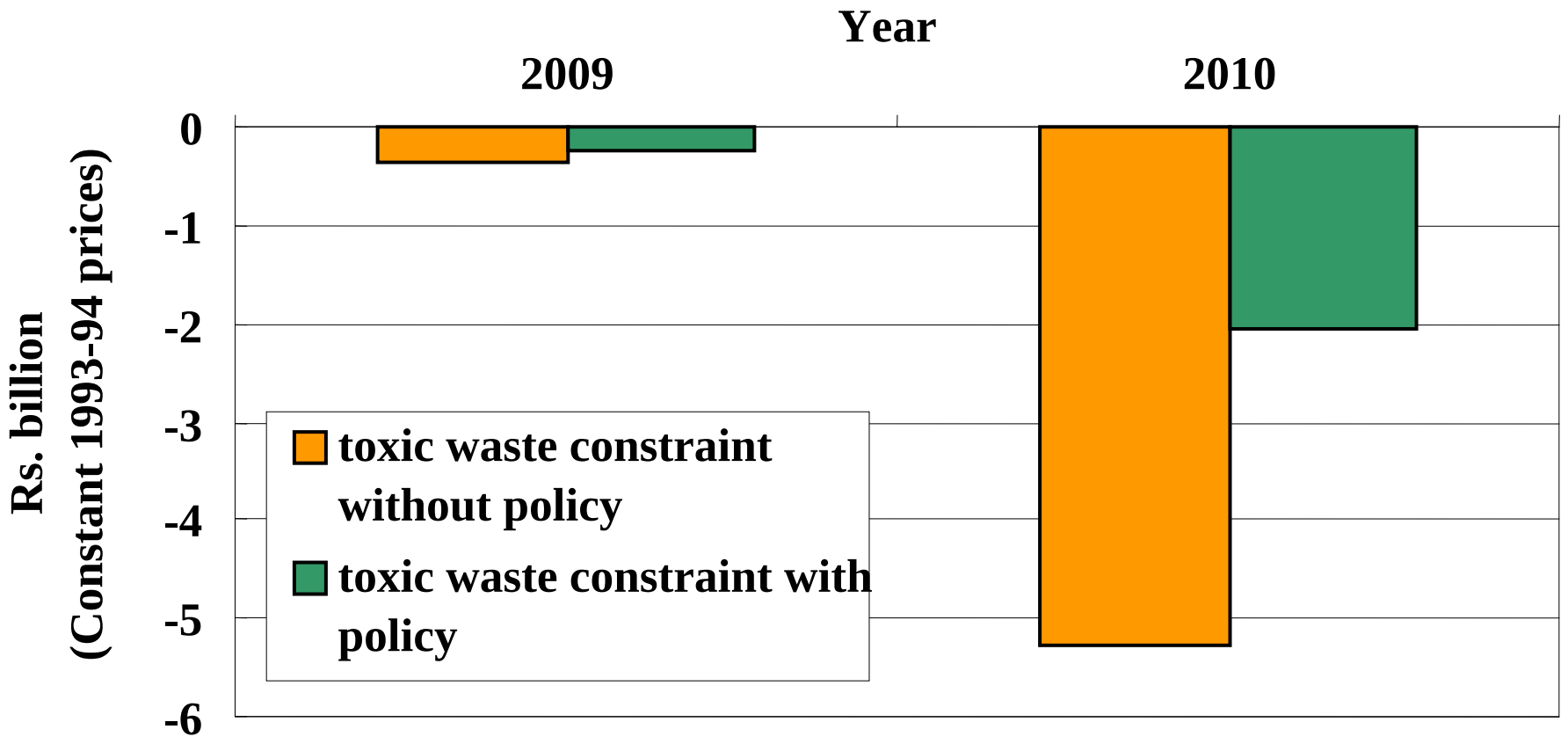
GDP change of reference case



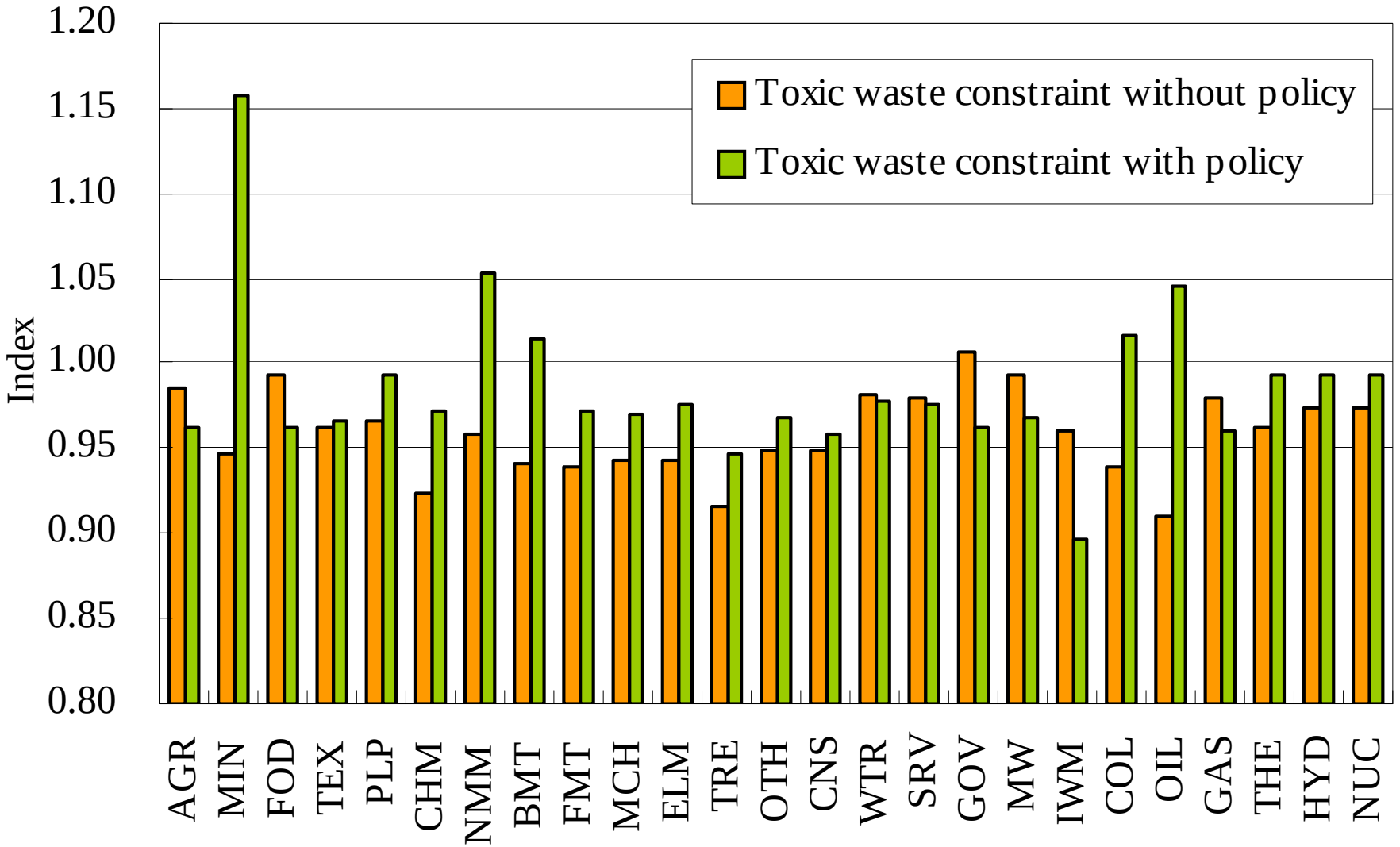
Trajectory of final disposal waste



GDP change due to toxic waste constraint and GDP mitigation by introduction of policy



Output changes in each sector in 2010 over reference case



Example of AIM/Material Model

- Application to India
  - simulation of toxic waste reduction
  - simulation of mitigation of economic impact by introducing countermeasures

- Application to Japan
  - simulation of CO2 reduction (Kyoto target)
  - simulation of final disposal of solid waste
  - simulation of mitigation of economic impact by introducing countermeasures

Sectors and commodities of AIM/Material [Japan]

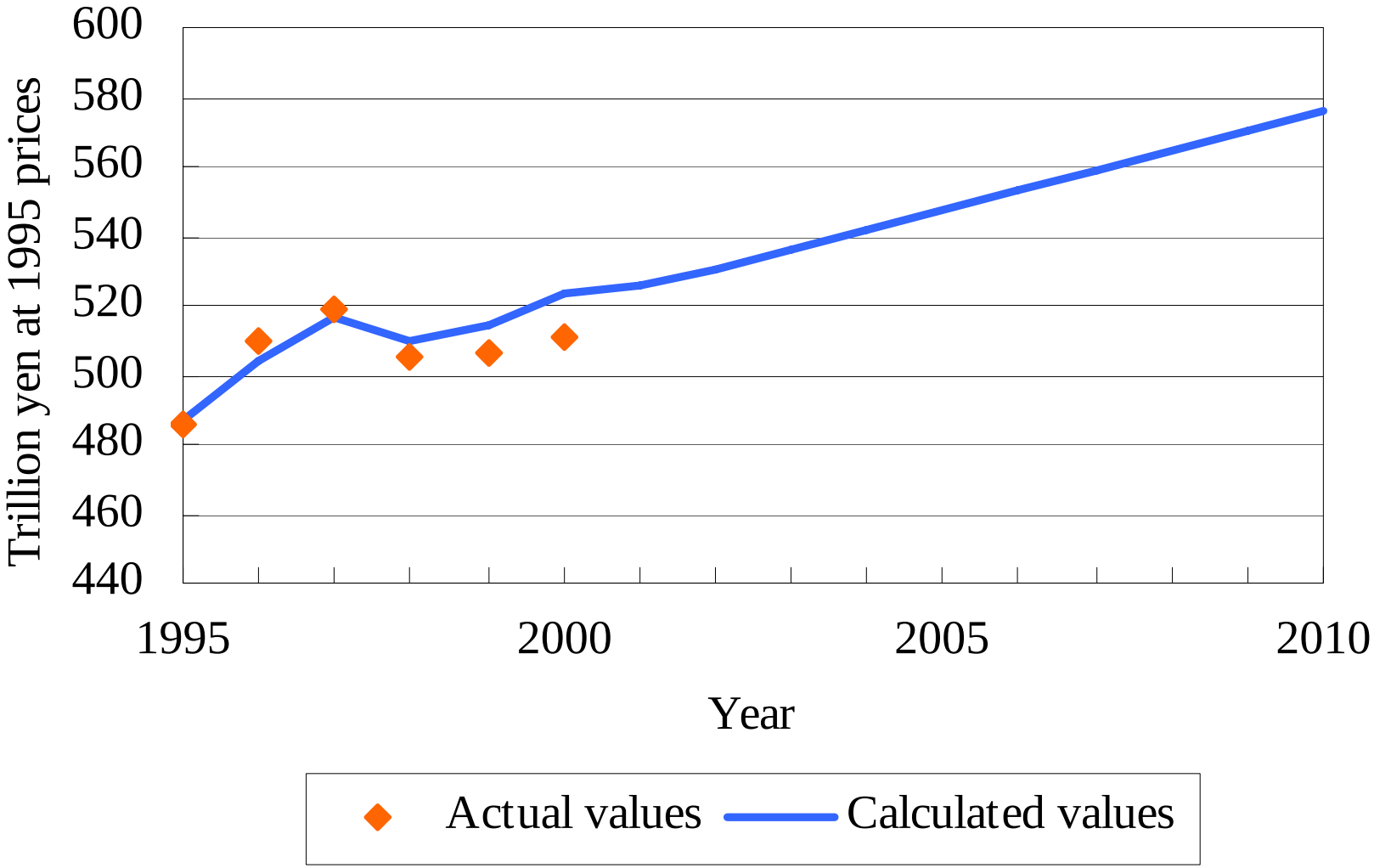
sector	commodity	sector	commodity
Agriculture, forestry & fisheries		Transportation & communications	
Mining except energy		Education, research, medical service, health & hygiene, & social welfare	
Coal mining	Coking coal		
	Coal for general use, lignite, anthracite	Goods renting & leasing	
Crude oil mining		Car & machine repairing	
Natural gas mining		Other service	
food		Government service	
textile mill products		Environmental industry	
lumber, wood products, pulp, paper & paper products		Sewage service	
chemical & allied products		Municipal solid waste treatment service	
plastic		Industrial solid waste treatment service	
ceramic, stone, & clay products		Manufacture of coal products	Coke
iron, steel, non-ferrous metals & products			Other coal products
non-ferrous metals & products			Paving materials
fabricated metal products		Manufacture of petroleum	Gasoline
general machinery			Jet fuel oil
electrical machinery, equipment & supplies			Kerosene
transportation equipment			Light oil
precision instruments & machinery			Heavy oil
Miscellaneous manufacturing industries			Naphtha
Construction			LPG
Steam & hot water supply			Other petroleum products
Water supply		Manufacture of gas	Town gas
Wholesale & retail trade		Thermal power generation	Electricity
Finance & insurance		Hydro power generation	
Real estate		Nuclear power generation	

Classification of solid waste in AIM/Material [Japan]

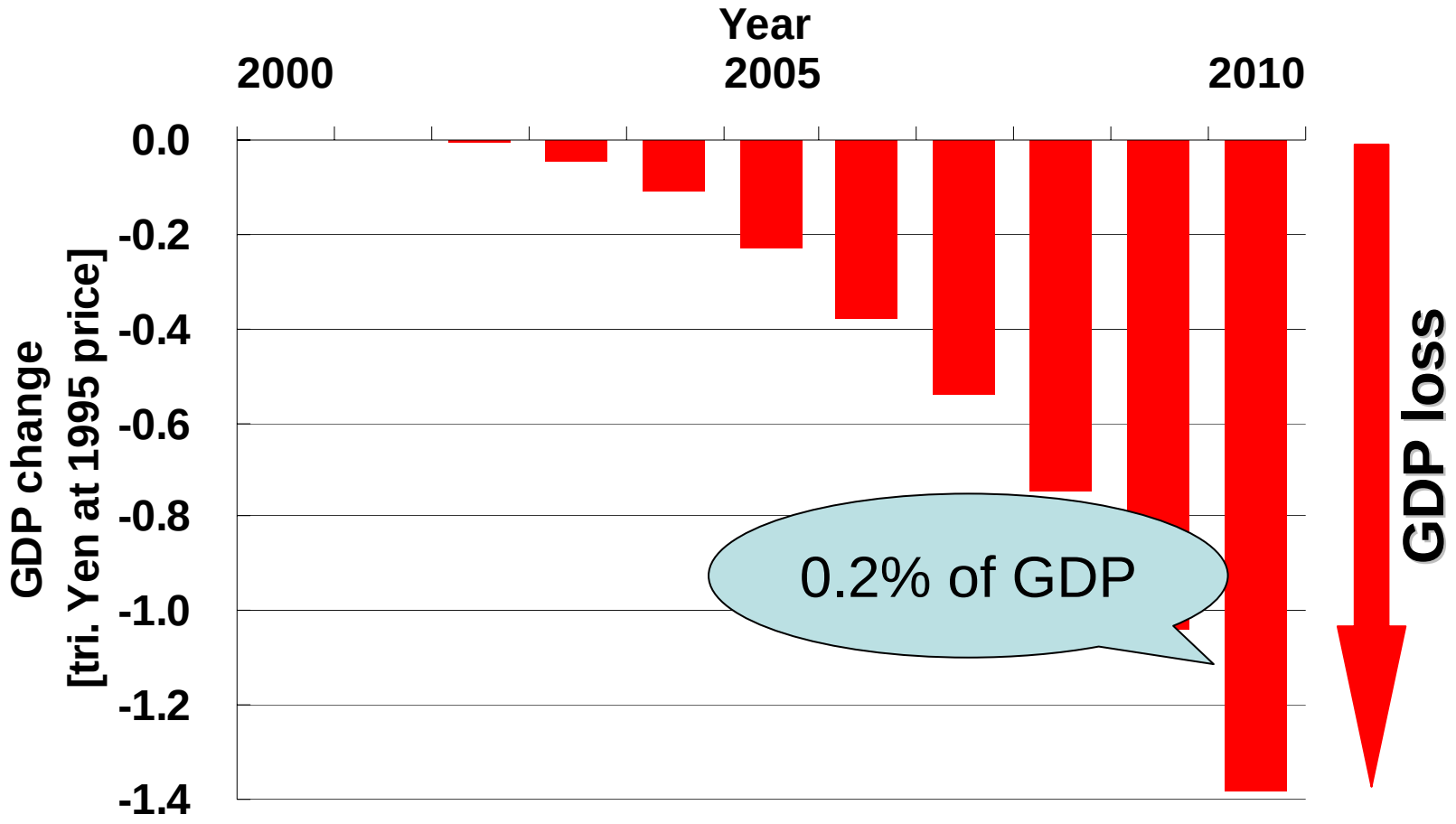
ash	animal and plants wastes
sludge	waste rubber
slush, waste oil	metal trash, scrap metal
waste acid	waste glass
waste alkali	slag
waste plastics	construction and demolition waste
waste paper	dust, soot
waste wood	animal excrement
waste fiber and textile	animal carcass

Yellow cells represent both industrial waste and municipal waste classification.
White cells represent industrial waste classification.

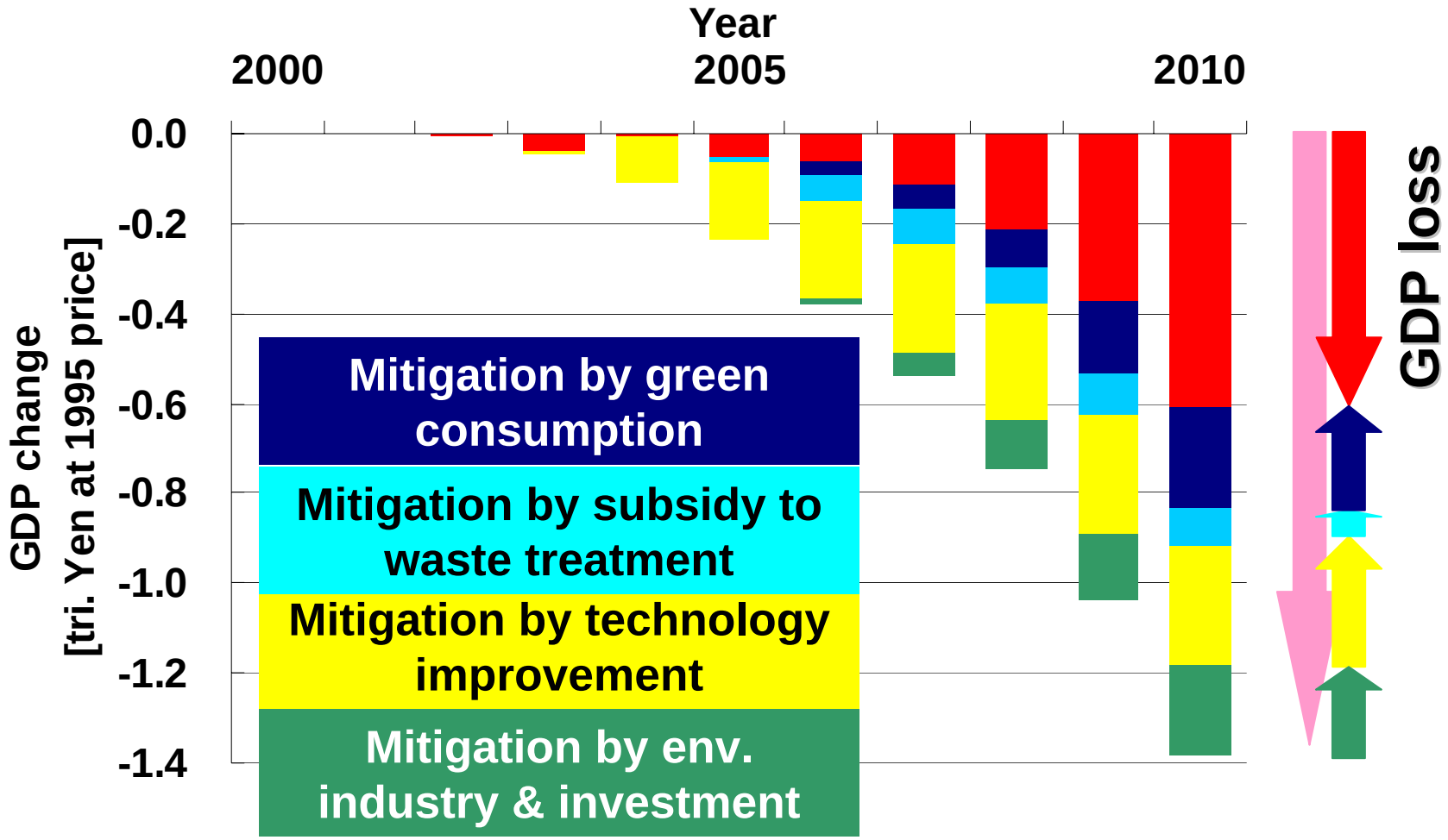
GDP change of Japan in reference case



GDP loss due to CO2 reduction & final disposal reduction of wastes



Mitigation of GDP loss by various countermeasures



Future activities

- Application of AIM/Material to other countries
- Simulation of other countermeasures
- Linkage to AIM/Emission and AIM/CGE
- Including other environments such as natural assets