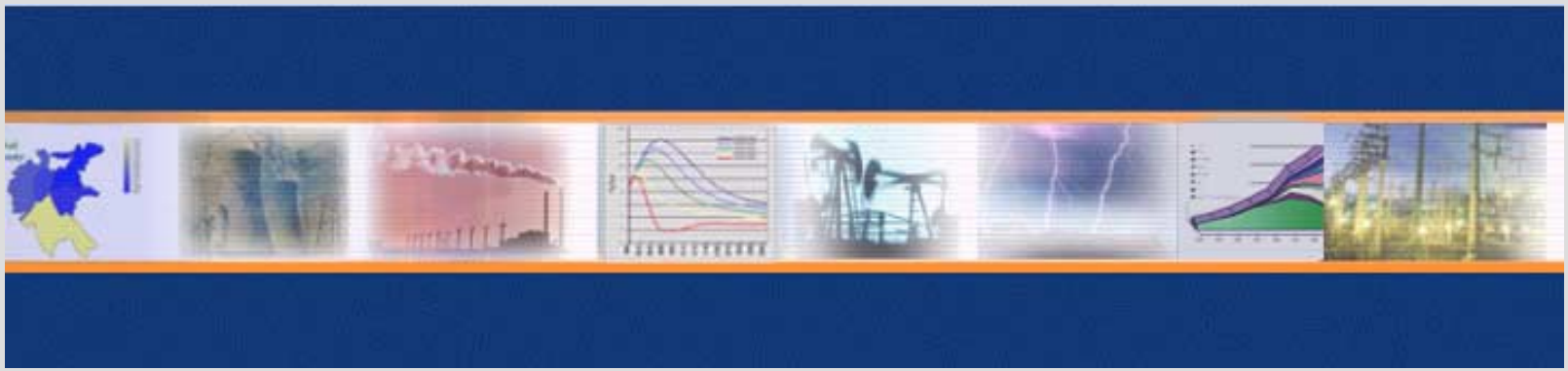
Applications of AIM/Material Model to India

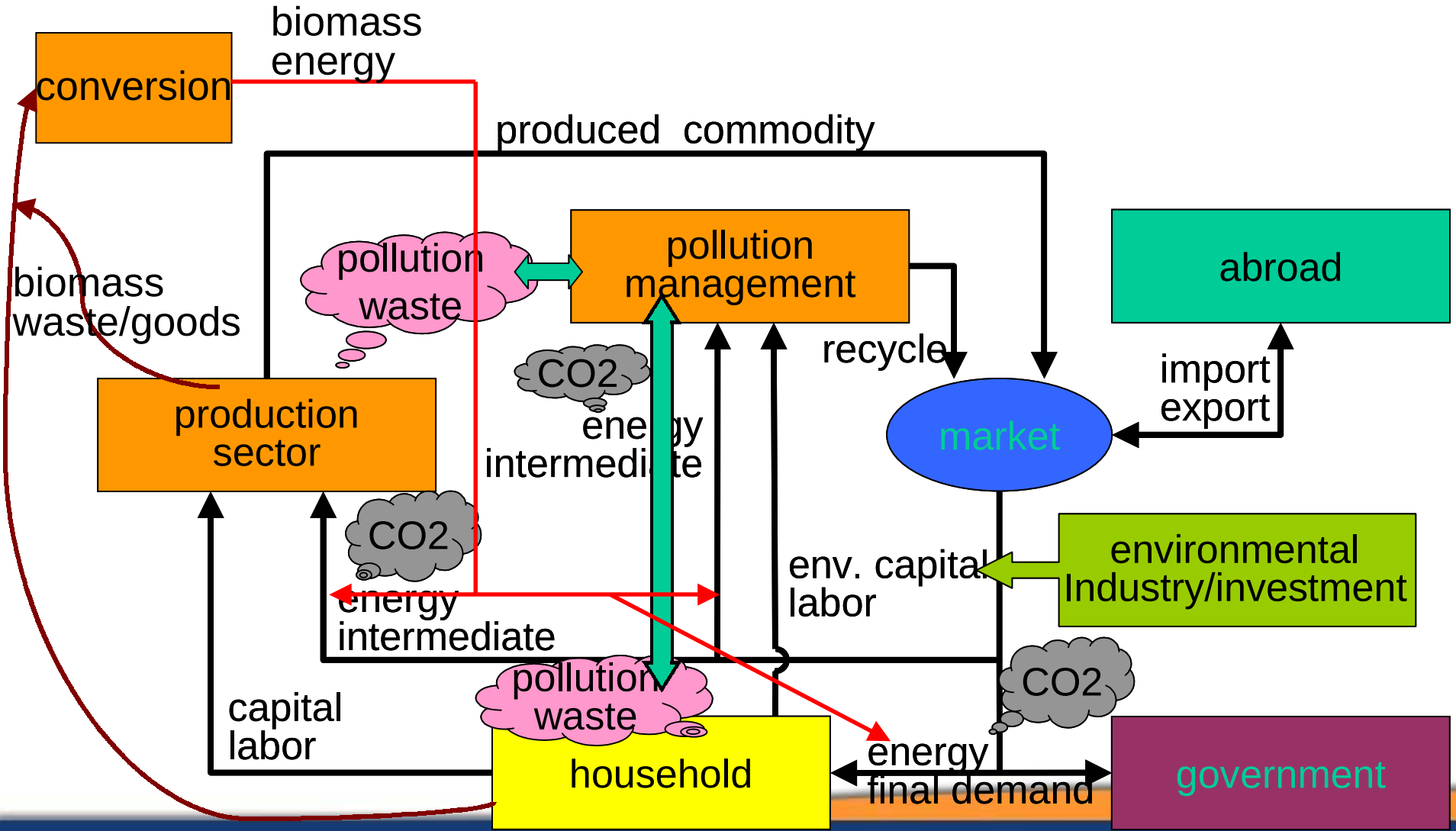


ECONOMIC AND ENVIRONMENTAL MODELING WORKSHOP

Features of AIM/Material Model

- Top-down model
- Domestic model
- Computable General Equilibrium model
- Recursive dynamics
- Treatment of pollution generation, management and discharge
- Activity of environmental industry and environmental investment
- Keeps economic balance and material balance
- Link with technology model such as AIM/Emission model for technology progress

Structure of AIM/Material Model



Structure of AIM/Material Model

Production sector

- Input: capital, labor, energy, other intermediate input, pollution (inputs for pollution management)
- Output: commodity

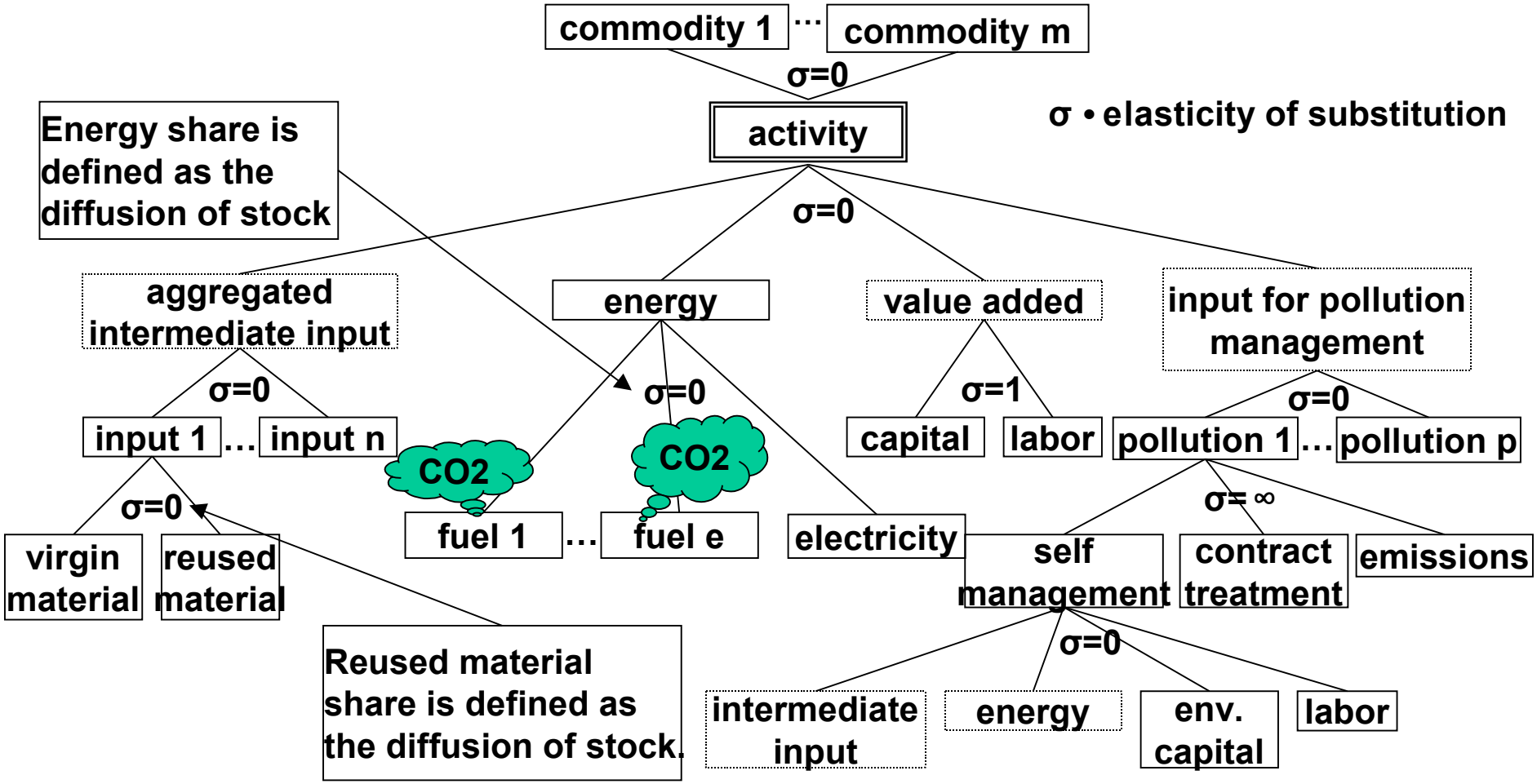
Household

- Endowment: capital, labor
- Demand: household final consumption, investment

Government

- Revenue: tax including environmental tax
- Demand: government final consumption, government investment

Production in AIM/Material



Overview of AIM/Material

40 Sectors × 33 Commodities

More Details in Energy-related Activities

- Electricity Disaggregated into 8 Sectors
- Other 6 Sectors for Energy Production and Conversion/Processing
- 5 Sectors For Energy-intensive Industries
  - Iron & Steel
  - Pulp & Paper
  - Non-metal Mineral Products
  - Non-ferrous
  - Chemical

Environmental Industry Sector and Environmental Investment

1993-2030, Step = 1 Year

Dataset for AIM/Material Model

- IO table (commodity x commodity)
- U matrix (commodity x sector)
  - **Disaggregate pollution management**
- V matrix (sector x commodity)
- Investment by sector
  - **Disaggregate pollution management**
- Pollution flow by sector
  - **Generation, treatment, discharge, recycle, ...**
- Supply and demand of reused material

Scenarios

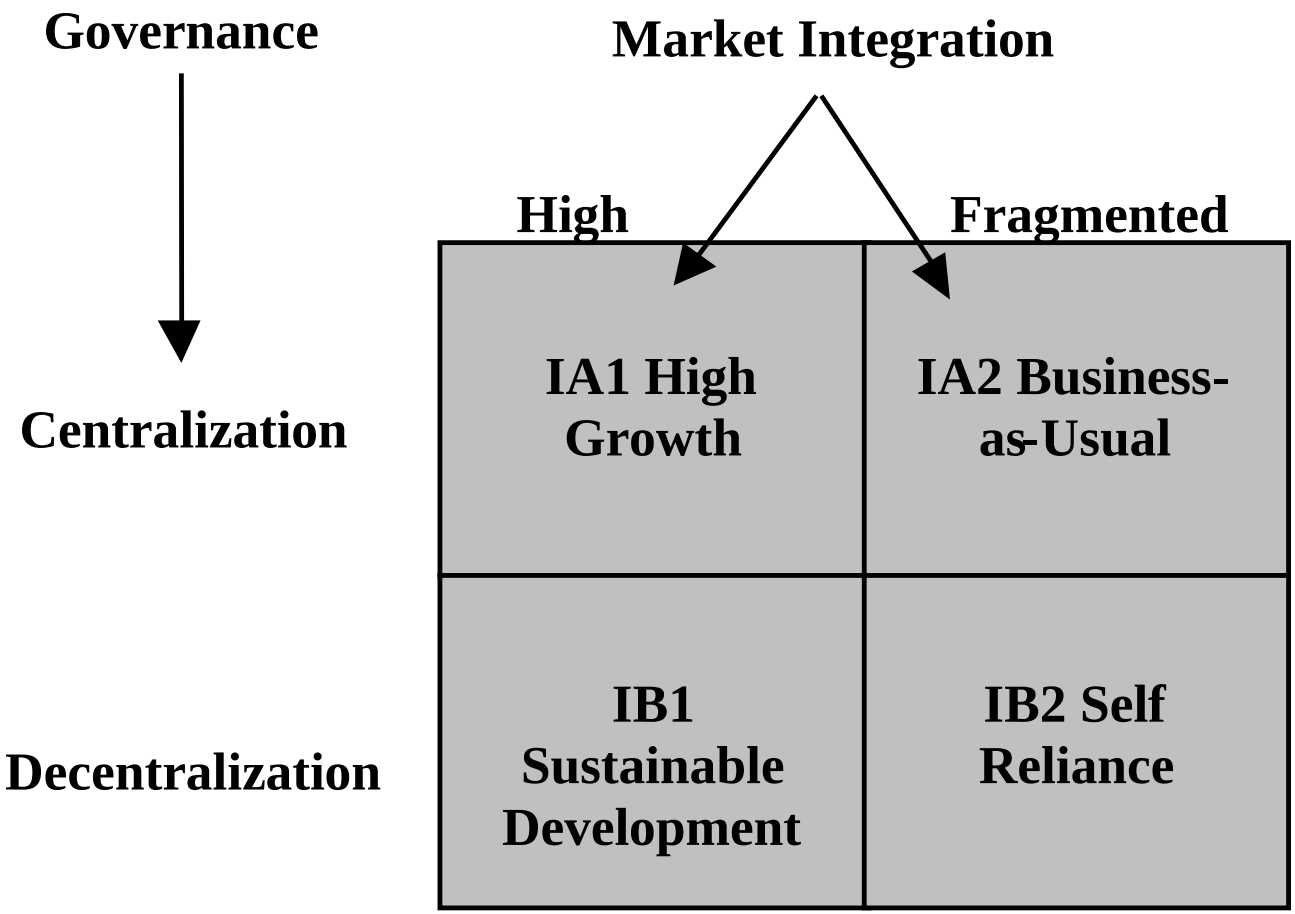
Indian emission scenarios

- IA1, IA2, IB1, IB2

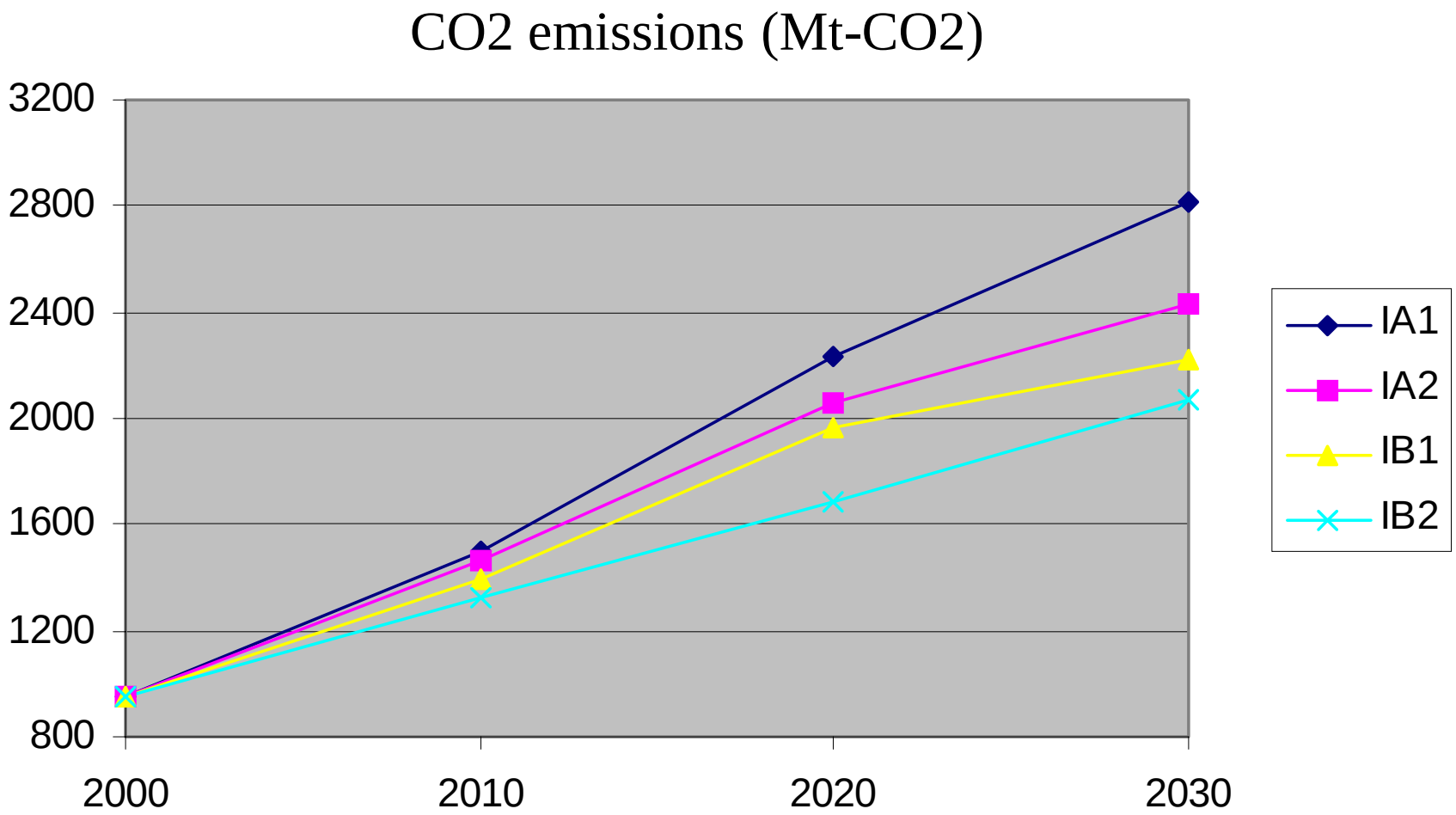
Policy scenarios

- Set 1
  - CO_2 Constraint
  - Recycling
  - Innovation
- Set 2
  - Toxic waste disposal constraint
  - Environmental investment

Indian Emission Scenarios

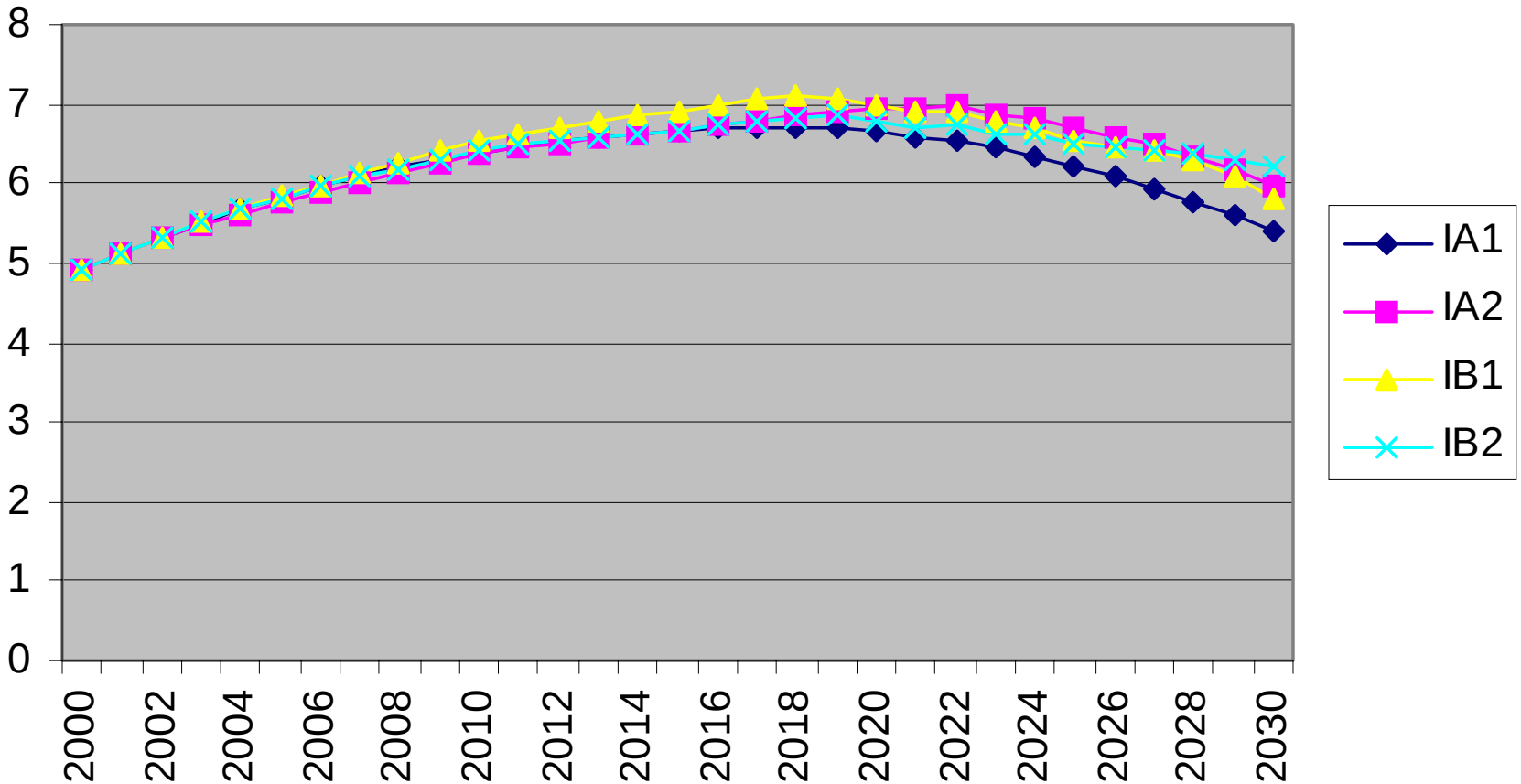


Indian Emission Scenarios



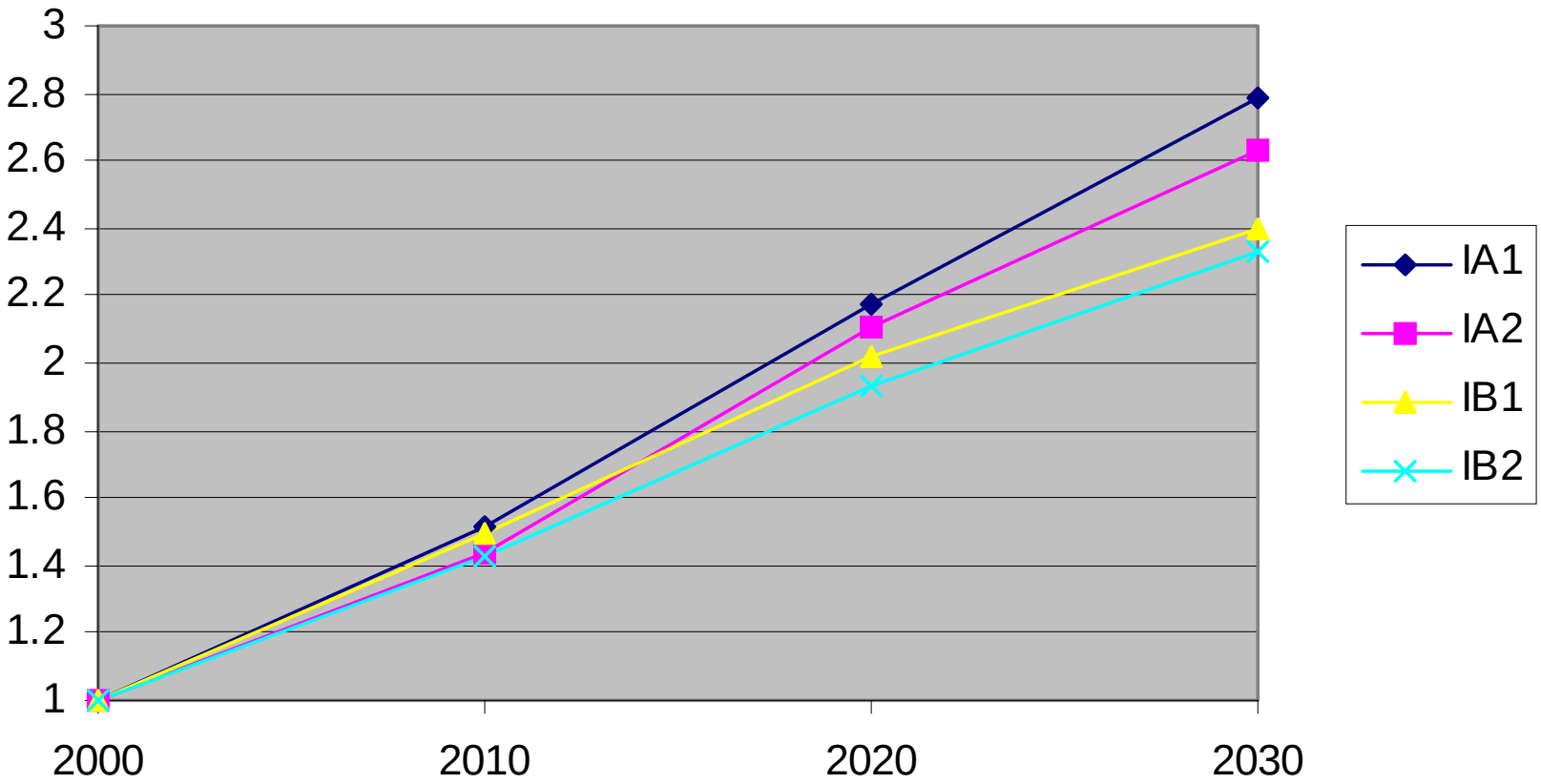
Indian Emission Scenarios

SO2 emissions (Mt-SO2)

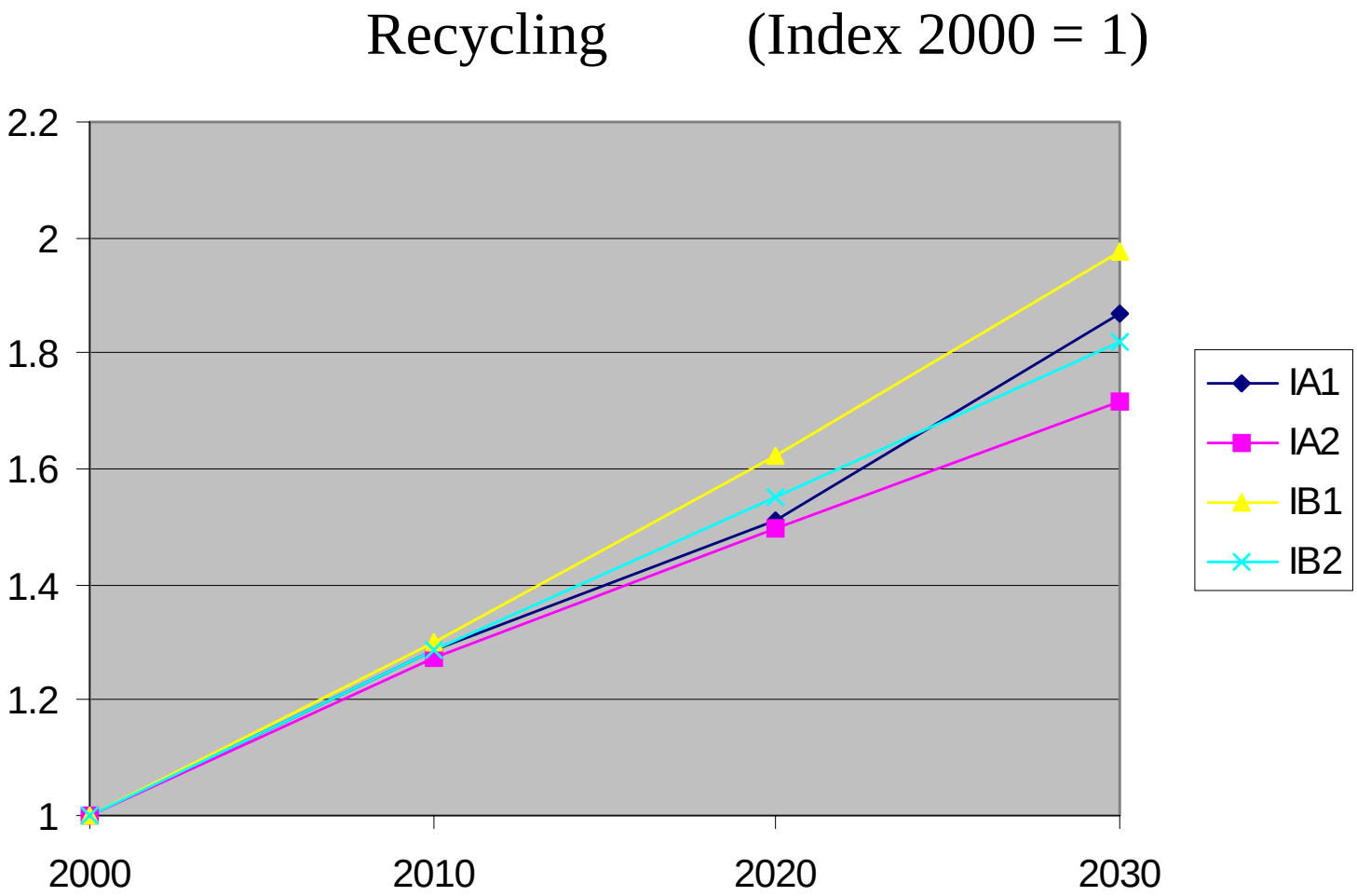


Indian Emission Scenarios

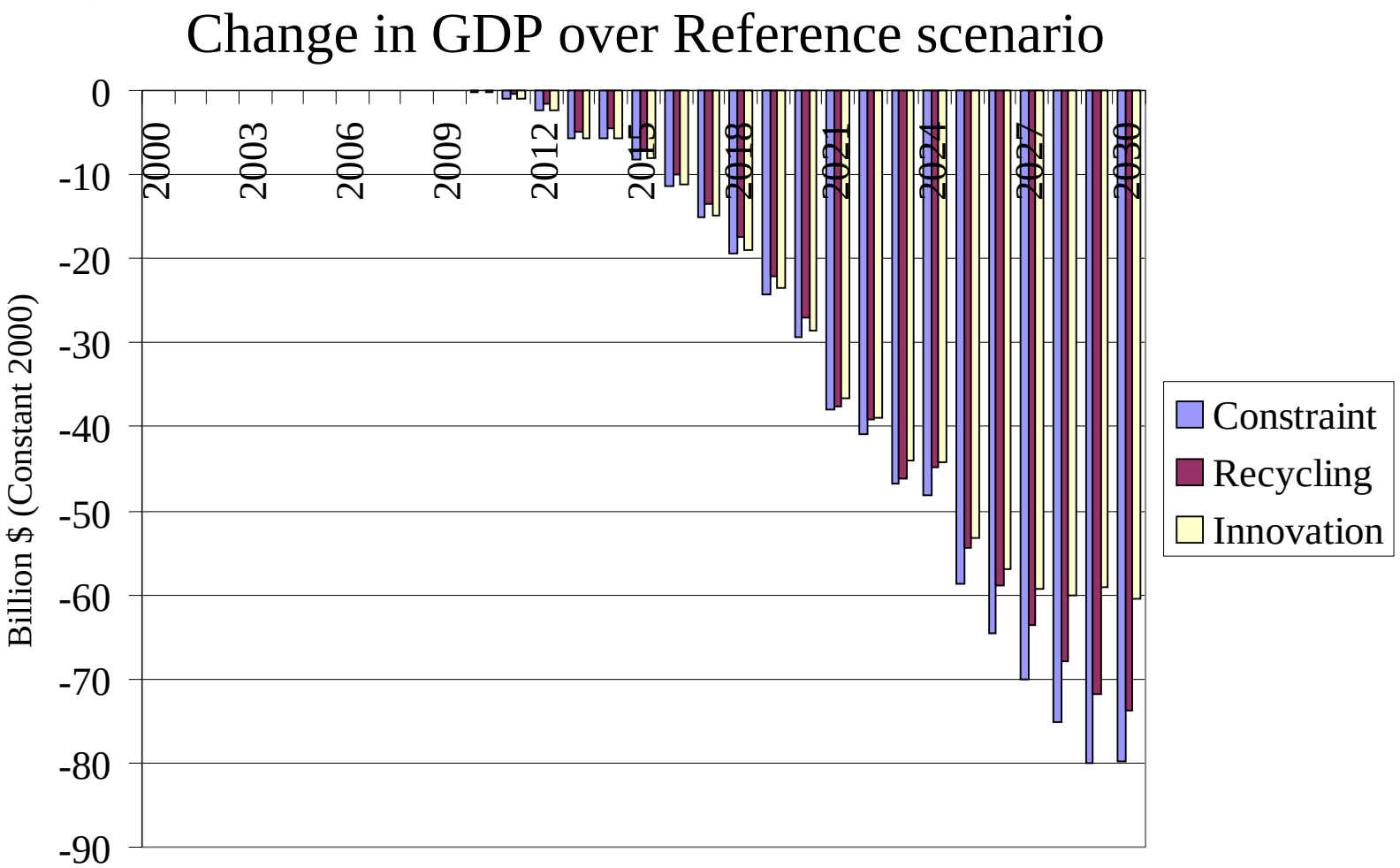
Solid waste (Index 2000 = 1)



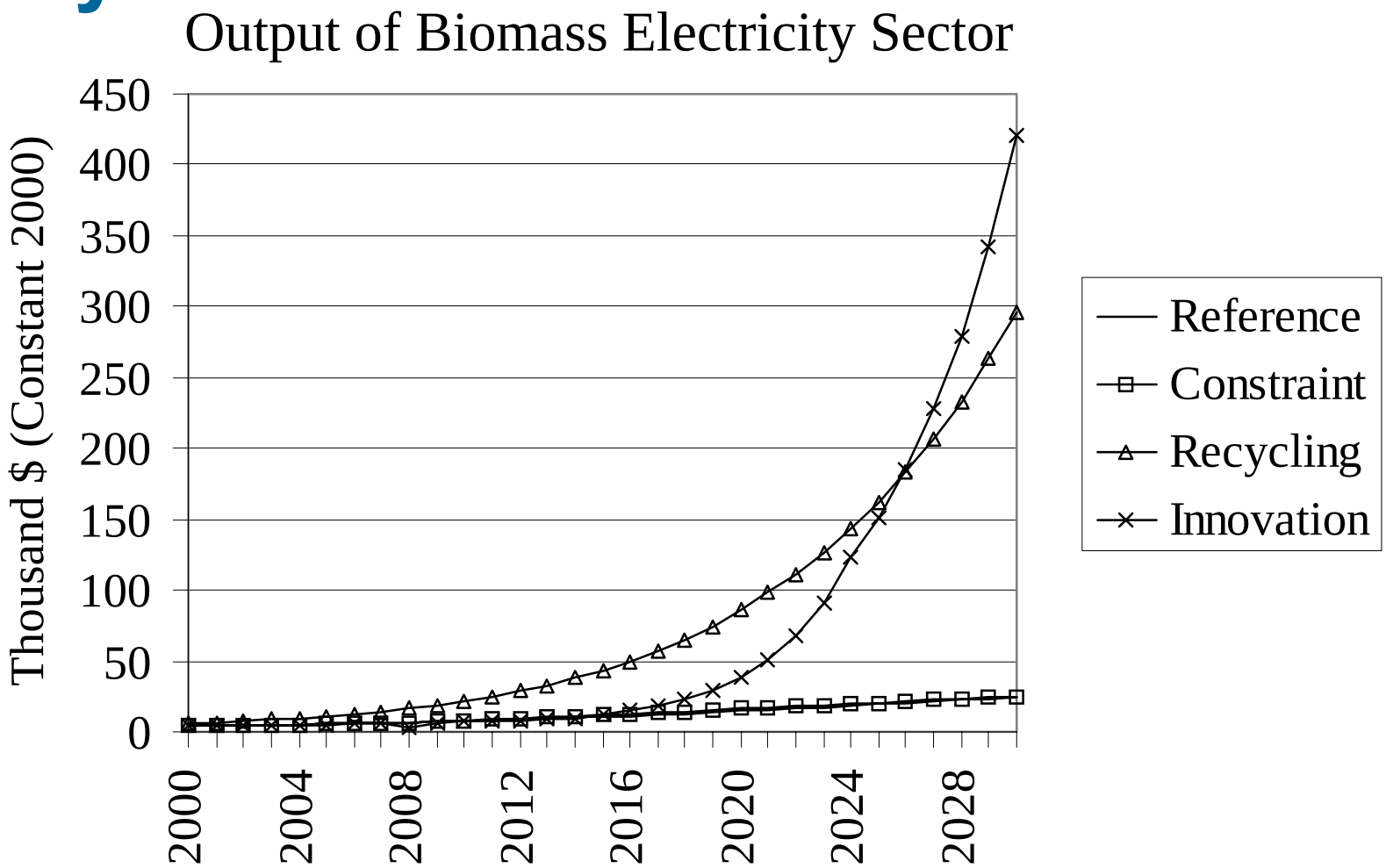
Indian Emission Scenarios



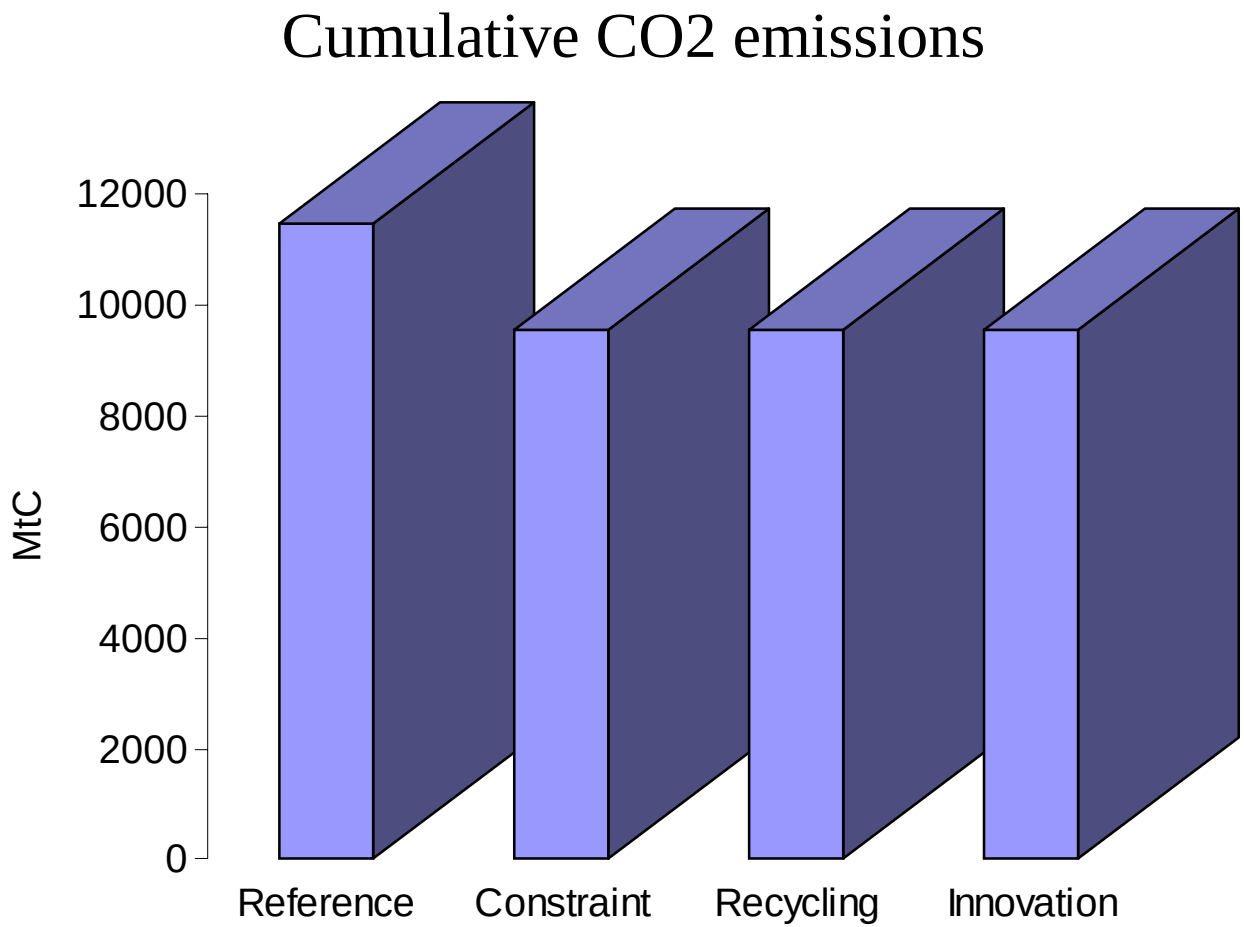
Policy scenarios



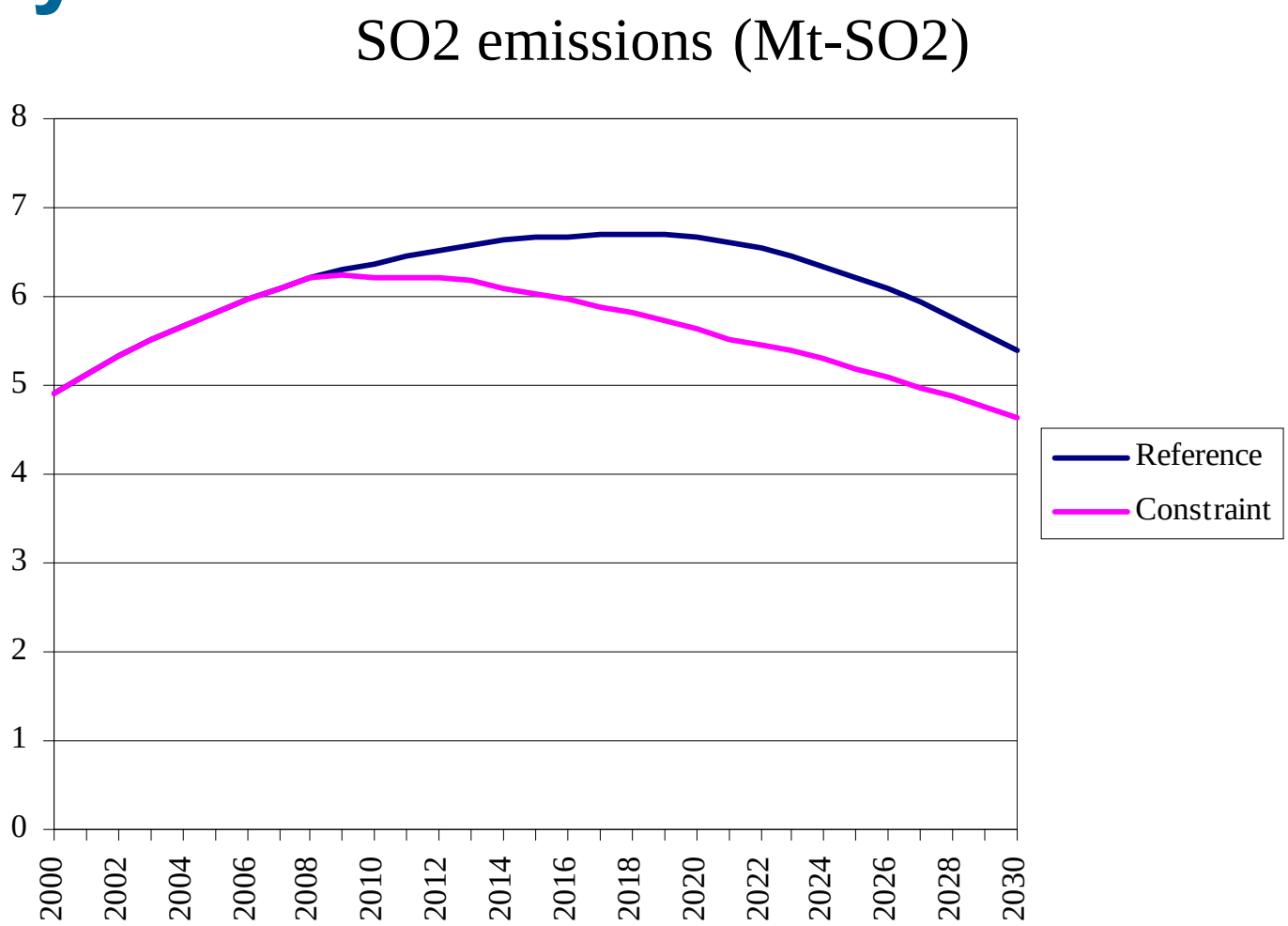
Policy scenarios



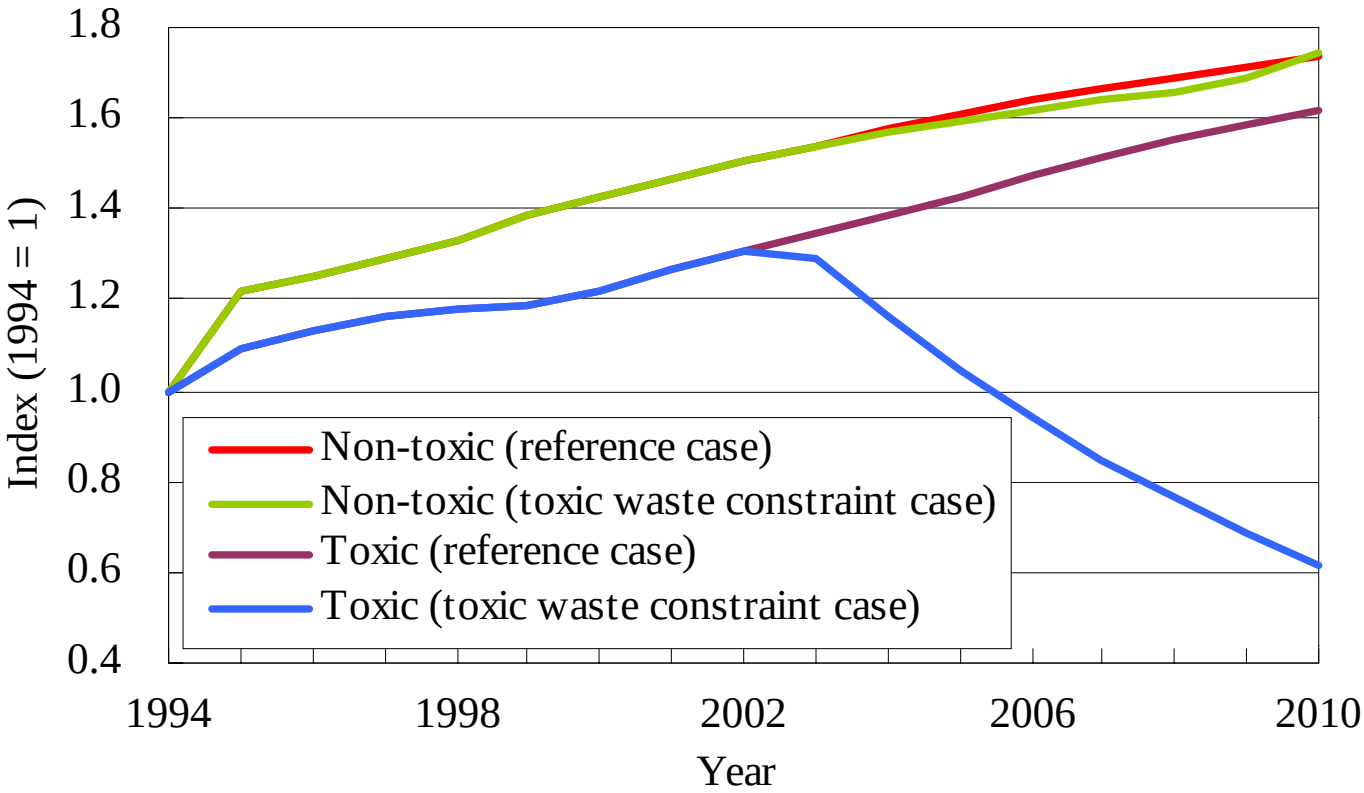
Policy scenarios



Policy scenarios

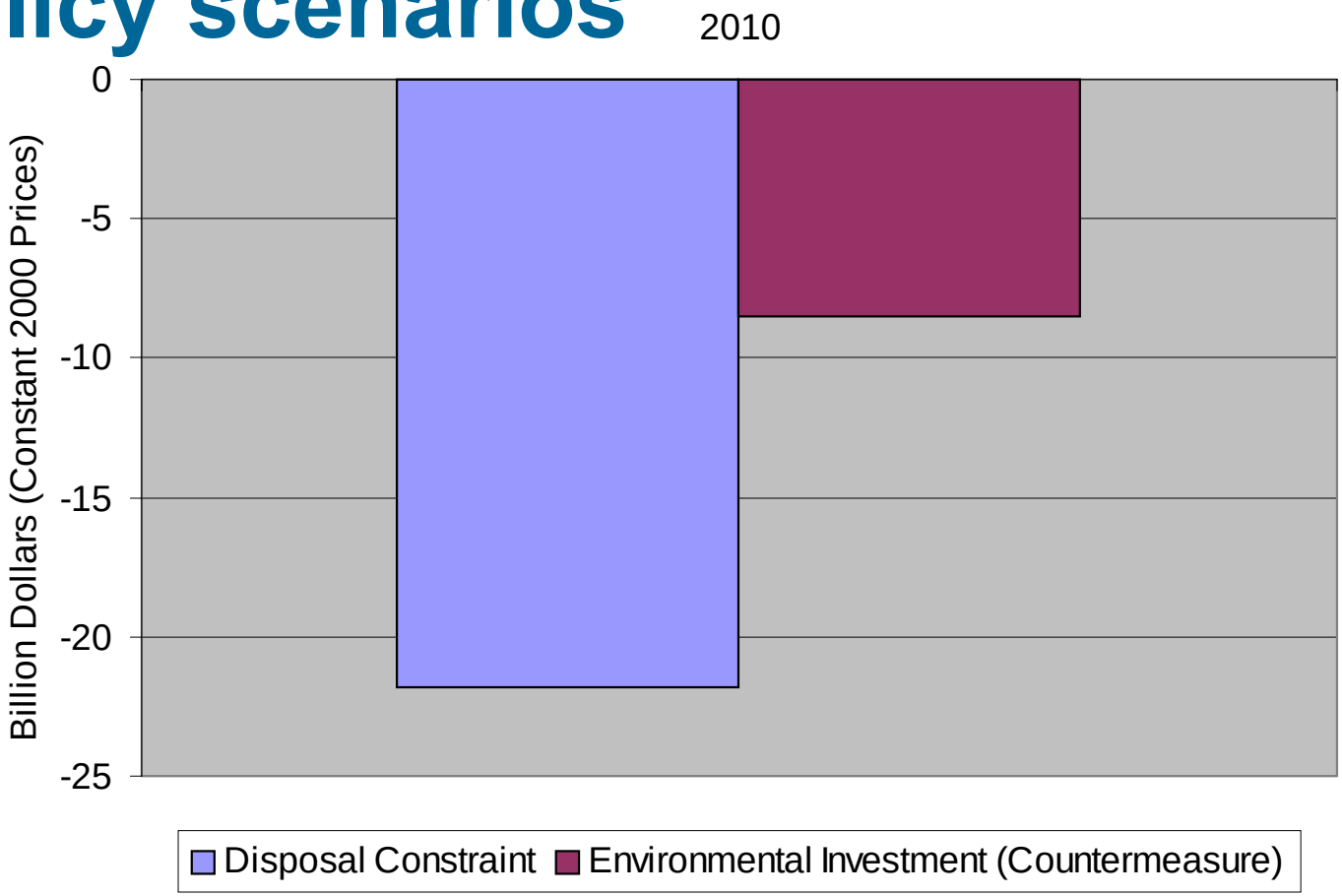


Policy scenarios



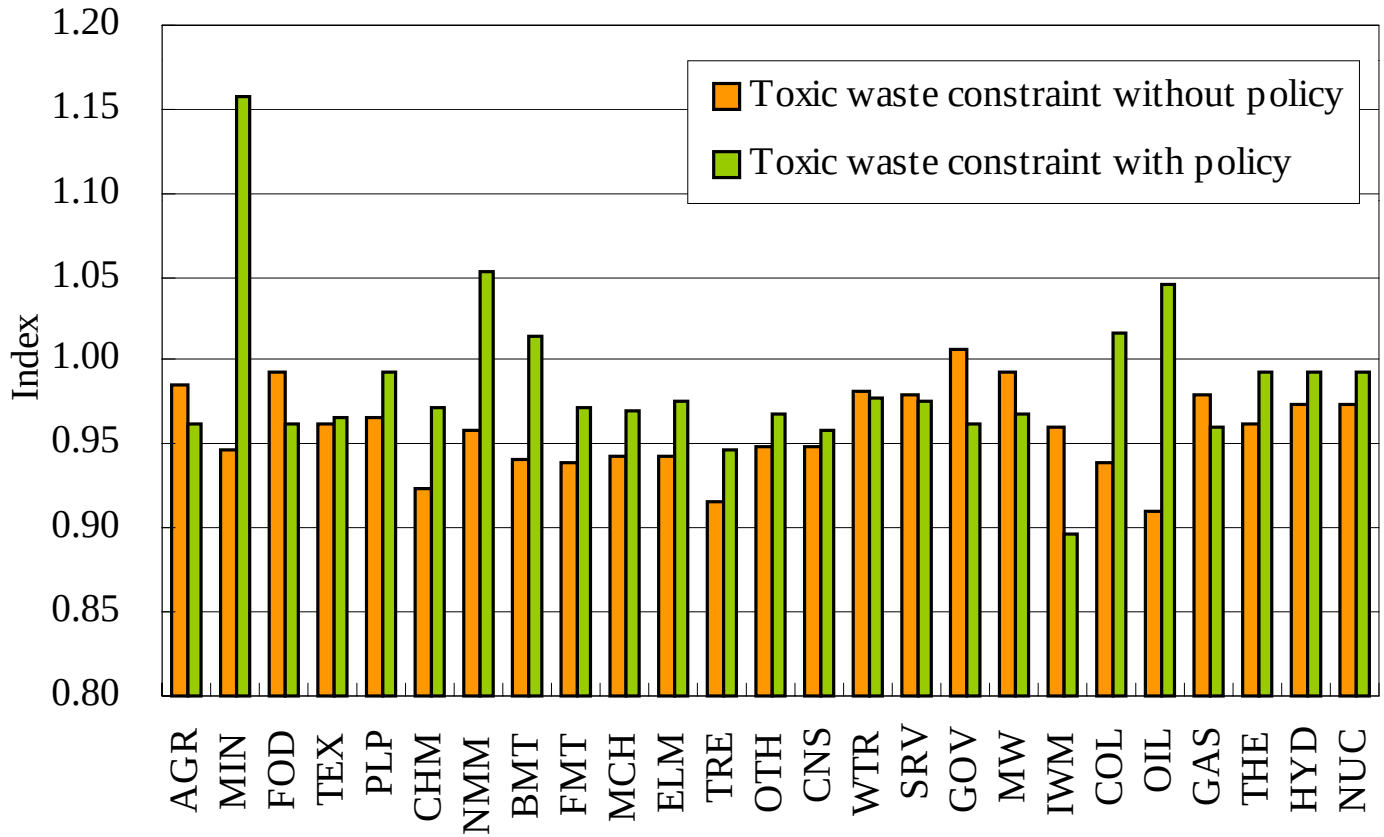
Trajectory of final disposal waste

Policy scenarios



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

Policy scenarios



Output changes in each sector in 2010 over reference case

Messages from simulation results

Environmental constraints will diminish economic activities.

By introducing environmental policies including enhancement of environmental industry, the impact on economic activity will be mitigated.

- Mitigation of environmental constraints
- Creation of new market and induced demand

Not only supply side but also demand side of environmental industry is significant