

Low Carbon Asia Research Network (LoCARNet) 4<sup>th</sup> Annual Meeting  
International Conference of Low Carbon Asia  
*Stabilising climate through Low carbon actions in Asia- Road to  
COP21 and beyond*

# Bridging the climate change and SDGs

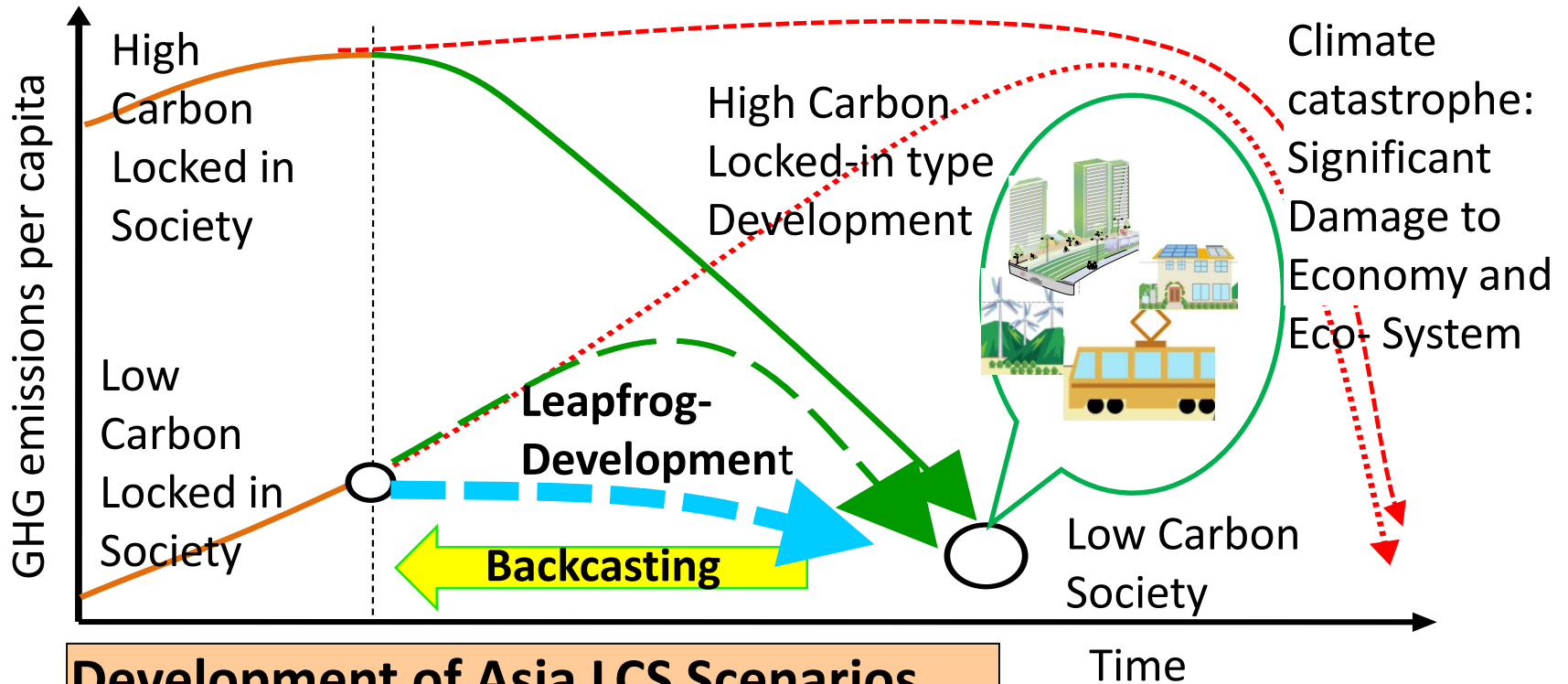
Mikiko Kainuma,  
Senior Research Advisor, IGES;  
Fellow, Center for Social and Environmental  
Systems Research, NIES

11-13 October 2015  
DoubleTree Hotel, Johor Bahru, Malaysia

# The 17 UN Sustainable Development Goals



# Can Asia Change the World through Leapfrogging?



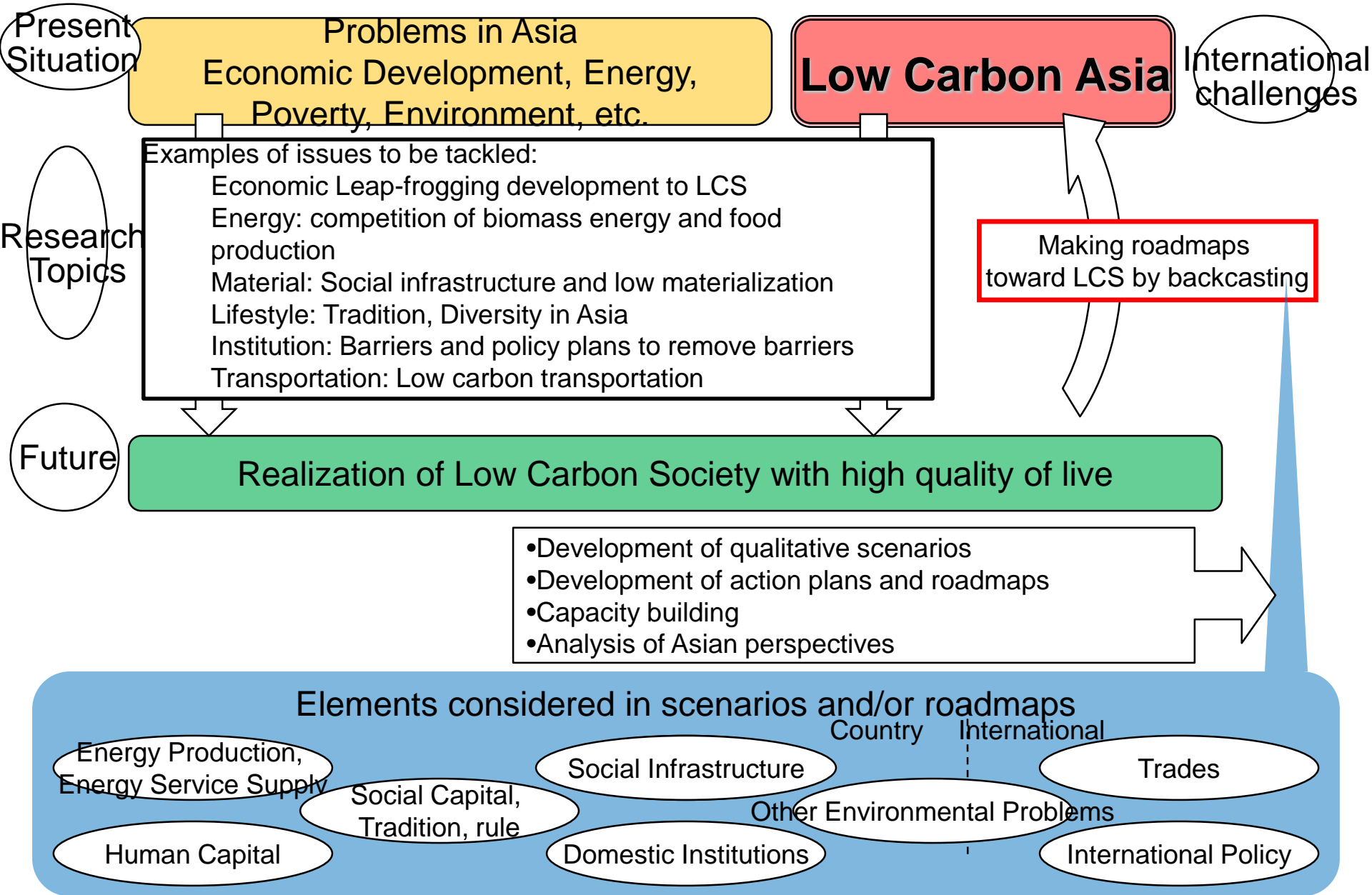
## Development of Asia LCS Scenarios

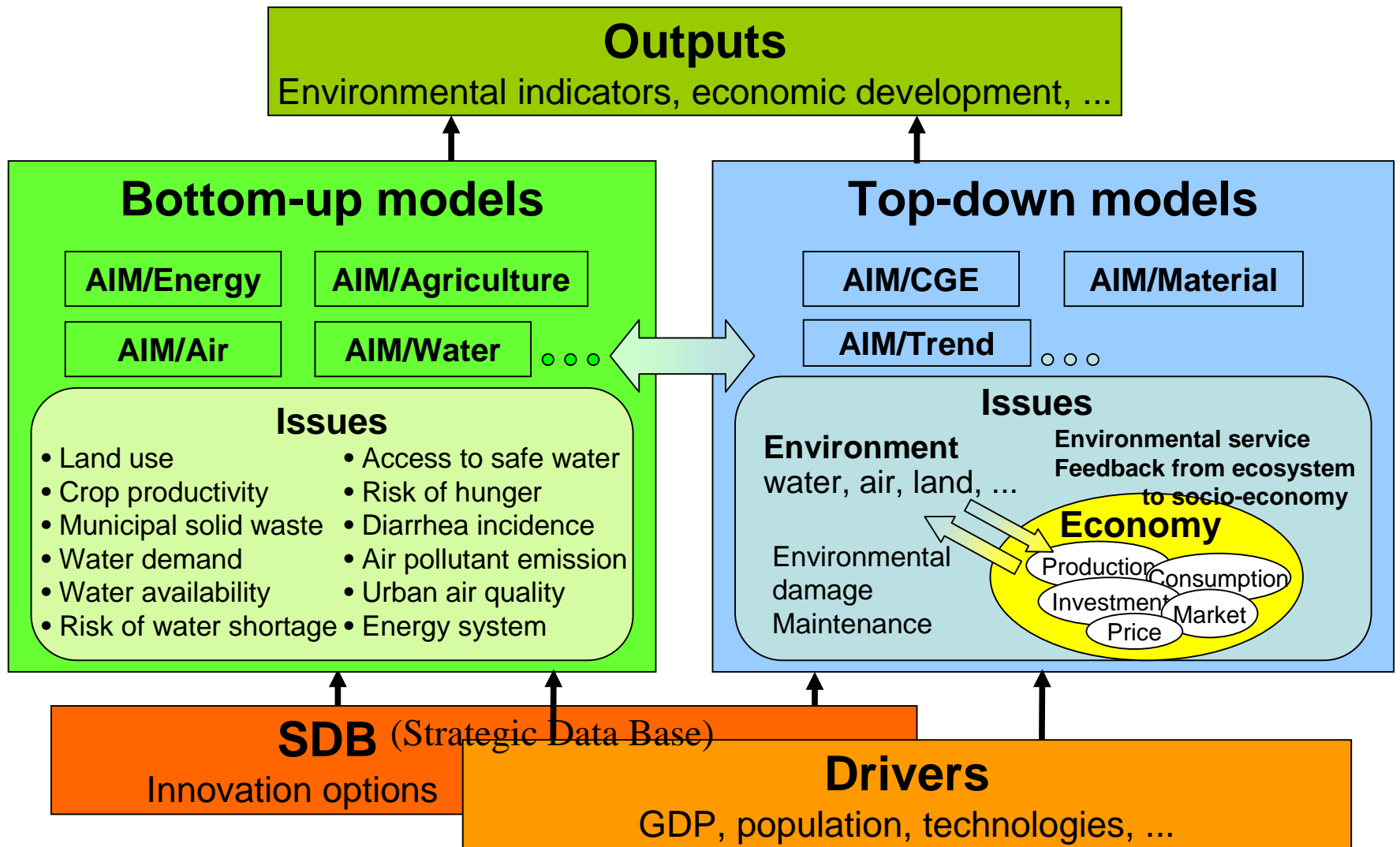
- (1) Depicting narrative scenarios for LCS
- (2) Quantifying future LCS visions
- (3) Developing robust roadmaps by backcasting

**Policy Packages for Asia LCS**

Funded by the Ministry of the Environment,  
Japan (GERF, S-6) and NIES  
<http://2050.nies.go.jp/index.html>

# Challenges toward low-carbon societies in Asia





**SDB** (Strategic Data Base)

Innovation options

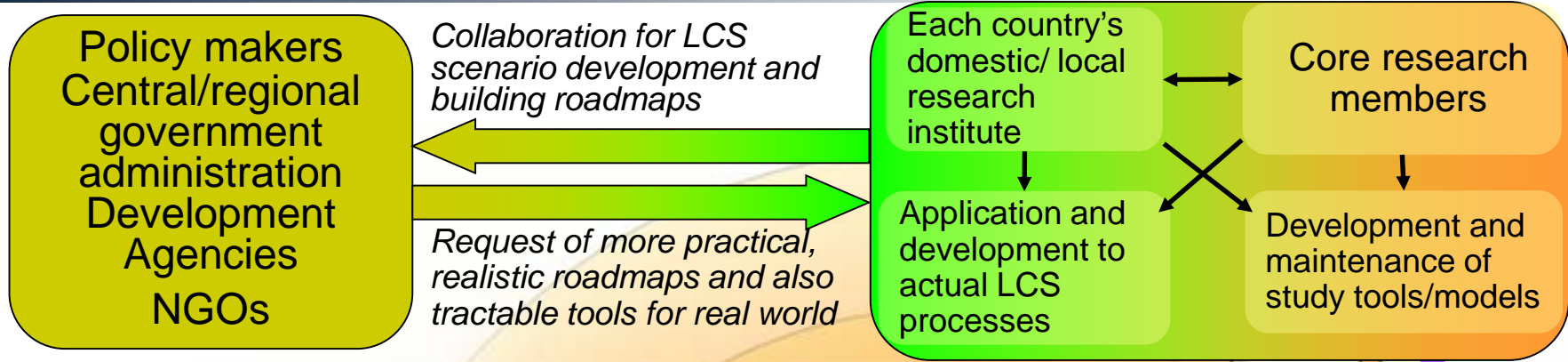
**Drivers**

GDP, population, technologies, ...

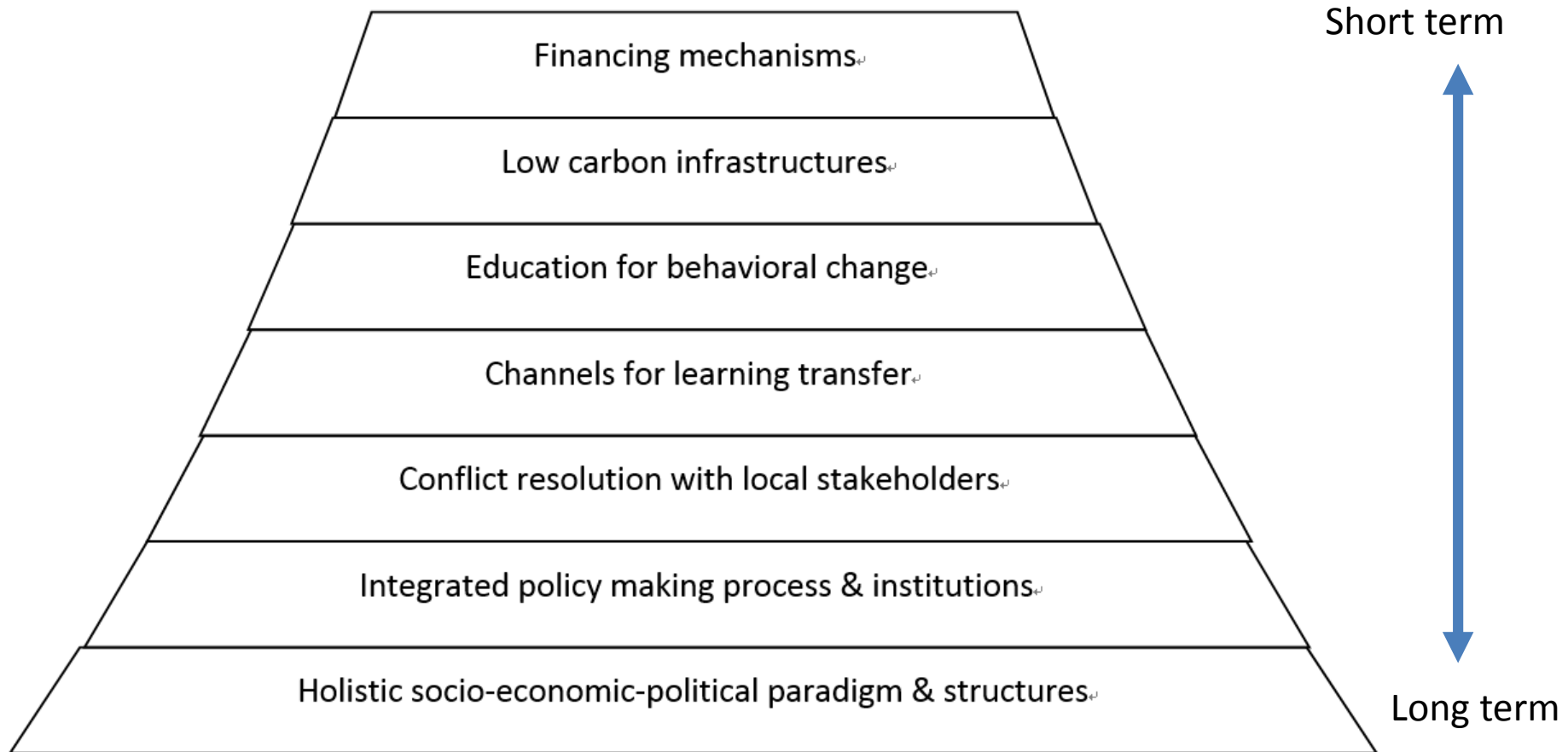
Models of the AIM family



# How to deploy our study to real world



# Layers of changes needed in structures, institutions, processes and mechanisms for a low carbon society



There are formidable barriers that inhibit or slow down the introduction and diffusion of low-carbon measures. Some require implementation of new mechanisms of market or regulation. Those which require fundamental structural changes are harder to implement. Inertia makes such changes difficult.

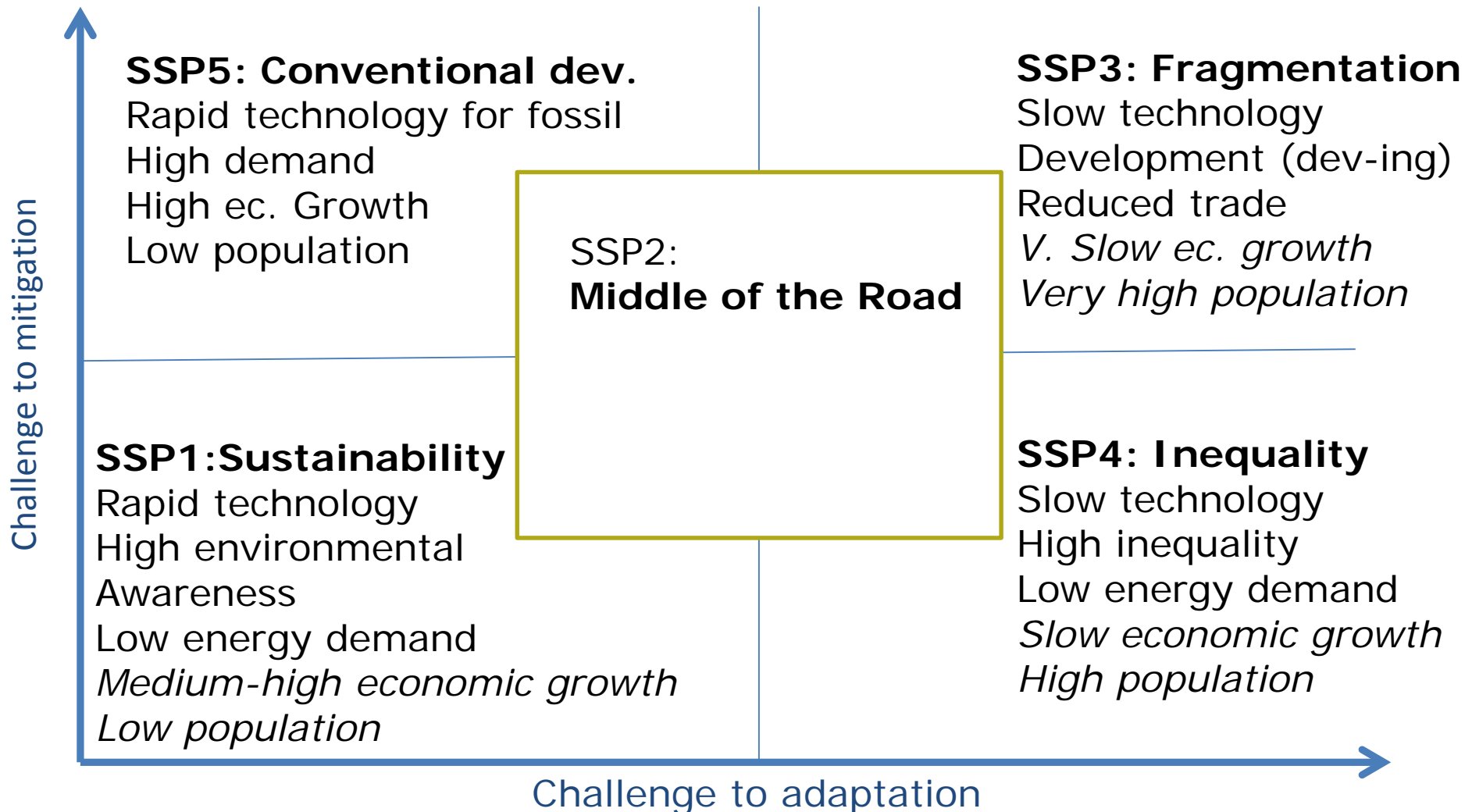
# ***What kind of issues IAM Tools can address?***

Issues Considered	Examples
Integration of sustainable development goals, global environmental problems, and sustainability	India's assessment of innovative options for meeting both sustainable development goals and climate change objectives
Renewable energy, rural electrification, and municipal solid waste management	Thailand's and Korea's environmentally sound energy innovations
Rain water, drinking water, weather, climate, ....	Asia-Pacific countries' water and sanitation developments and national health improvements
City air pollution management	Beijing city air management China air pollution and health impact

**IAM Tools can address country-specific various environment and development problems**



# Shared Socio-economic scenarios (SSP) for mitigation and impact analysis



# The Consequence of Climate Mitigation on Food Security

Aim of the study:

- Quantify the 3 impacts on food security
- Explore the possibility of reducing the negative impacts of mitigation measures by transferring funds.

1. Future climate change will affect **food supply and demand** through change in crop yields.

Climate  
change  
impact

2. Heavy bioenergy implementation would cause **land competition between food and energy crops** owing to limited land and water resources.

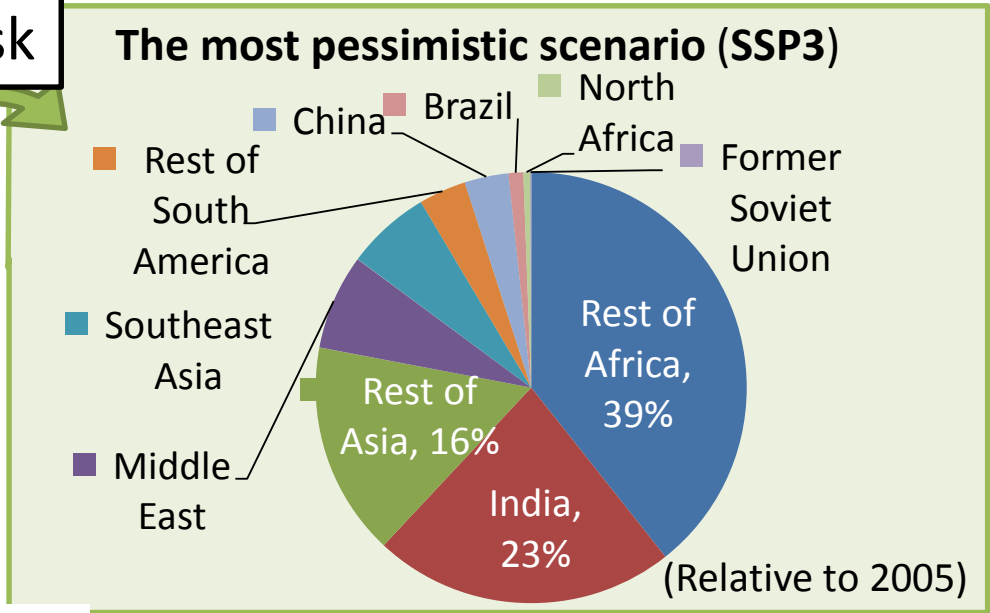
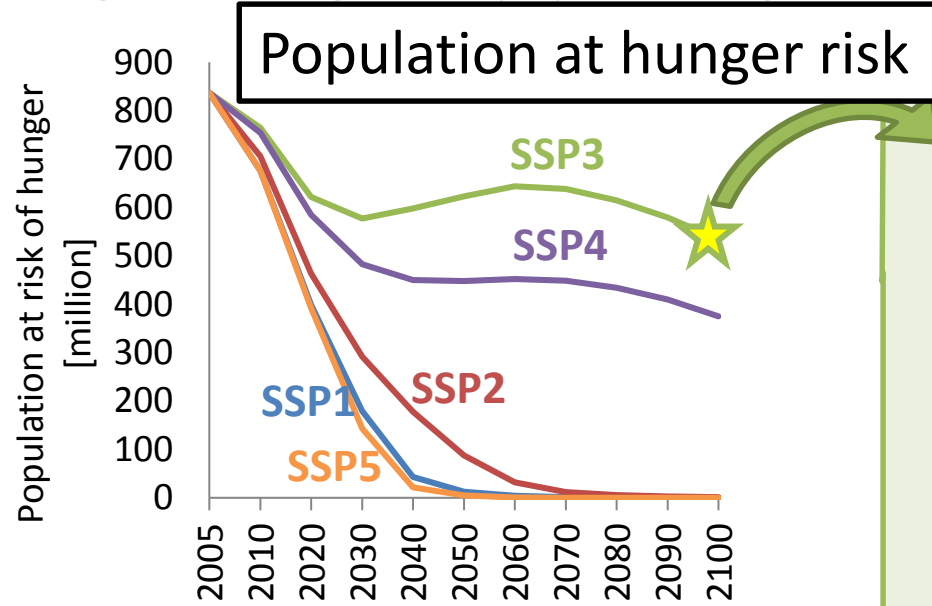
Bioenergy  
impact

3. Mitigation measures to stabilize GHG concentration at 450 ppm would cause **GDP loss** by 2050 (IPCC AR4 WGIII chapter 3).

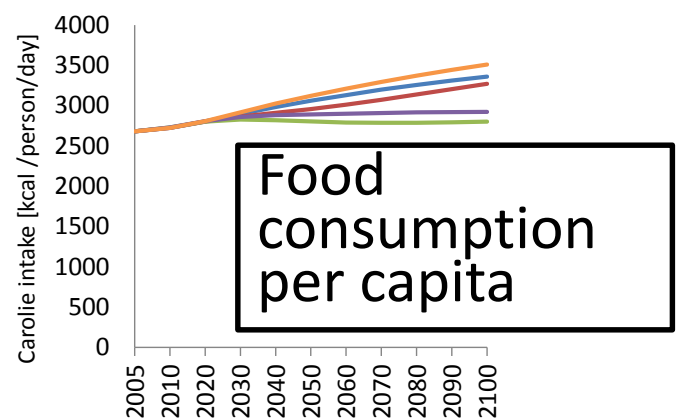
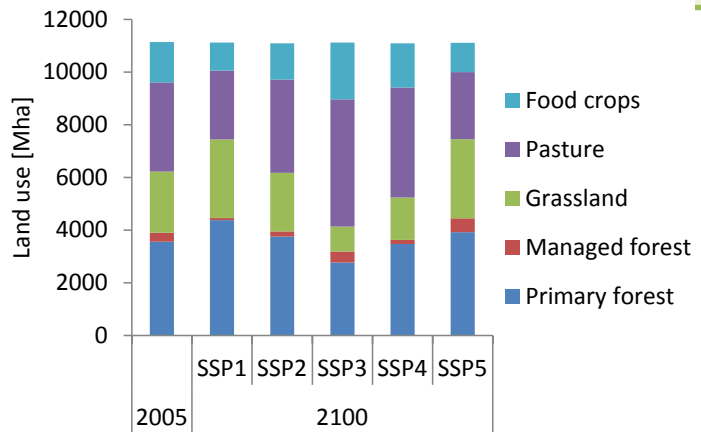
Macroeconomic  
impact

# Risk of hunger in the 21<sup>st</sup> century

- 21st-century risk of hunger strongly differs among different socioeconomic conditions
- Regional distribution depends greatly on population growth, equality in food distribution and increase in food consumption
- Regions with greater population growth face higher risk of hunger.



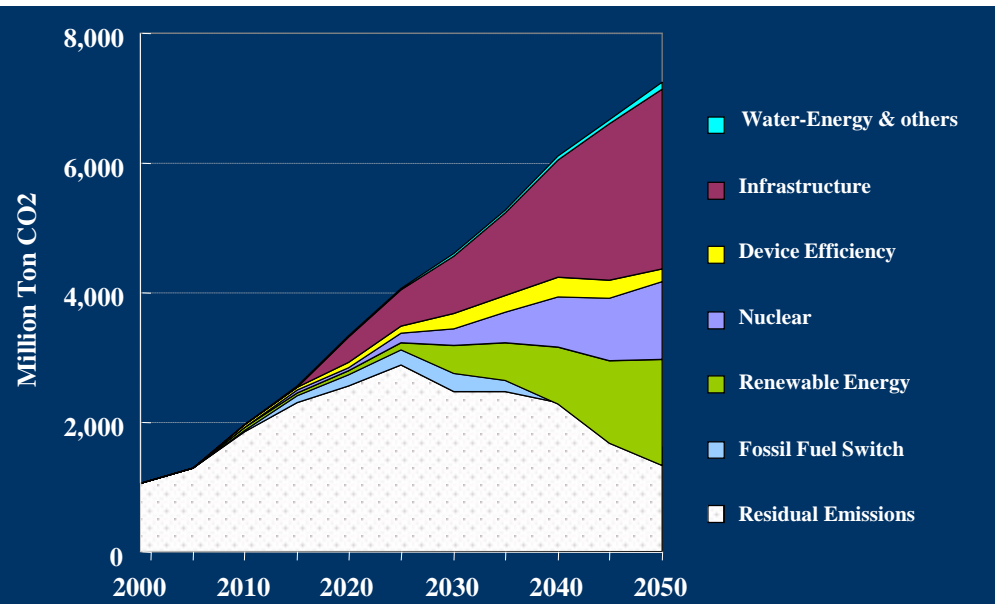
**Land use change**



Hasegawa et al., 2015



# 2°C Stabilization: Mitigation Alternatives



**Conventional Approach: transition with conventional path and carbon price**

- High Carbon Price
- Climate Focused Technology Push
- Top-down/Supply-side actions

**Technology Co-operation Areas**

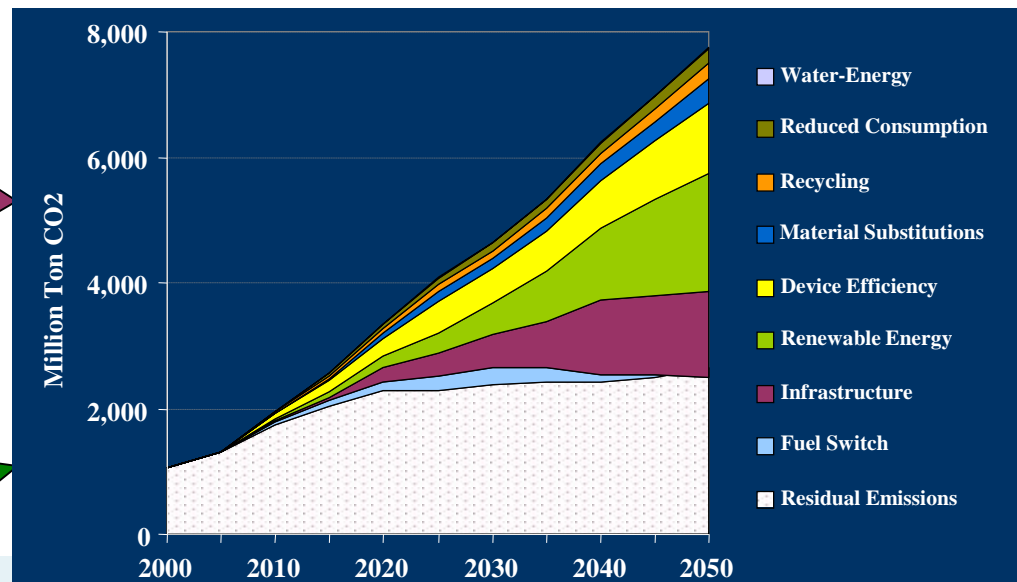
- Energy Efficiency
- Wind/Solar/Biomass/Small Hydro
- Nuclear/Low Carbon Infrastructure

**Sustainability Approach: aligning climate and sustainable development actions**

- Low Carbon Price
- Bottom-up/Demand-side actions
- Behavioural change
- Diverse Technology portfolio

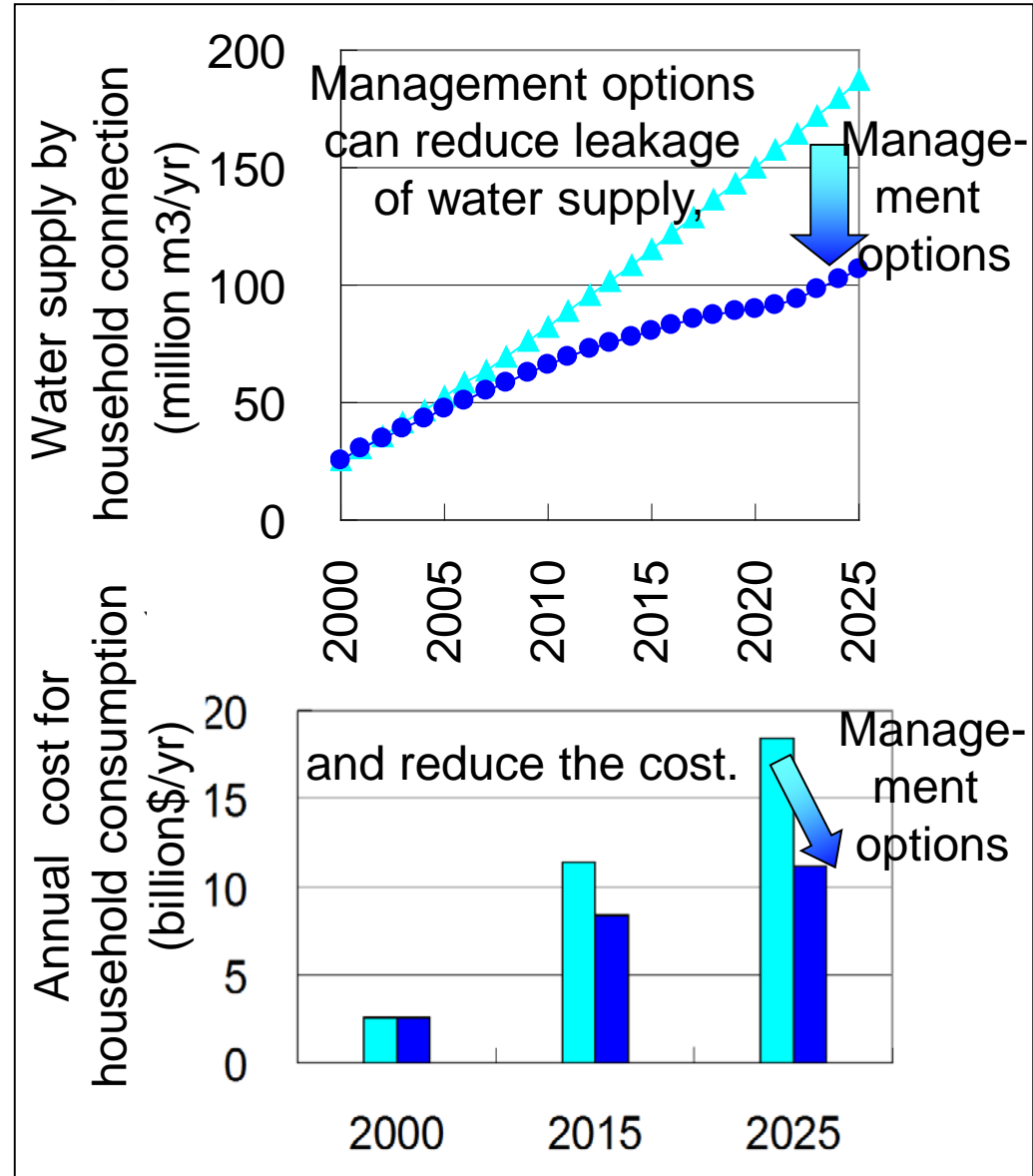
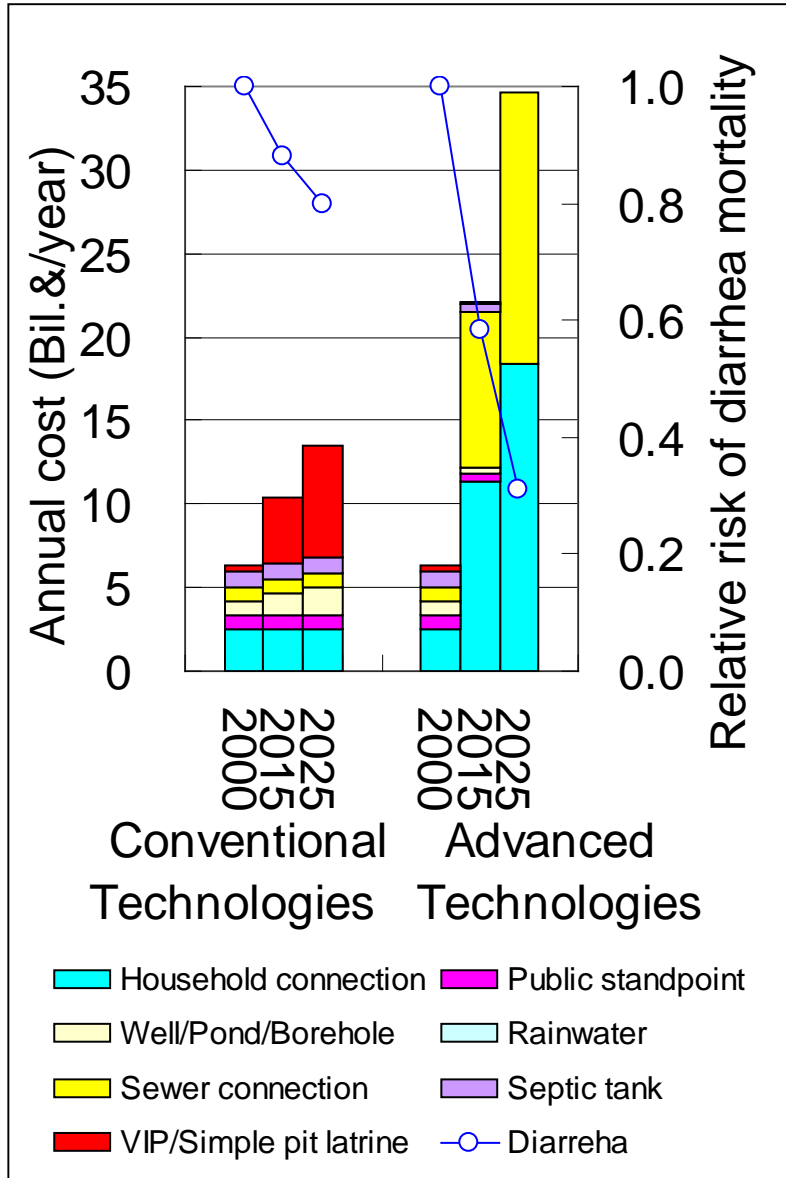
**Technology Co-operation Areas**

- Transport Infrastructure Technologies
- 3R, Material Substitutes, Renewable Energy
- Process Technologies
- Urban Planning, Behavioral Changes



# Assessment of Safe Water/Sanitation Technologies and Management Options

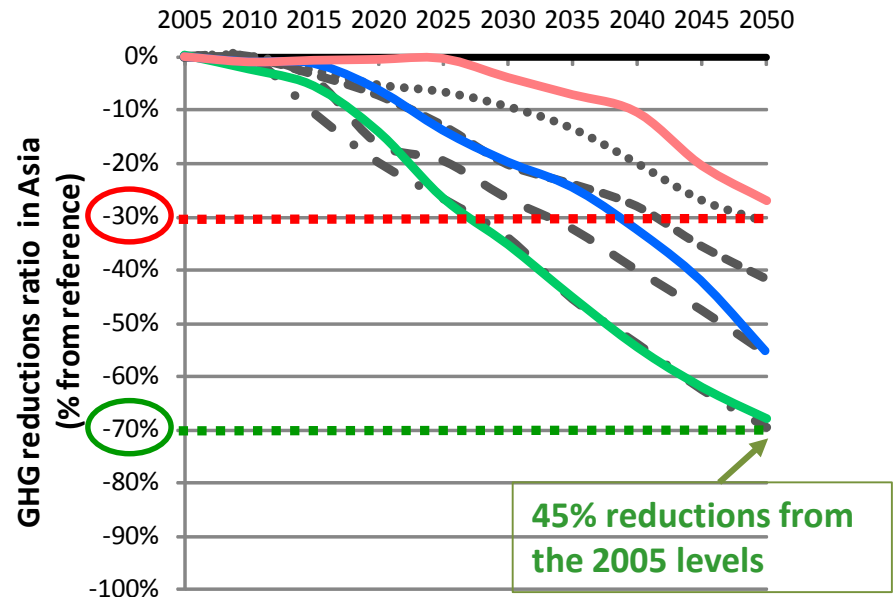
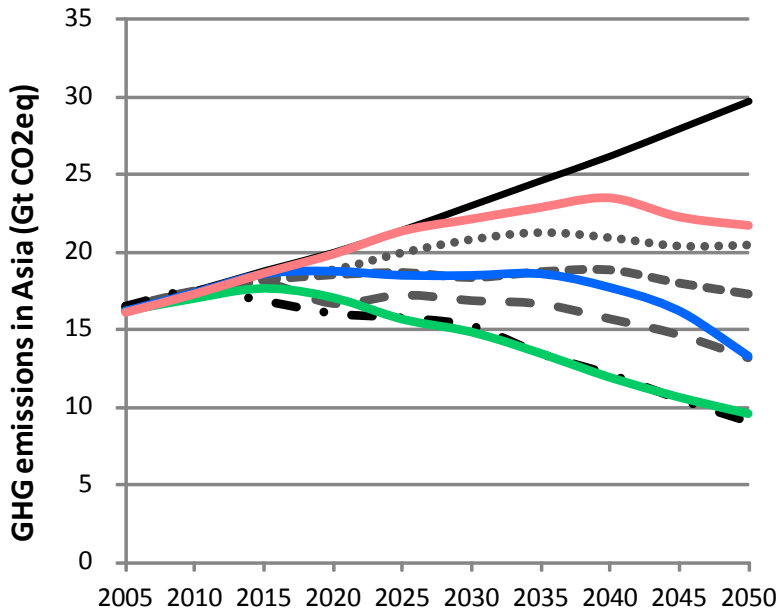
- Illustrative example of **India's case** -



# 6 GHGs emissions pathways in Asia and comparison with 2 °C target pathways

- ◆ Emissions constraints of achieving 2°C-3°C were calculated based on UNEP Gap Report
- ◆ Future global economy-wide carbon prices scenarios (US\$/tCO<sub>2</sub>)

Scenario name	2013	2020	2030	2040	2050
Reference	0	0	0	0	0
50 US\$/tCO <sub>2</sub>	3.75	12.5	25	37.5	50
100 US\$/tCO <sub>2</sub>	7.5	25	50	75	100
200 US\$/tCO <sub>2</sub>	15	50	100	150	200
400 US\$/tCO <sub>2</sub>	30	100	200	300	400

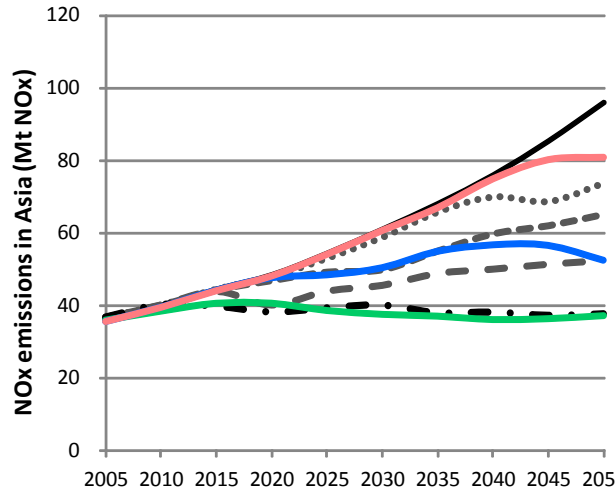
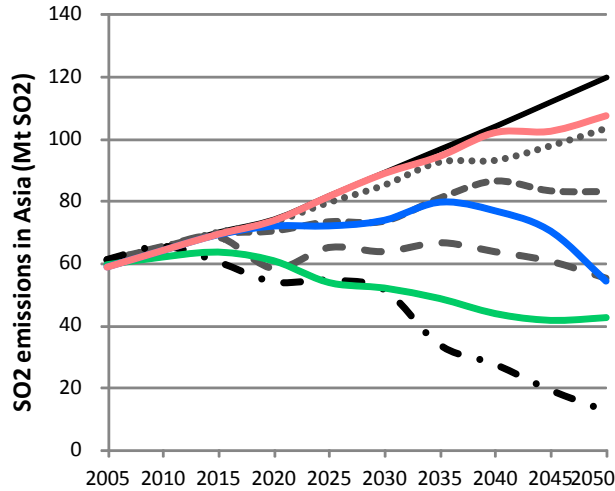


— Reference    ..... 50US\$/tCO<sub>2</sub>    - - - 100US\$/tCO<sub>2</sub>    - - - 200US\$/tCO<sub>2</sub>    - • - 400US\$/tCO<sub>2</sub>  
 — 2°C scenario    — 2.5 °C scenario    — 3 °C scenario

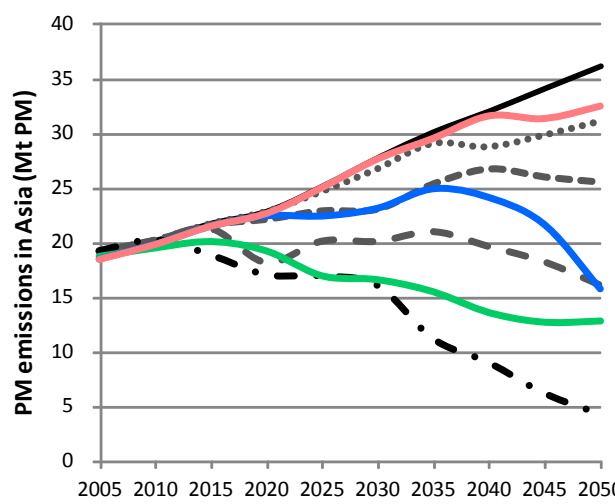
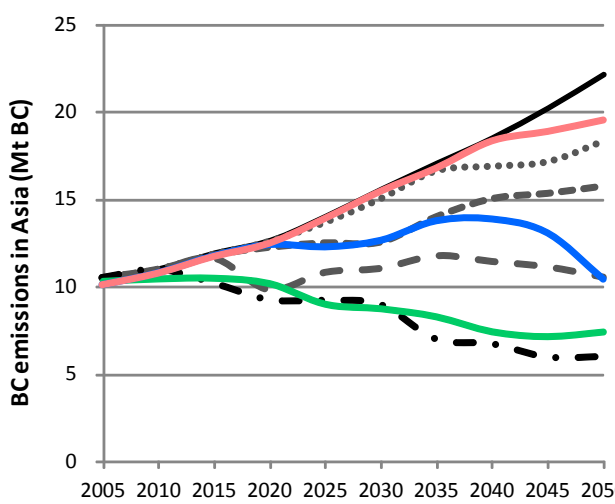


# SLCP & Air pollutants emissions in Asia

## - Cobenefits of implementing CO2 mitigation policies



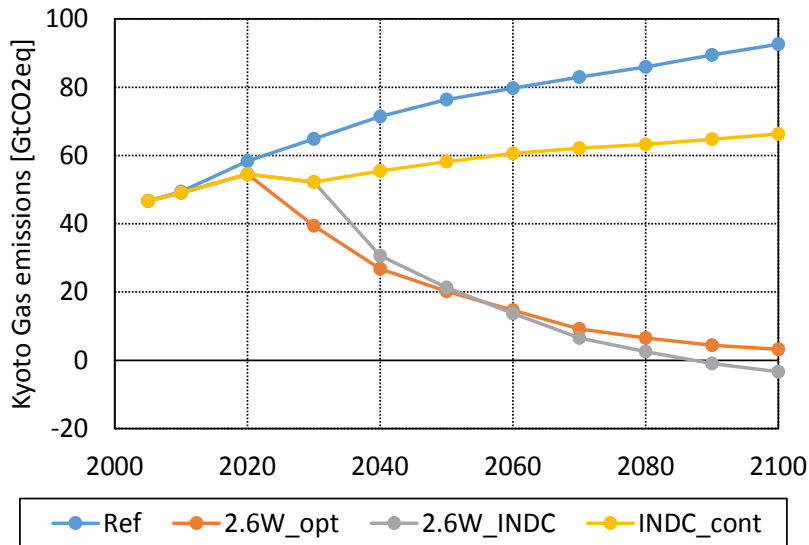
There are large reduction potentials of air pollutants and SLCPs, due to GHG mitigation actions such as drastic fuel shifts and energy efficiency improvement. (e.g. 60~90% reductions compared to baseline in 2050)



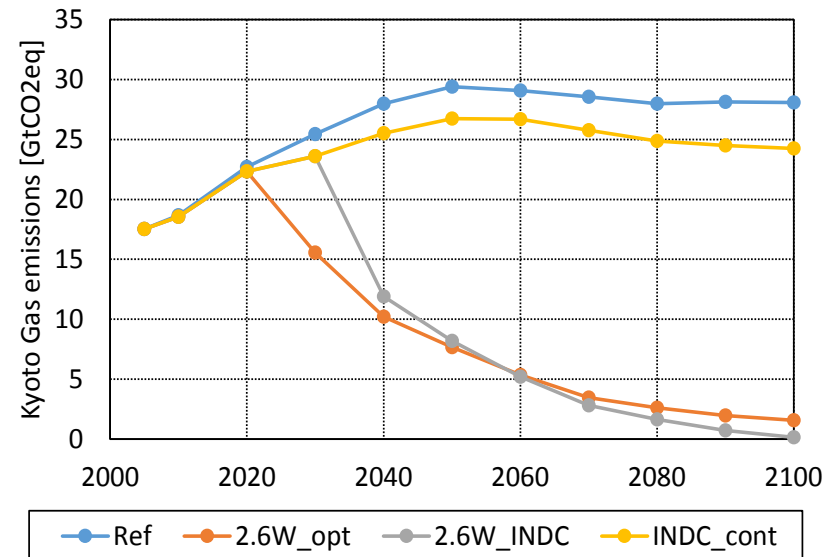
- Reference
- ..... 50US\$/tCO2
- - - 100US\$/tCO2
- 200US\$/tCO2
- · - 400US\$/tCO2
- 3°C scenario
- 2.5 °C scenario
- 2 °C scenario

# Assessment of INDCs using AIM/CGE[Global] (Ver.1)

Targets proposed in INDCs are meaningful and necessary to develop low carbon society. However, achievement of the 2 °C target will depend on the revision of INDCs and mitigation measures after 2030. Share of GHG emissions in Asia is large, therefore mitigation measures in Asia, become more important.



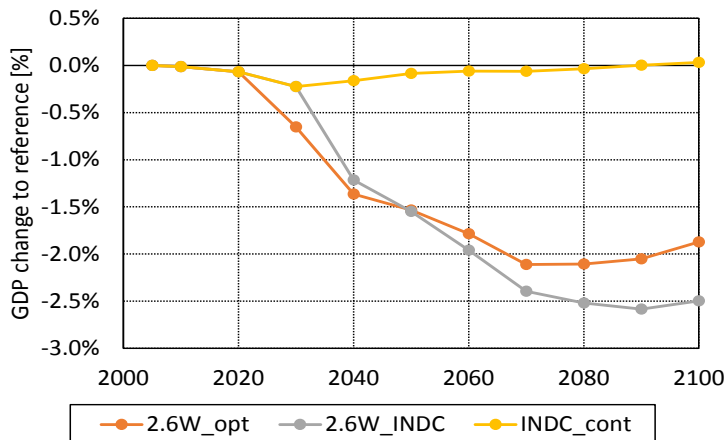
Trend of global GHG emissions



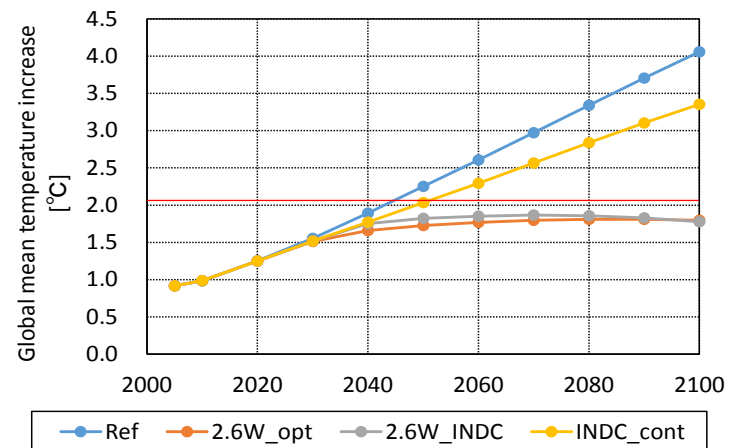
GHG emissions in Asia

# GDP Changes and Global Mean Temperature Change (Assessment of INDCs)

The global GDP decrease in INDC scenario is lower than that of 2.6W\_opt by 2050, but it becomes larger after 2050. The global mean temperature increase in 2100 compared with the pre-industrial level will be 4 °C in REF scenario, and 3.3 °C in INDC\_cont scenario. Note that the costs of climate impacts are not counted in the GDP analysis. If we count the costs of climate impacts, GDP of Ref scenario could be lower than 2 degrees scenarios.



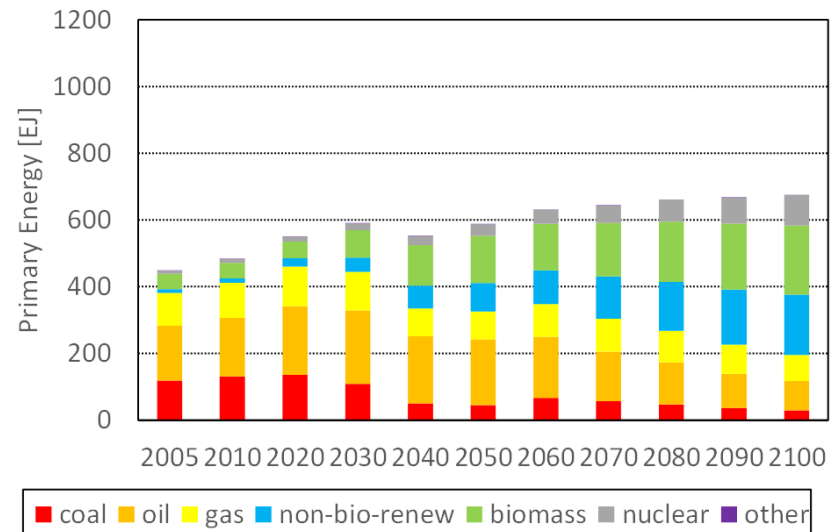
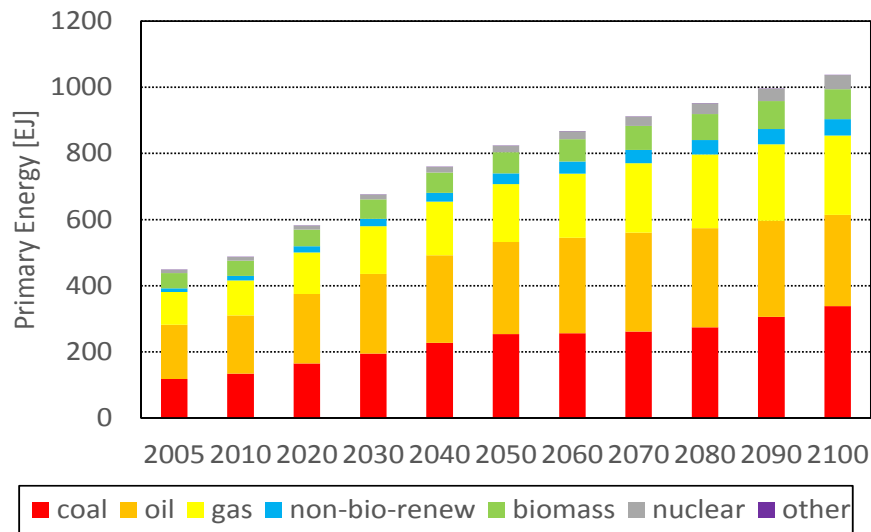
Global GDP change to Ref



Global mean temperature change to the pre-industrial level

# Trends of global primary energy supply (Assessment of INDCs)

In 2030, INDCs will be able to lead the reduction of the global primary energy supply through the energy saving, and the switch from fossil fuels to non-fossil energy. In 2.6W\_INDC pegged with the 2 °C target, this trend after 2030 will be more likely, and the total primary energy will be around 60% compared with Ref. Moreover, 75% of total supply will be renewable energy.

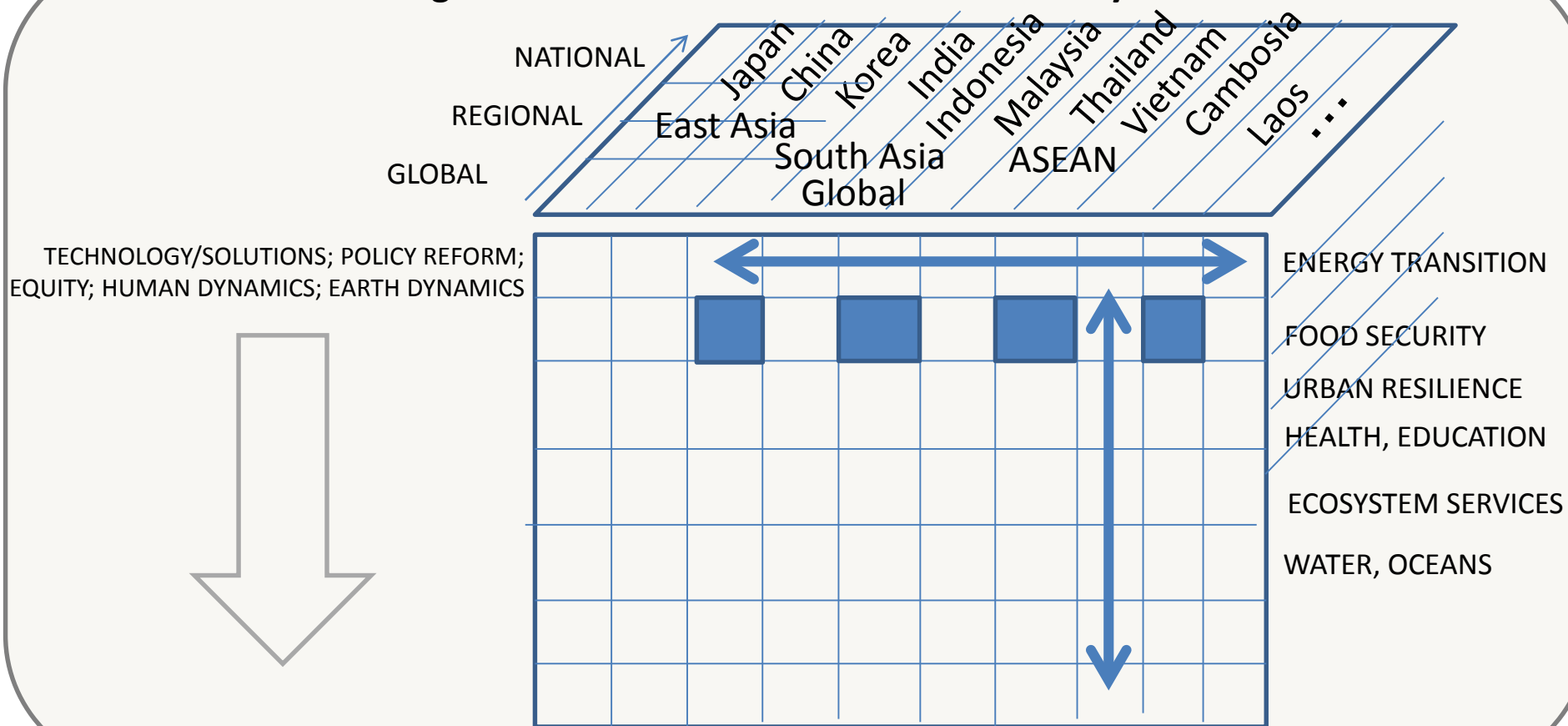


Trends of global primary energy supply (Left: Ref, Right: 2.6W\_INDC)

# INTEGRATED SCENARIOS OF MEETING SDGS WITHIN PLANETARY BOUNDARIES – VERSUS BAU

HUMAN DEVELOPMENT/ECONOMIC DEVELOPMENT/EARTH RESILIENCE

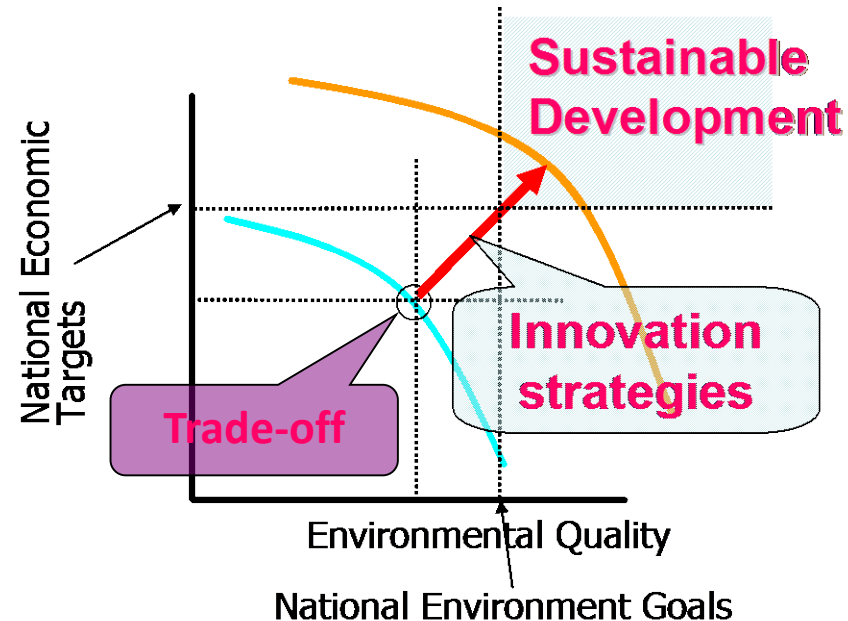
## Normative framing of desired future: SDGs within Planetary Boundaries



# *Messages from AIM*

## *-Integrated Environmental Assessment-*

1. IAM tools can assess policies to achieve SDGs & national targets, link science and policy, and assist to improve effectiveness of policy-making.
2. Quantitative assessment can provide information and insights for making innovative choices delivering co-benefits.
3. Technology and institution innovations are keys to extend the frontier of environment and development.

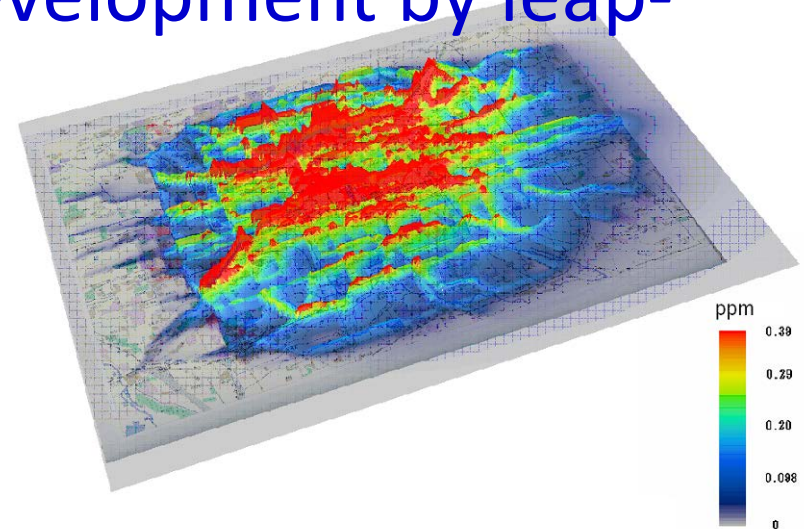




# ***Messages from AIM***

## ***-Integrated Environmental Assessment-***

4. There is a gap between 2 °C target and INDCs. How to fill the gap is a challenge and the policies to meet SDGs can enhance to meet the climate goal.
5. There are great opportunities in Asia to achieve sustainable development by leap-frogging.



# Thank you for your attention!

<http://2050.nies.go.jp/LCS/>

Live simply so others may simply live.  
Mahatma Gandhi



# Additional Slides

## Concrete/practical steps for transformation

- We should try to meet the climate change targets and SDGs as one overarching goal, as they are complimentary and one cannot do without the other – a failure to meet targets set by the climate change regime would also have an adverse effect on achieving the SDGs.
- Not only for targets for GHG emissions reduction, but also for targets for SDGs, it is utmost important to take data in a comparable manner, with uniform indexes and hard measures.
- In the post-2015 development era, multi-stakeholder partnerships are expected to play an increasingly important role in the implementation of sustainable development.

Source: Presentation by Sébastien Treyer, Iddri at The 7<sup>th</sup> Low Carbon Society research network, Paris Conference

# What kinds of things matter most for adaptation challenges?

- Expert Survey Results (41 respondents), Schweizer and O'Neill, 2011, variables that most shape adaptation challenges
  - Per-capita income (36)
  - Quality of governance (36)
  - Extreme poverty (35)
  - Coastal population (19)
  - Water availability (19)
  - Urbanization (18)
  - Educational attainment (18)
  - Innovation capacity (17)

Source: Marc A. Levy, Deputy Director, CIESIN

## **TARGETS**

### **13.1**

Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

### **13.2**

Integrate climate change measures into national policies, strategies and planning

### **13.3**

Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

#### **13.a**

Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible

#### **13.b**

Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities