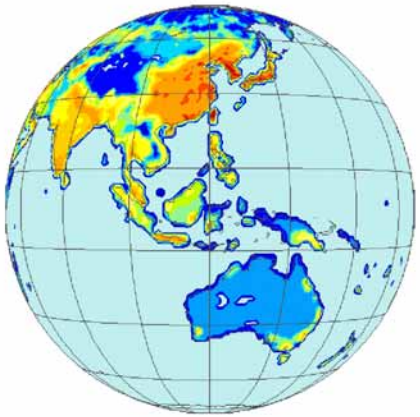


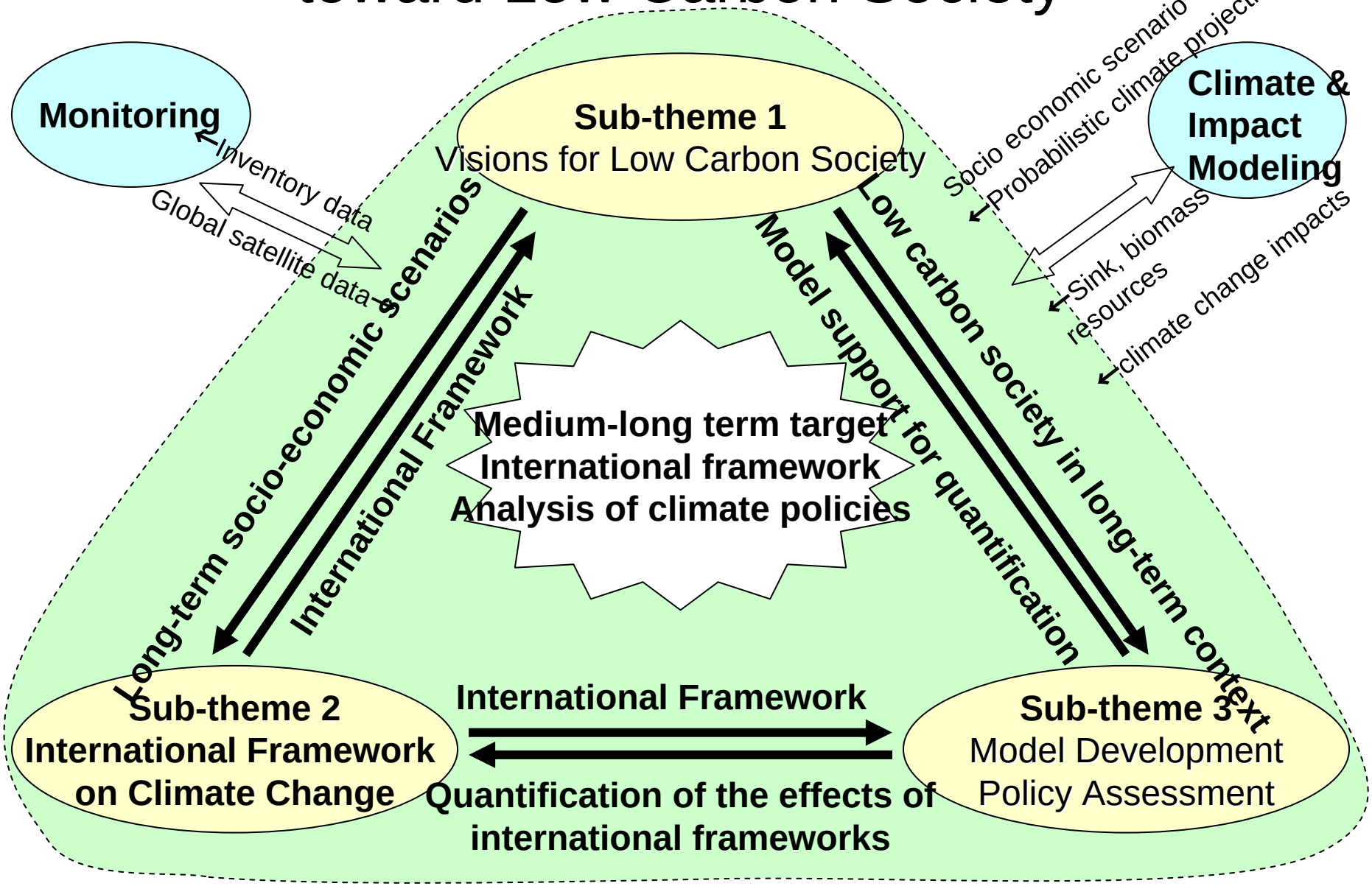
The 11th AIM International Workshop
19-21 February 2006
NIES, Tsukuba, Japan

Future Direction of AIM

Mikiko Kainuma

National Institute for Environmental Studies

Assessment of Climate Policies toward Low Carbon Society



Sub-theme 1: Visions for Low Carbon Society

Goal: Development of scenarios for Low Carbon Society through sustainable development

Sub-theme 1
Visions for Low Carbon Society

- Japanese scenarios towards low carbon society

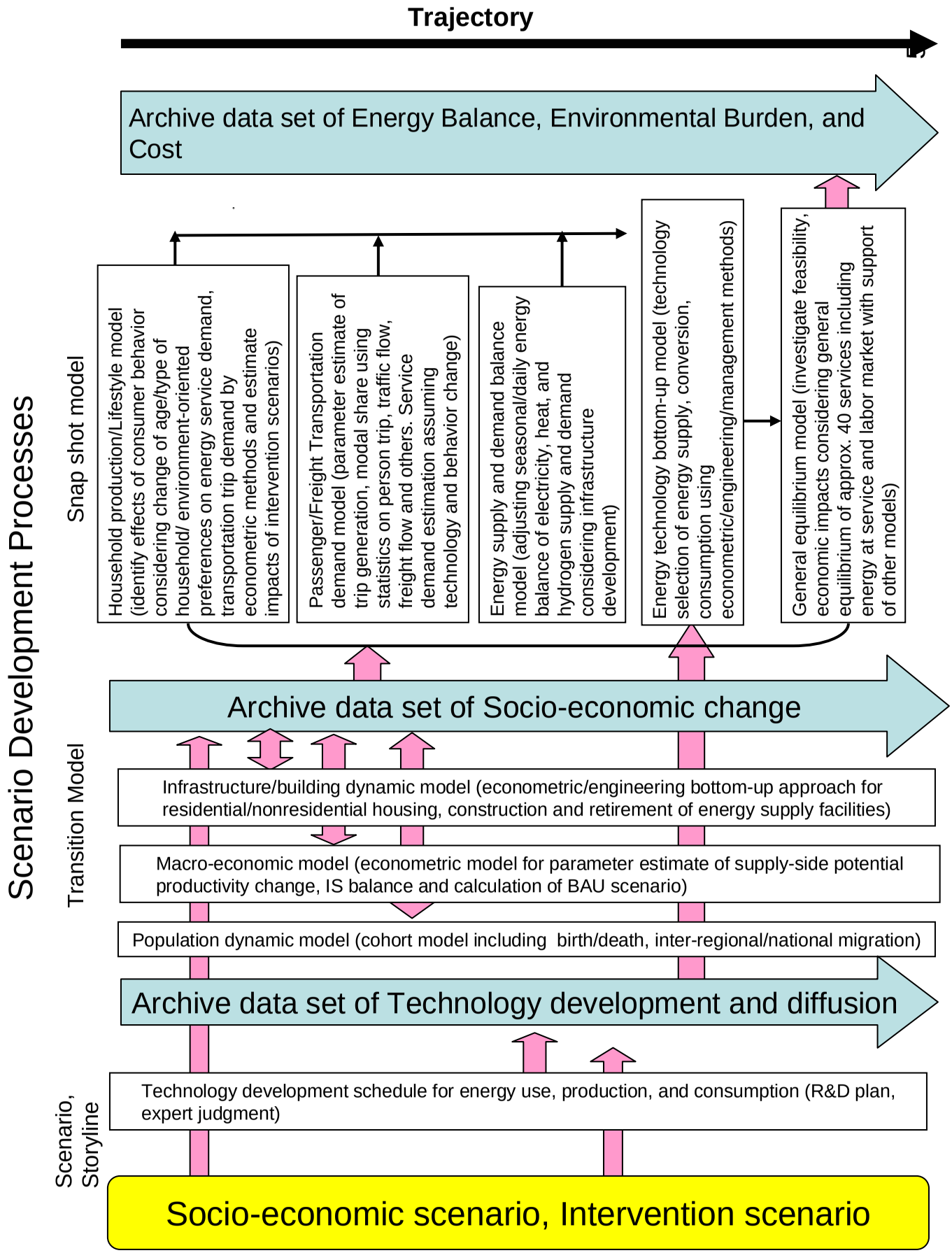
  Projection with consistency based on several dynamics such as macro-economic balance, industrial structure, household, consumption, lifestyle, transport demand, physical stock and Infra-structure

- Low carbon society in Asia regions

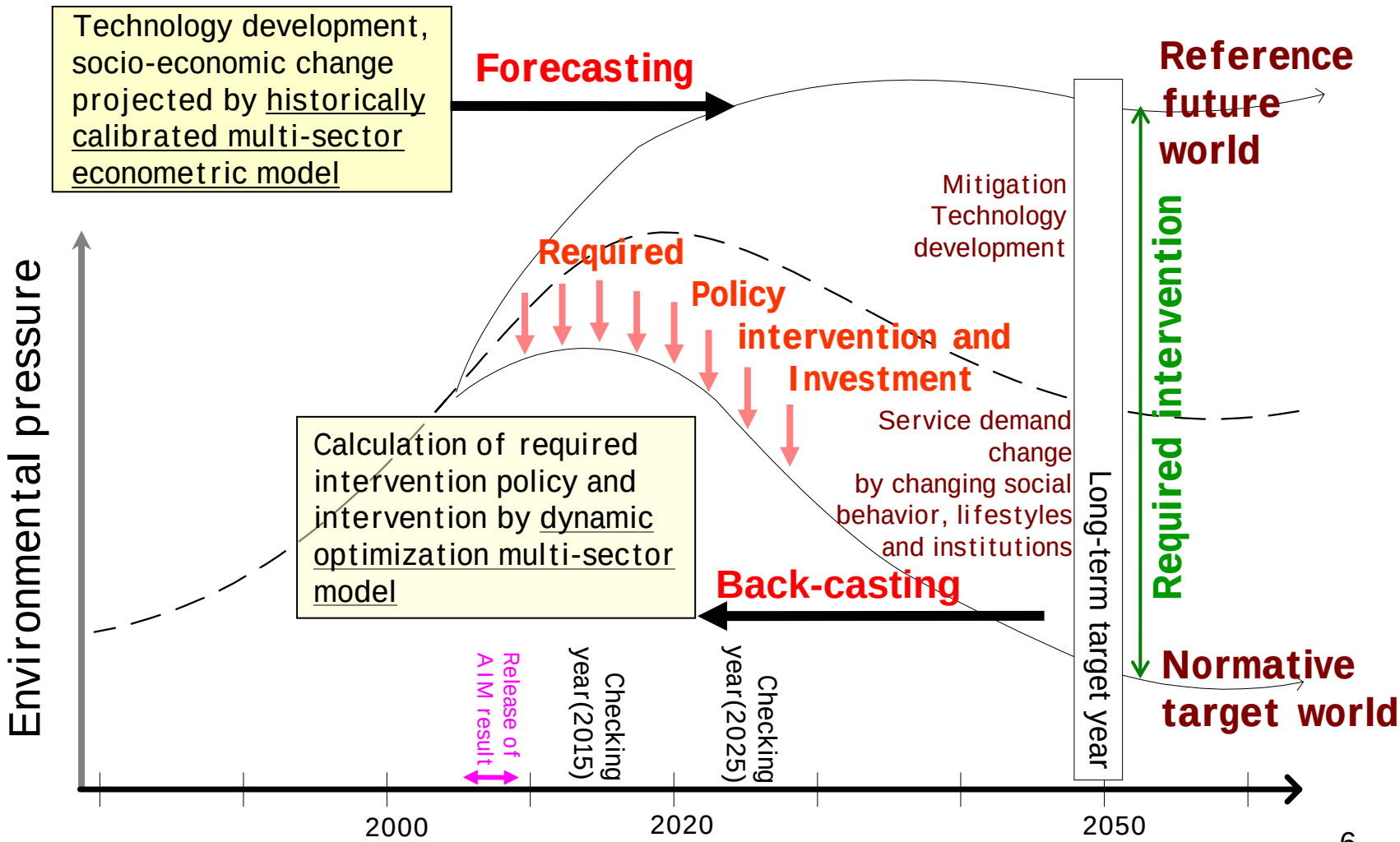
  Scenarios of China, India, Korea, Thailand, Indonesia, Viet Num, etc.

- Global stabilization

  Scenarios for low carbon society in world region.

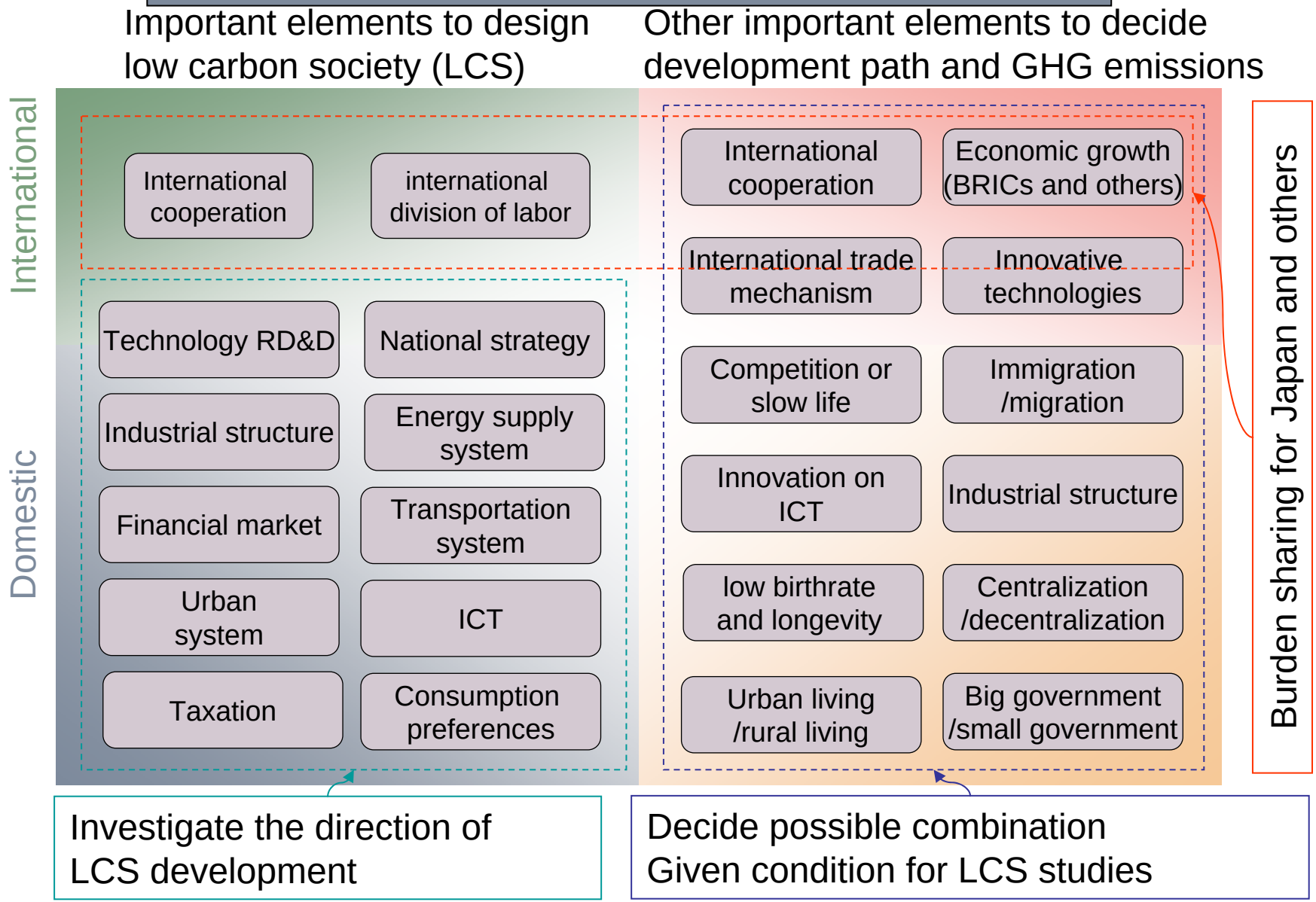

Trajectory
Archive data set of Energy Balance, Environmental Burden, and Cost
Scenario Development Processes
Snap shot model
Household production/Lifestyle model (identify effects of consumer behavior considering change of age/type of household/ environment-oriented preferences on energy service demand, transportation trip demand by econometric methods and estimate impacts of intervention scenarios)
Passenger/Freight Transportation demand model (parameter estimate of trip generation, modal share using statistics on person trip, traffic flow, freight flow and others. Service demand estimation assuming technology and behavior change)
Energy supply and demand balance model (adjusting seasonal/daily energy balance of electricity, heat, and hydrogen supply and demand considering infrastructure development)
Energy technology bottom-up model (technology selection of energy supply, conversion, consumption using econometric/engineering/management methods)
General equilibrium model (investigate feasibility, economic impacts considering general equilibrium of approx. 40 services including energy at service and labor market with support of other models)
Archive data set of Socio-economic change
Transition Model
Infrastructure/building dynamic model (econometric/engineering bottom-up approach for residential/nonresidential housing, construction and retirement of energy supply facilities)
Macro-economic model (econometric model for parameter estimate of supply-side potential productivity change, IS balance and calculation of BAU scenario)
Population dynamic model (cohort model including birth/death, inter-regional/national migration)
Archive data set of Technology development and diffusion
Scenario, Storyline
Technology development schedule for energy use, production, and consumption (R&D plan, expert judgment)
Socio-economic scenario, Intervention scenario

Back-casting from future target world by the macro-economy and industry structure dynamics model



Why we need scenarios?

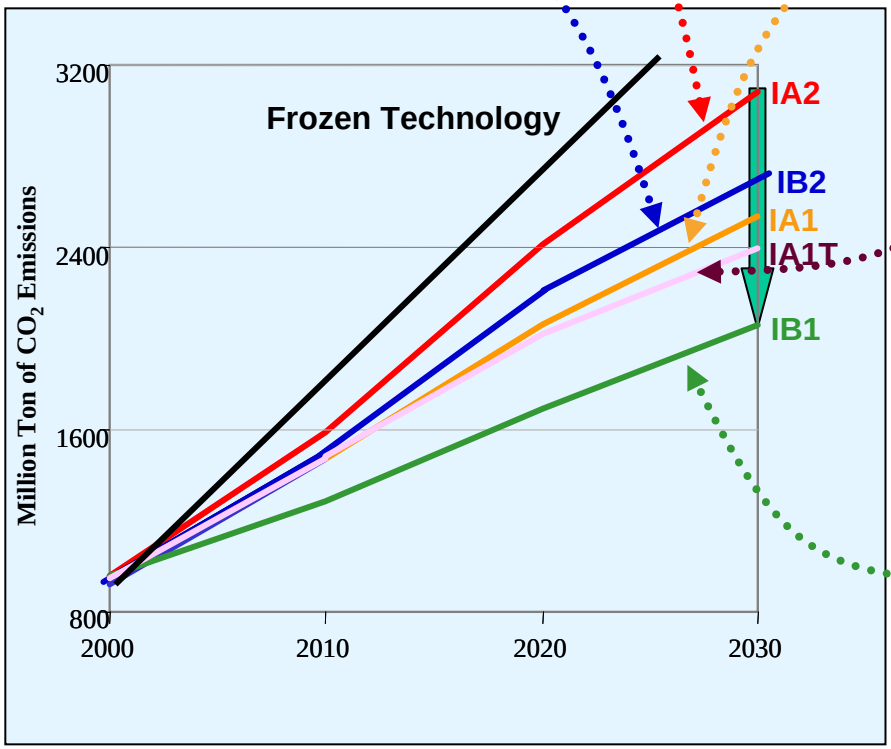
Main elements to decide development path and GHG emissions in Japan



Application to India

Technologies in Scenarios: Short-term

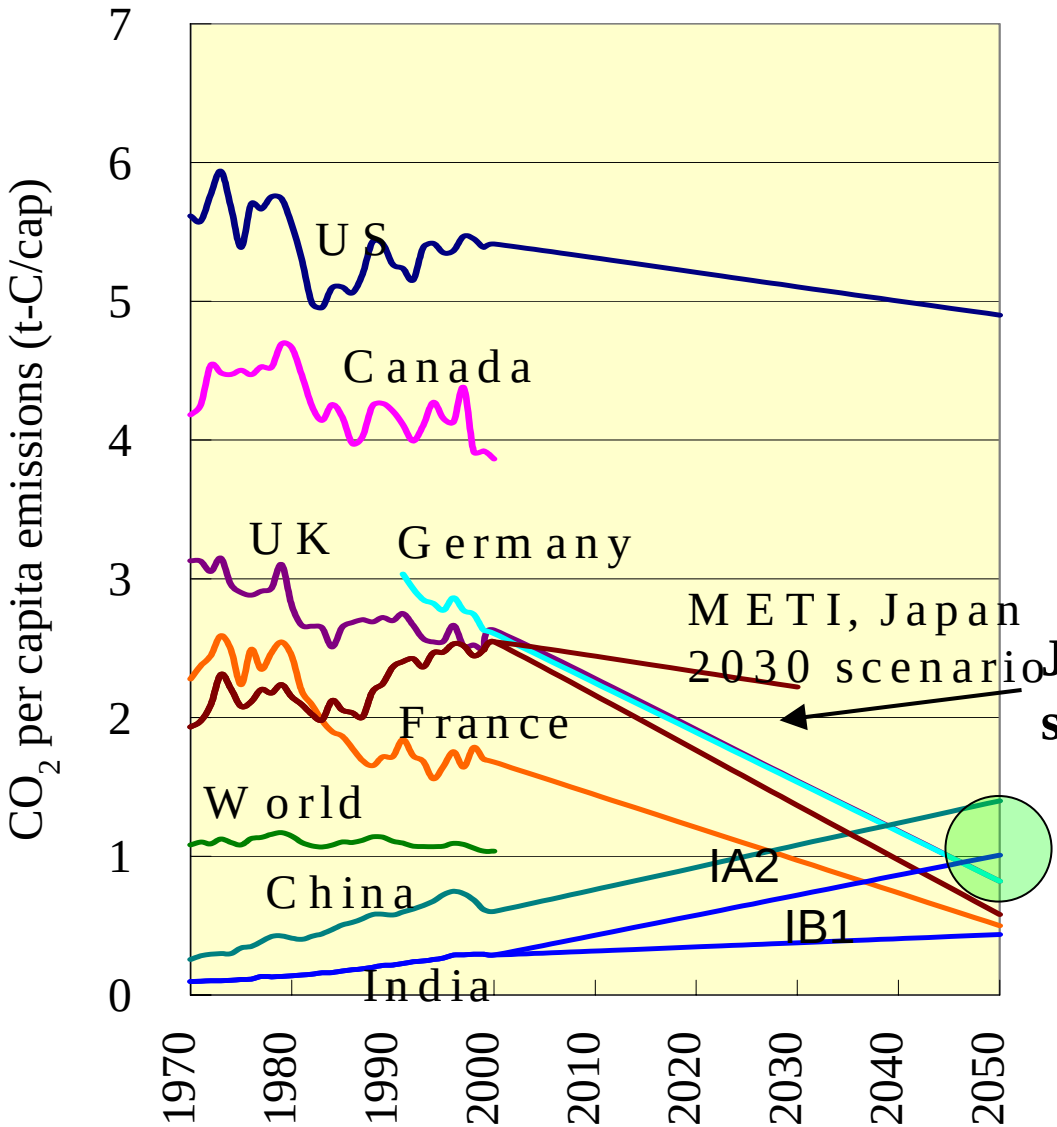
Conventional Technology Paths



- Road infrastructures, Energy markets
- Gasoline hybrid vehicle, Bio-ethanol
- Ultra-critical boilers, IGCC
- Building insulations, Appliance standards
- Nuclear Fission, Information highways
- Fuel cell vehicle: H2 from natural gas
- Energy efficiency, Environment markets
- Bikeway, Advanced car sharing system
- Renewable energy technologies
- Waste recycling and reuse
- Virtual communication system
- Urban planning, Public transport

Global Challenges Toward Low-Carbon Economy (LCE)

-Focus on Country-Specific Scenario Analysis-



Current per capita CO_2 emissions and Target

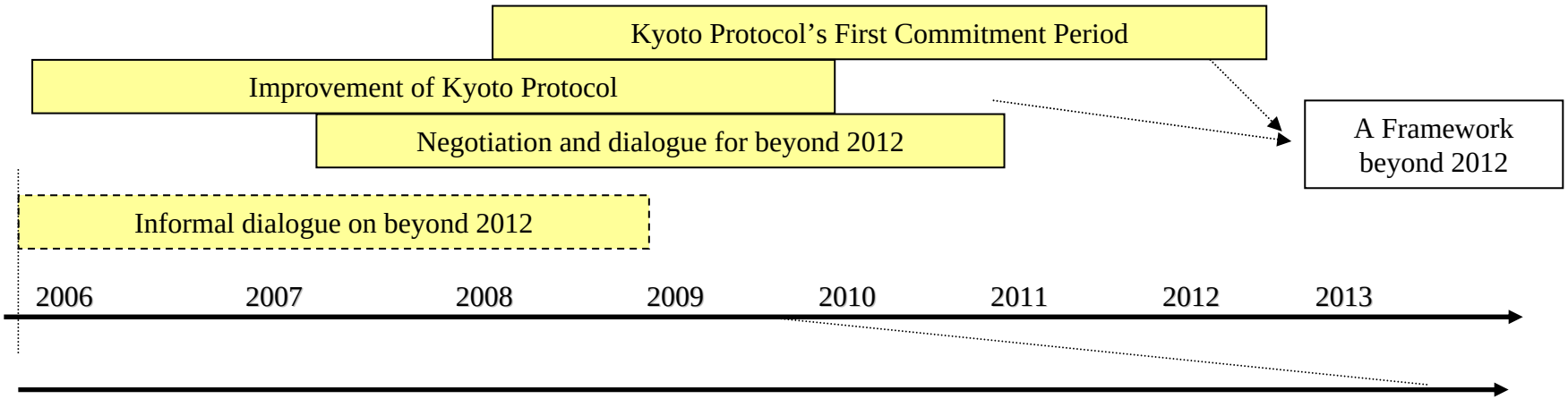
Japan 2050 scenario

Target for Low Carbon Economy

Sub-theme 2: Analysis on International Negotiation Process and International Framework on Climate Change

Goal: To make a proposal on a process to achieve an international agreement on climate change mitigation for years beyond 2012

International Politics



Research Agenda

- Analysis on current Kyoto Framework and mechanisms under Kyoto, such as international emissions trading and CDM
- Domestic climate policy of key countries

→ Assessment of the existing mechanisms, and proposals for any new mechanisms if necessary

→ A interim summary: a proposal for beyond 2012

→ Comments from key countries, especially those in the Asia-Pacific region

→ Assessments on international process to start a negotiation on a framework on beyond 2012

→ Final goal: a proposal for beyond 2012

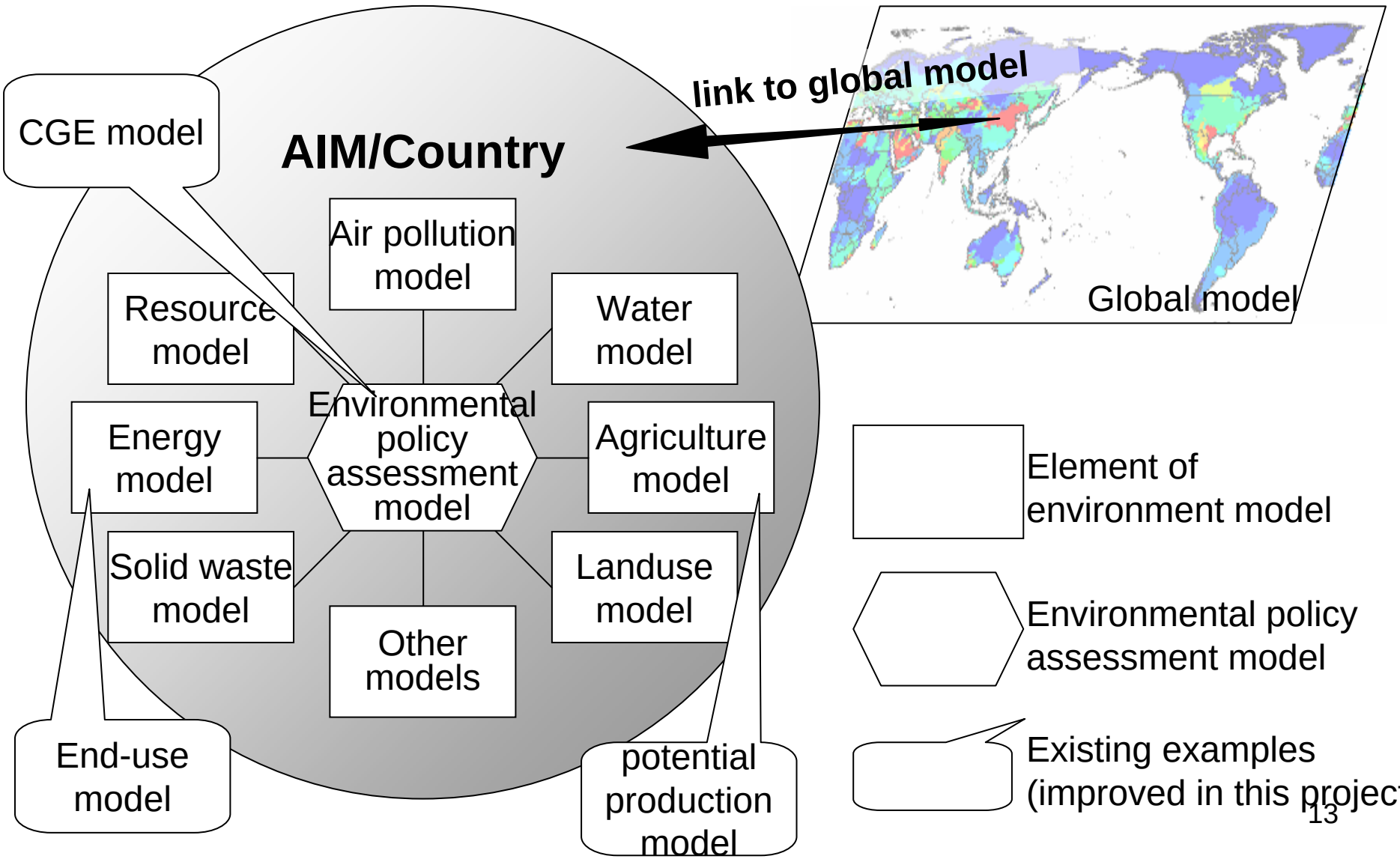
Sub-theme 3: Cost-effect analysis of climate change policies

Goal: Model development and application to assess climate change policies

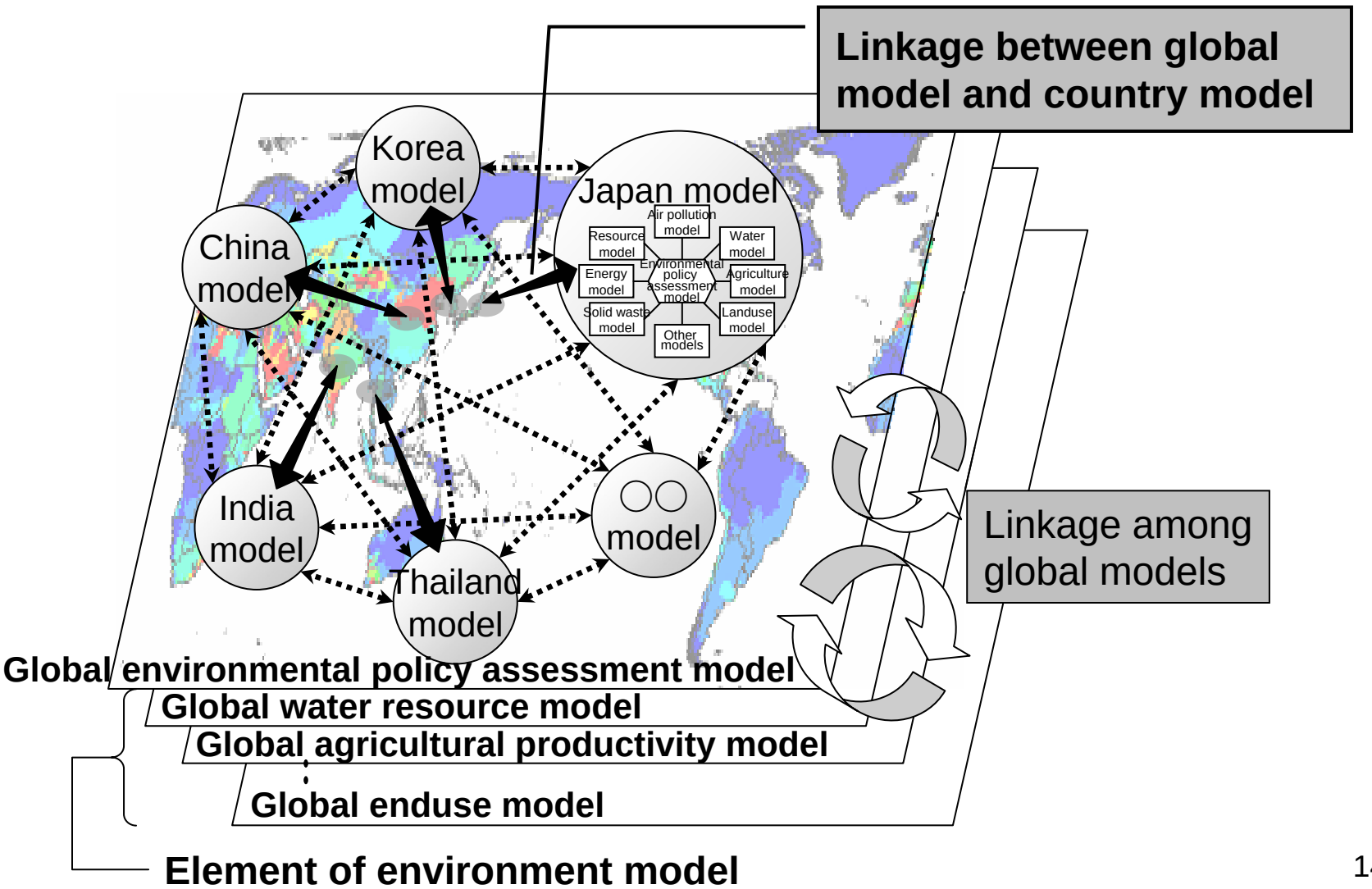
Sub-theme 3
Cost-effect analysis of climate change policies

1) Model development to support Japanese climate policies toward 2013 and beyond
2) Model development in Asia countries and application through sustainable development analysis of Millennium Development Goals and portfolio of adaptation and mitigation policies
3) Global model development to support international climate policies including emissions trading
4) Capacity building and model dissemination

Development of country model

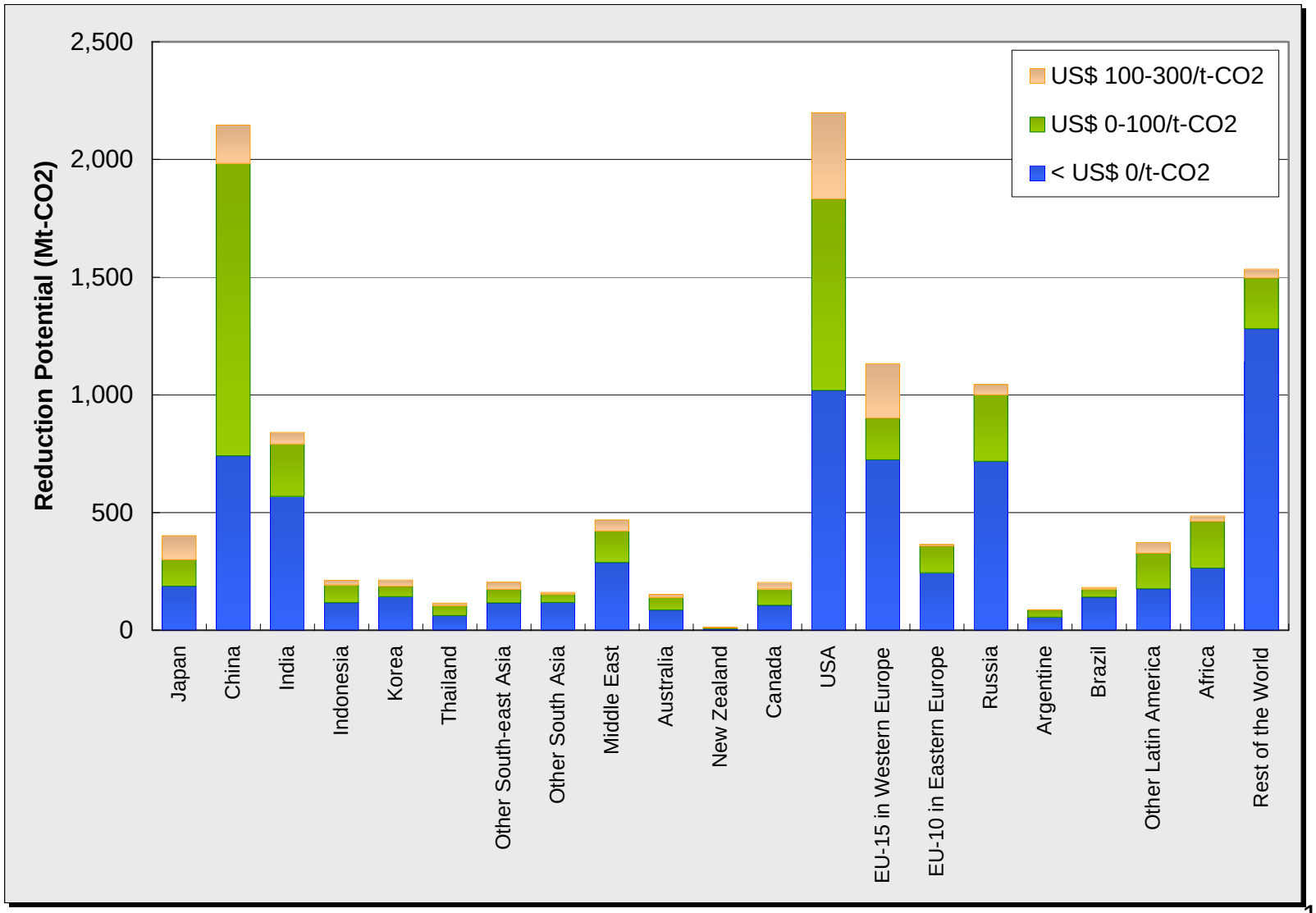


Development of global model



Region-wise reduction potential in 2020

elaboration and expansion up to 2030



Discount rate = 5%

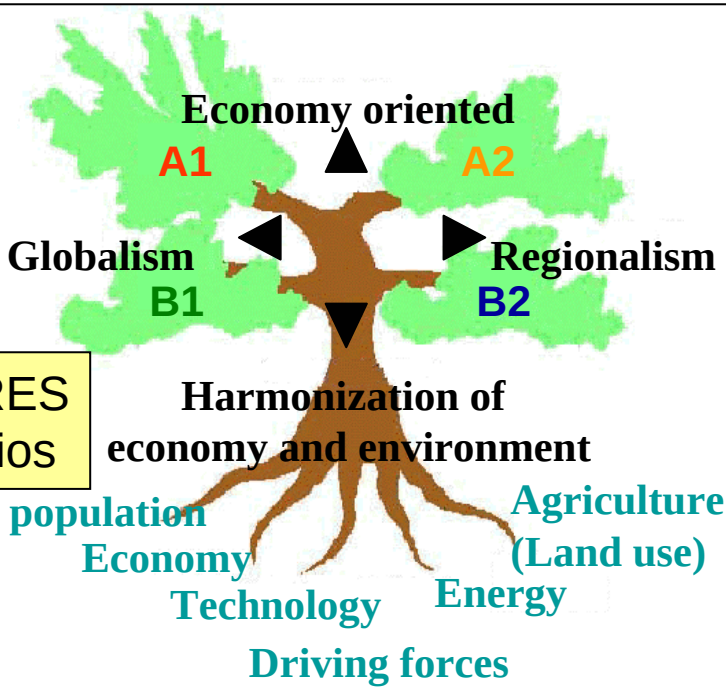
Images of results

Millennium Development Goals
Domestic environment policy
and economic development

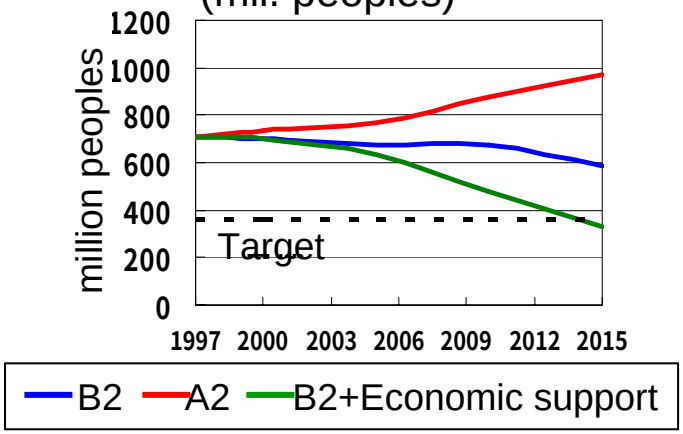
2010 - 2030

IPCC/SRES
4 scenarios

2100 -

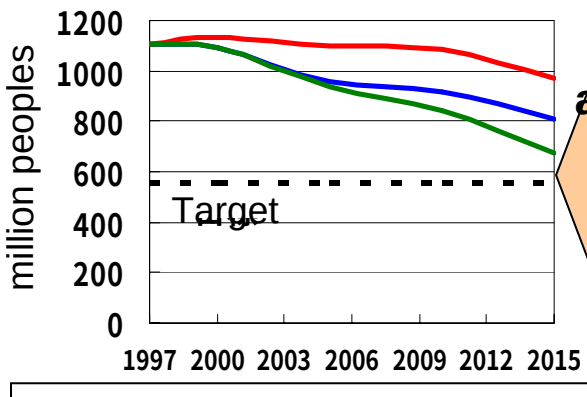


Number of people suffering from hunger
(mil. peoples)

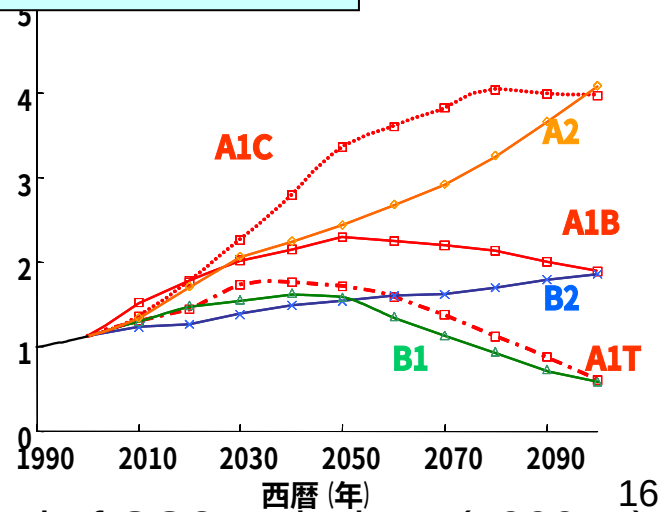


Stabilizing GHG
concentration

Number of poverty people
(mil. peoples)



Consistency among climate policy, other environmental problems and economic development



Trend of CO2 emissions (1990=1)

Appreciate your participation!