AIM/Impact[Policy]

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The 10th AIM International Workshop
National Institute for Environmental Studies
Tsukuba Japan, 10-12 March 2005

Development of AIM/Impact[Policy]

- Integrated assessment model which provides an evaluating framework for climate change impacts management under stabilization strategies of greenhouse gas emission, concentration and temperature
  - Platform to integrate past impacts studies of climate change on several sectors and analyze climate change impacts on dangerous level, economical damage and adaptation strategy comprehensively
  - Platform to investigate greenhouse gas emission reduction strategies for achievement of climate stabilization goals and analyze the effects of burden sharing scheme and flexibility scheme for greenhouse gas emission reduction
- Integrated assessment tool to assist policymakers' decision in action programs to arrest global warming

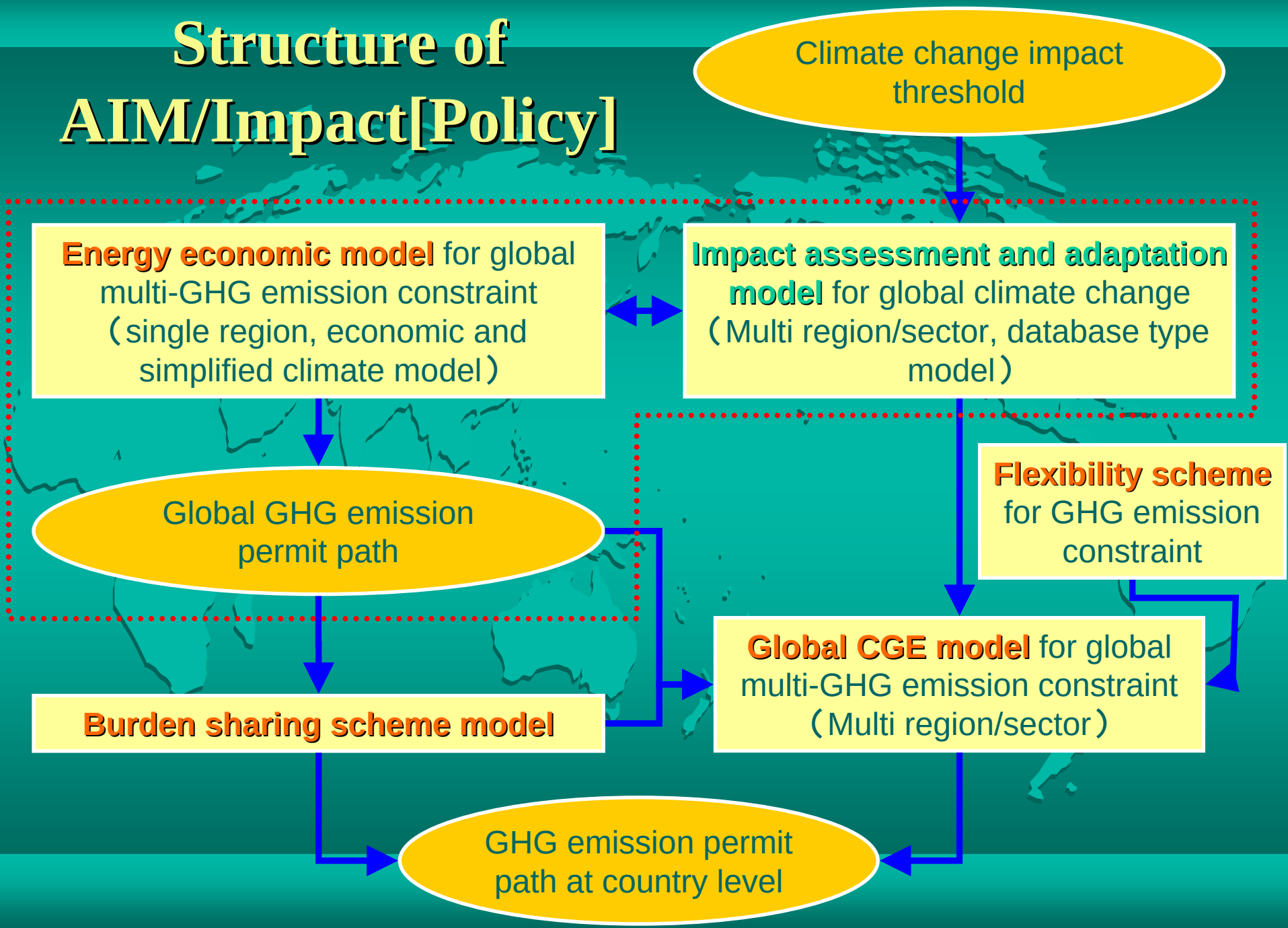
Structure of AIM/Impact[Policy]

- AIM/Impact[Policy] consists of a series of linked sub models representing two processes, greenhouse gas emission and climate change impacts

  - The greenhouse gas emission part includes four sub models:
    (1) Energy economic model for global multi-greenhouse gas emission constraint,
    (2) Burden sharing scheme model,
    (3) Global CGE model for global multi-greenhouse gas emission constraint,
    (4) Flexibility scheme for greenhouse gas emission constraint

  - Climate change impacts part include a sub model, impact assessment and adaptation model for global climate change
    (1) Database type model and composed of pre-simulated results of process type models

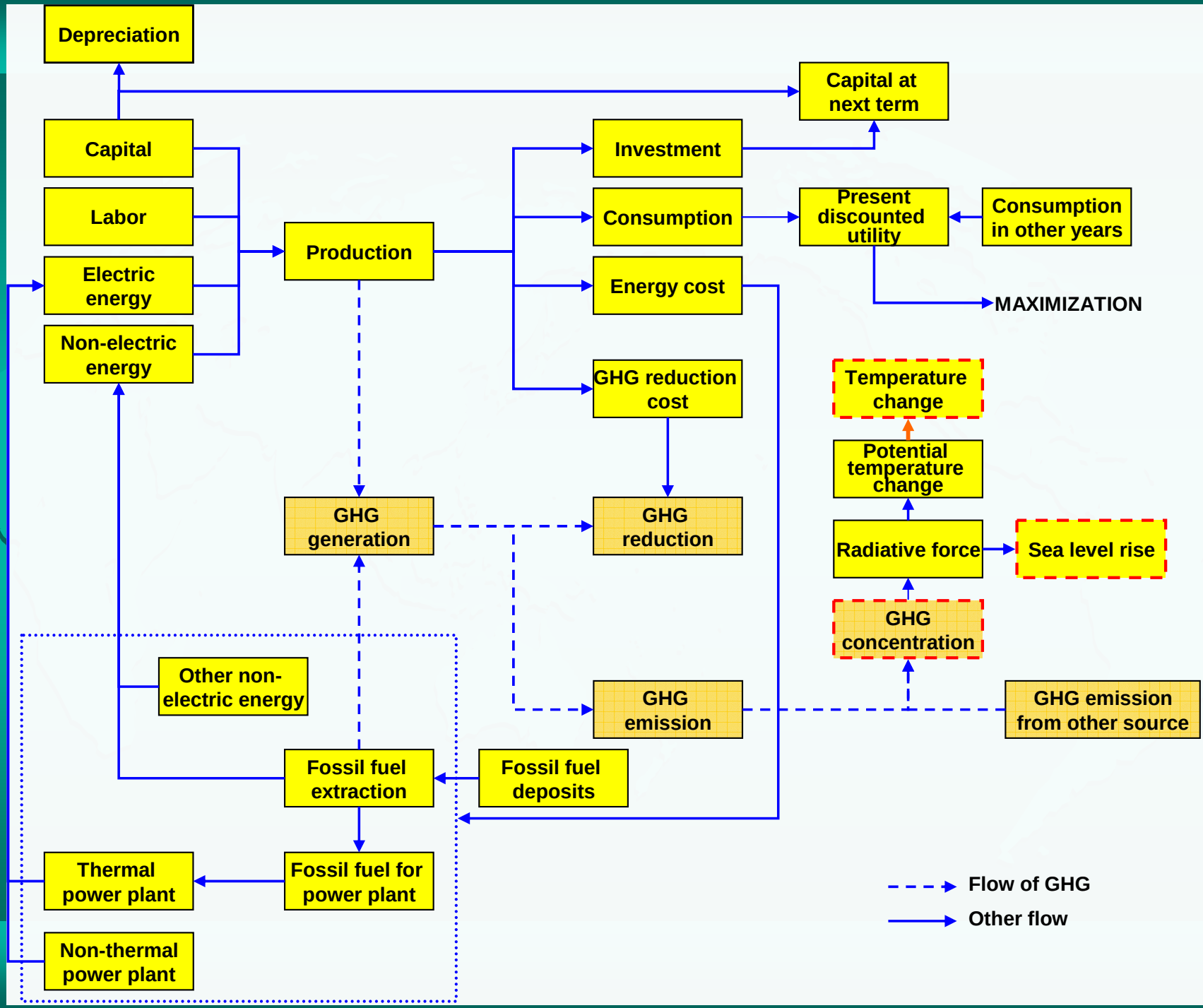
Structure of AIM/Impact[Policy]



Features of Energy Economic Model

- Analyze global greenhouse gas emission path under different socio-economic scenarios and reduction constraint strategies of multi greenhouse gases
  - Future Plan
    - ▸▸▸ Analyze global greenhouse gas emission path considering climate change impacts, e.g. water resource, agriculture, health, etc

- Model Details
  - ✓ Dynamic optimization model wiht simplified climate modules (+sea level module)
  - ✓ Single region
  - ✓ Greenhouse gases: CO_2, CH_4, N_2O, SO_2, CFC, PFC, SF_6, BC, O_3
  - ✓ Time periods: decades from 1990 through 2200
  - ✓ Constraints: GHG concentration, GHG emission, Temperature change, Temperature change speed, Sea level rise

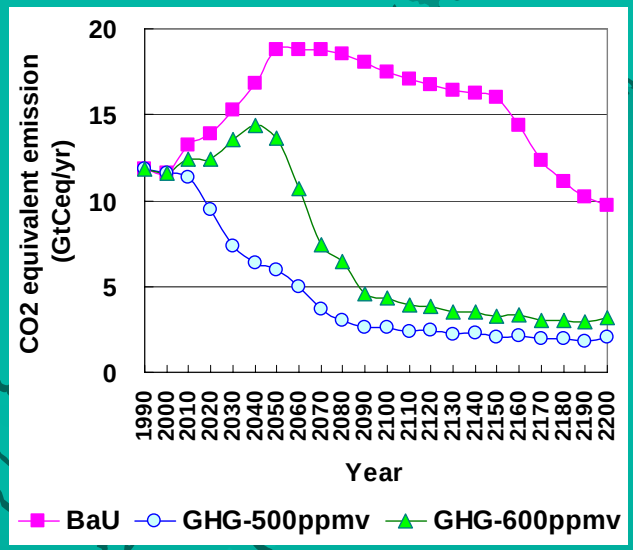

Depreciation
Capital at next term
Capital
Labor
Electric energy
Non-electric energy
Production
Investment
Consumption
Energy cost
GHG reduction cost
Present discounted utility
Consumption in other years
MAXIMIZATION
Temperature change
Potential temperature change
Radiative force
Sea level rise
GHG concentration
GHG generation
GHG reduction
GHG emission
GHG emission from other source
Other non-electric energy
Fossil fuel extraction
Fossil fuel deposits
Thermal power plant
Fossil fuel for power plant
Non-thermal power plant
Flow of GHG
Other flow

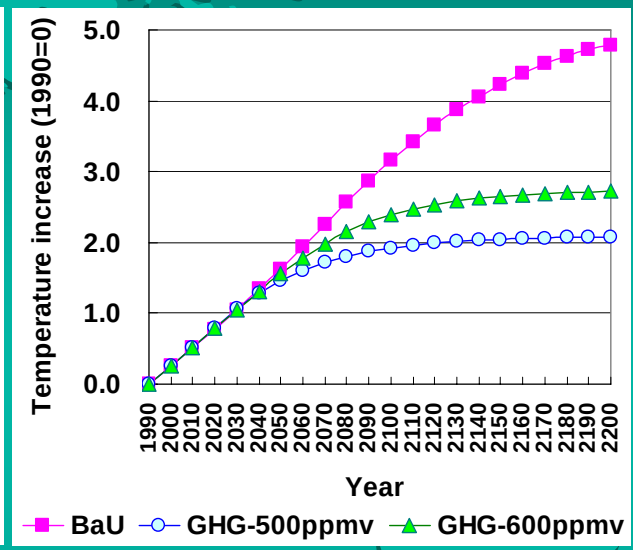
Outline of model simulation

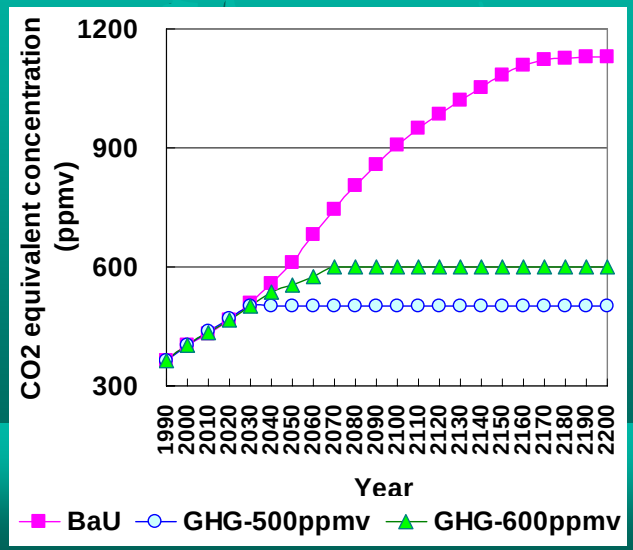
- Scenario: SRES B2
- Discount rate: 4%
- Climate sensitivity: 2.5℃
- Simulation cases
  - ✓ Business as Usual
  - ✓ GHG-500ppmv: 500 ppmv cap on total GHG concentration
  - ✓ GHG-600ppmv: 600 ppmv cap on total GHG concentration

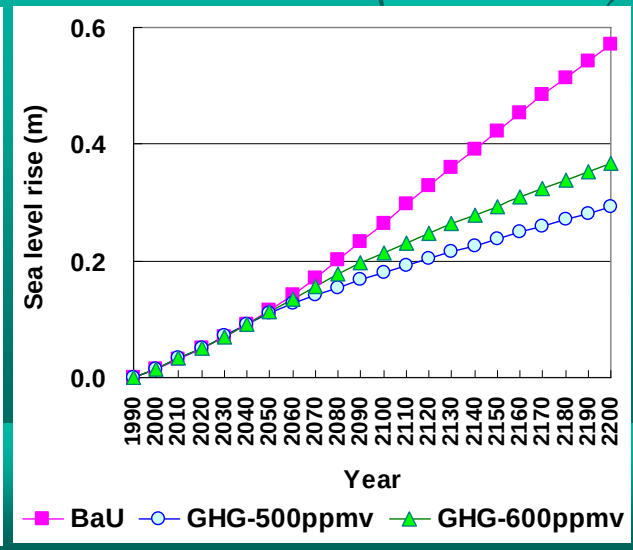
Simulation Results

- To achieve around 2℃ temperature increase in 2100, 550ppmv cap on total GHG constraint is needed
- Reduction required to achieve 550ppmv cap on total GHG constraint ▸▸▸ 4.4GtCeq/yr in 2020 and 12.8 GtCeq/yr in 2050









Future Task

- Single region ▸▸▸▸ Multi region
- Installation of several impact functions (Crop productivity, water resource, health, etc.)
- Uncertainty analysis