Low Carbon Asia Research Network (LoCARNet)
First Annual Meeting
Mobilising Wisdom for a Low-carbon Asia

Session 1-1: Policy Making Process and
Use of Integrated Assessment Model

Role of Asia-Pacific Integrated Model (AIM) towards Asia Low Carbon Society

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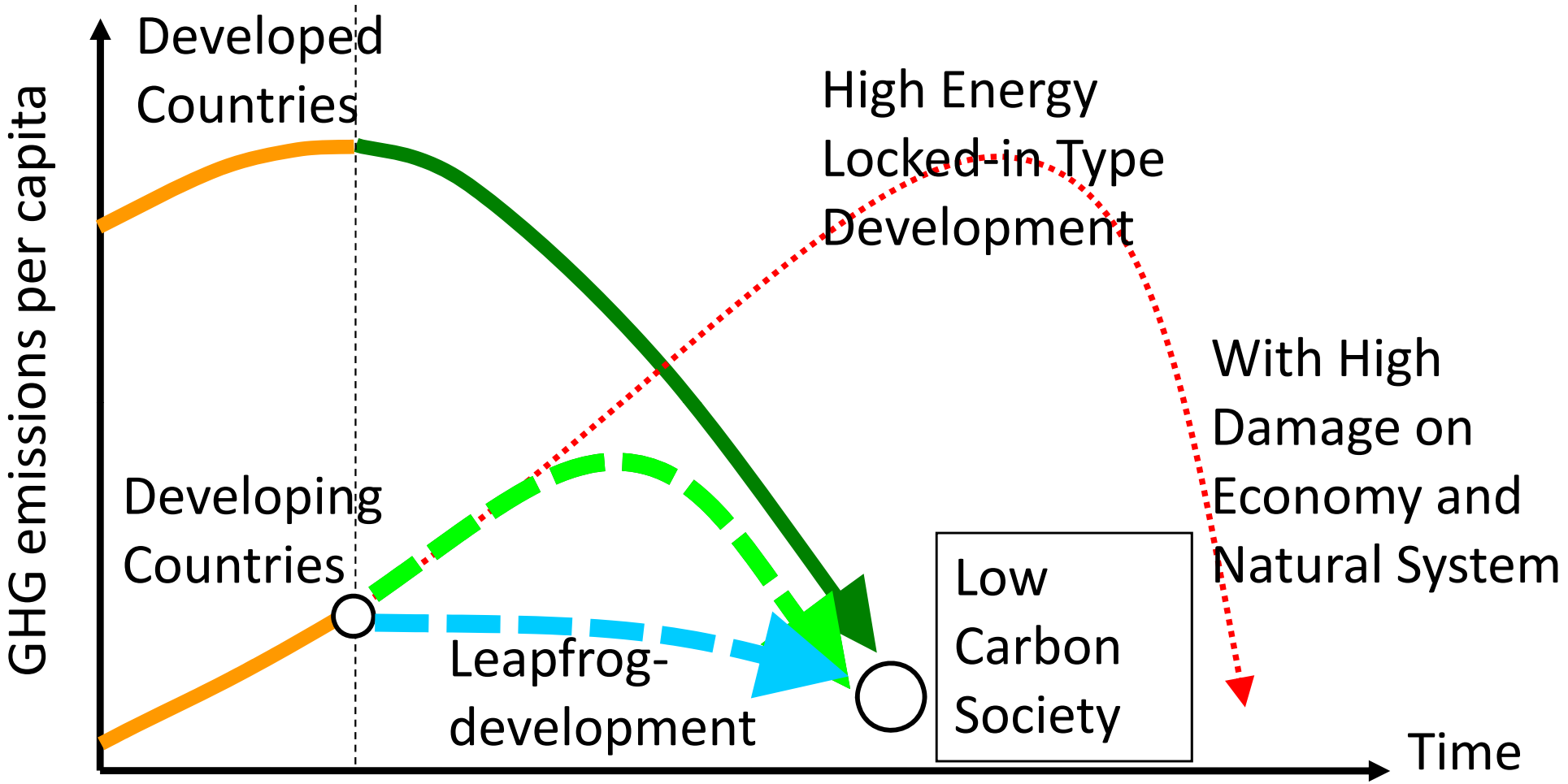
National Institute for Environmental Studies

Date: 16-17 October 2012
Venue: Novotel Bangkok on Siam Square,
Bangkok, Thailand

AIM
ASIA-PACIFIC INTEGRATED MODEL

ASIA LCS

AIM LCS Scenario study



Development of Asia LCS Scenarios

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

Policy Packages for Asia LCS

- Support setting the target
- Support developing comprehensive LC policy with the provision of actions and time frameworks
- Assist consensus building and decision-making among different stakeholders with scientific basis

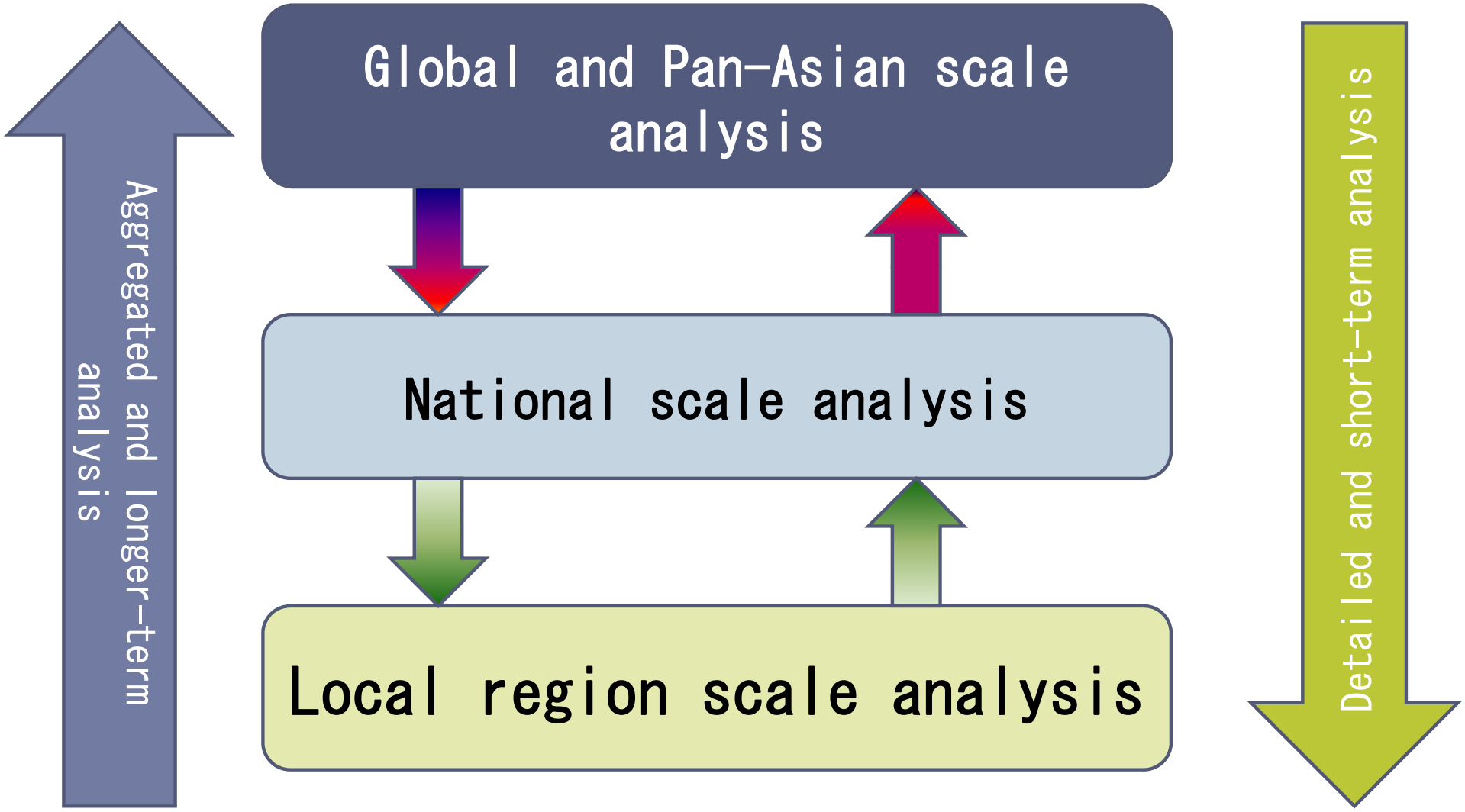
Key aspects of Asian low carbon society

- take actions that are compatible with the principles of sustainable development, ensuring that the development needs of all groups within society are met
- make an equitable contribution towards the global effort to stabilize the atmospheric concentration of CO2 and other greenhouse gases at a level that will avoid dangerous climate change, through deep cuts in global emissions
- Take actions that improve environment conditions in various aspects.
- demonstrate a high level of energy efficiency and use low-carbon energy sources and production technologies
- adopt patterns of consumption and behaviour that are consistent with low levels of greenhouse gas emissions.

Elements of actions to realize a low carbon society

1. Technologies: Energy production technologies, end-use energy saving technologies, system integration of supply-demand technologies, etc.
2. Social infrastructure: transportation system, Urban infrastructure, etc.
3. Human resources: active participation by policy makers, engineers, citizens participation, etc.
4. Institution: Support of market penetration, Funding mechanism, international/regional/national mechanisms such as carbon tax, emissions trading, etc.
5. Social capital, and lifestyle: Lifestyle specific to certain community, Energy efficient and low material consumption, etc.

Multi-scales and interactive approach for LCS studies



Two approaches for ASIA LCS

[Top-down approach]

Global emissions scenario analysis using CGE model

Identify the emission allowances for each Asian country to ensure the global emissions by half by 2050.

Japan, China, India, Korea, Thailand, Malaysia, Vietnam, Philippine, Singapore, Indonesia and Taiwan.

【Bottom-up approach】

National, local, city-level approach using a simplified tools

Discuss LCS visions which consider the local conditions & targets with local researchers/policy makers individually.

Malaysia, India, China, Thailand, Indonesia, Vietnam, Ahmedabad city (India), Bhopal city (India)

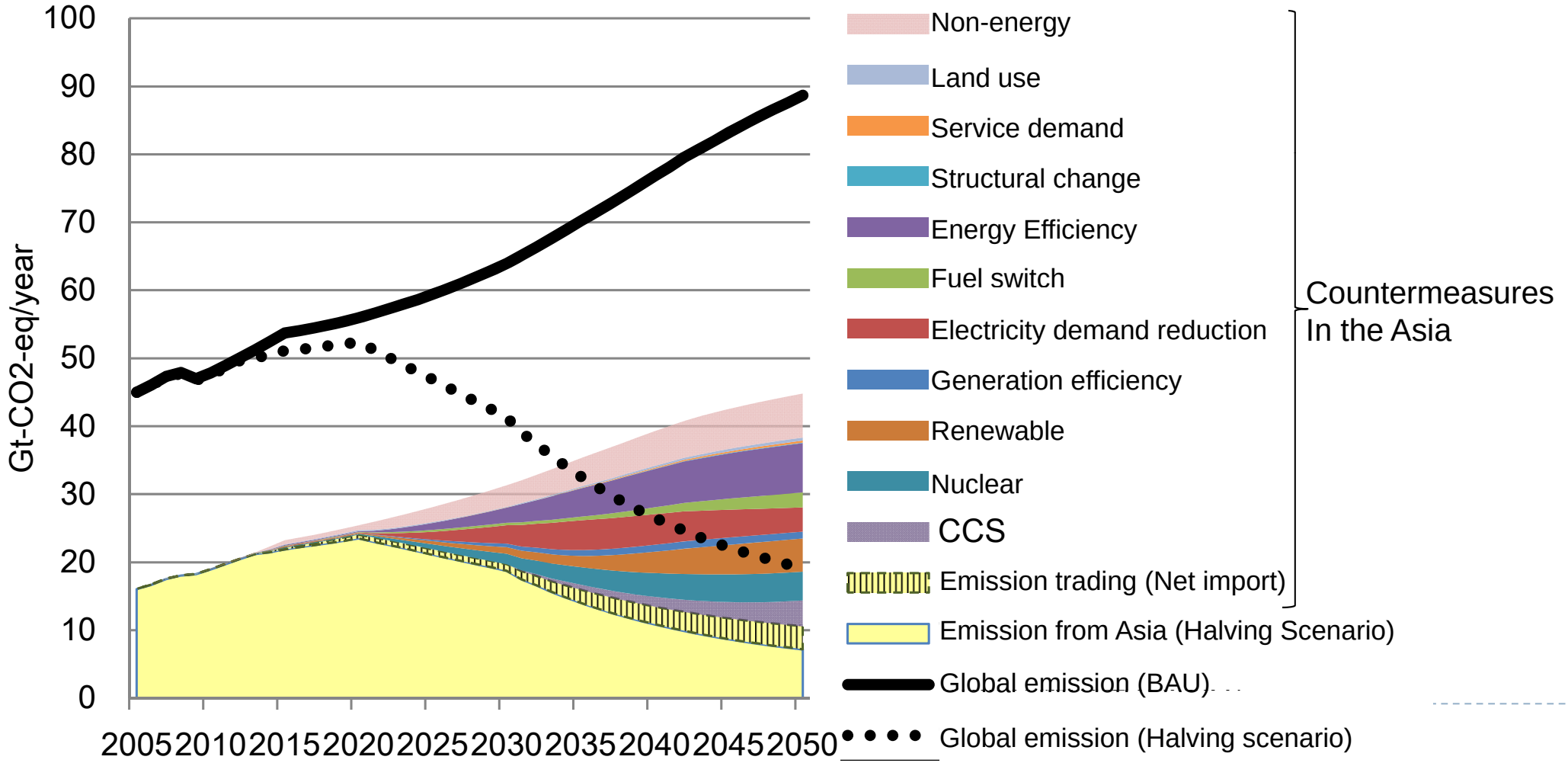
- *Is it feasible to implement a scenario with cutting the GHG emissions by half in 2050 from 1990 level?*
- *What would be the emission allowance for each Asian country? What would be the impact on economy?*

- *What is the LCS in each region look like?*
- *Is it possible to achieve the LCS together with solving the other socio economic issues in the region?*
- *What should be done to achieve the vision?*

ASIA LCS

Assessment of the “50% reduction” scenario

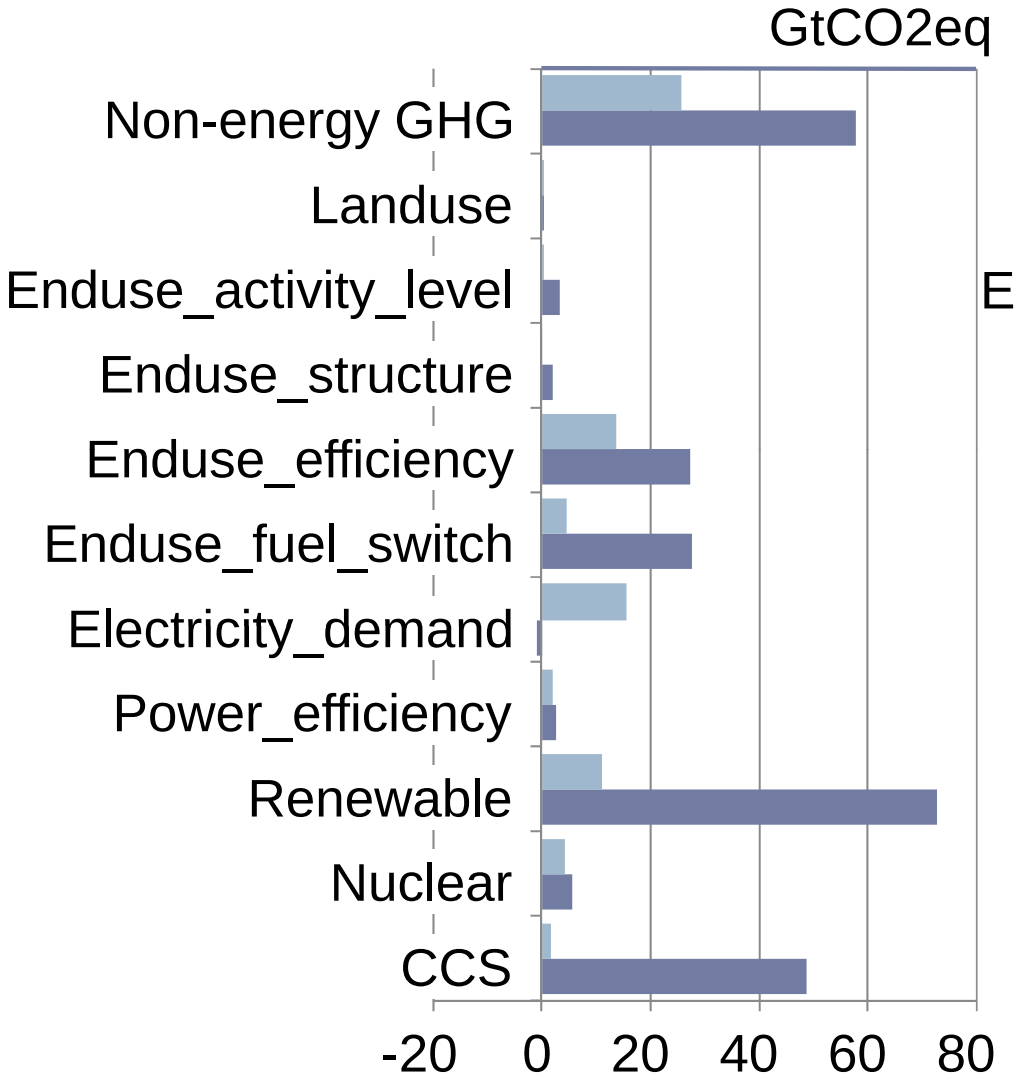
- **Reducing GHG emissions by half by 2050 to the1990 level: Feasible**
- **Estimated Marginal Abatement Cost is high**
  - **Cost reduction (possible? How?) : need further discussion**
- **Impact on GDP: 2% (In some regions >10%)**
- **Share of GHG emissions from Asia is increasing. Need to avoid lock-in of high carbon infrastructure.**



Source: AIM/CGE, Masui et al.

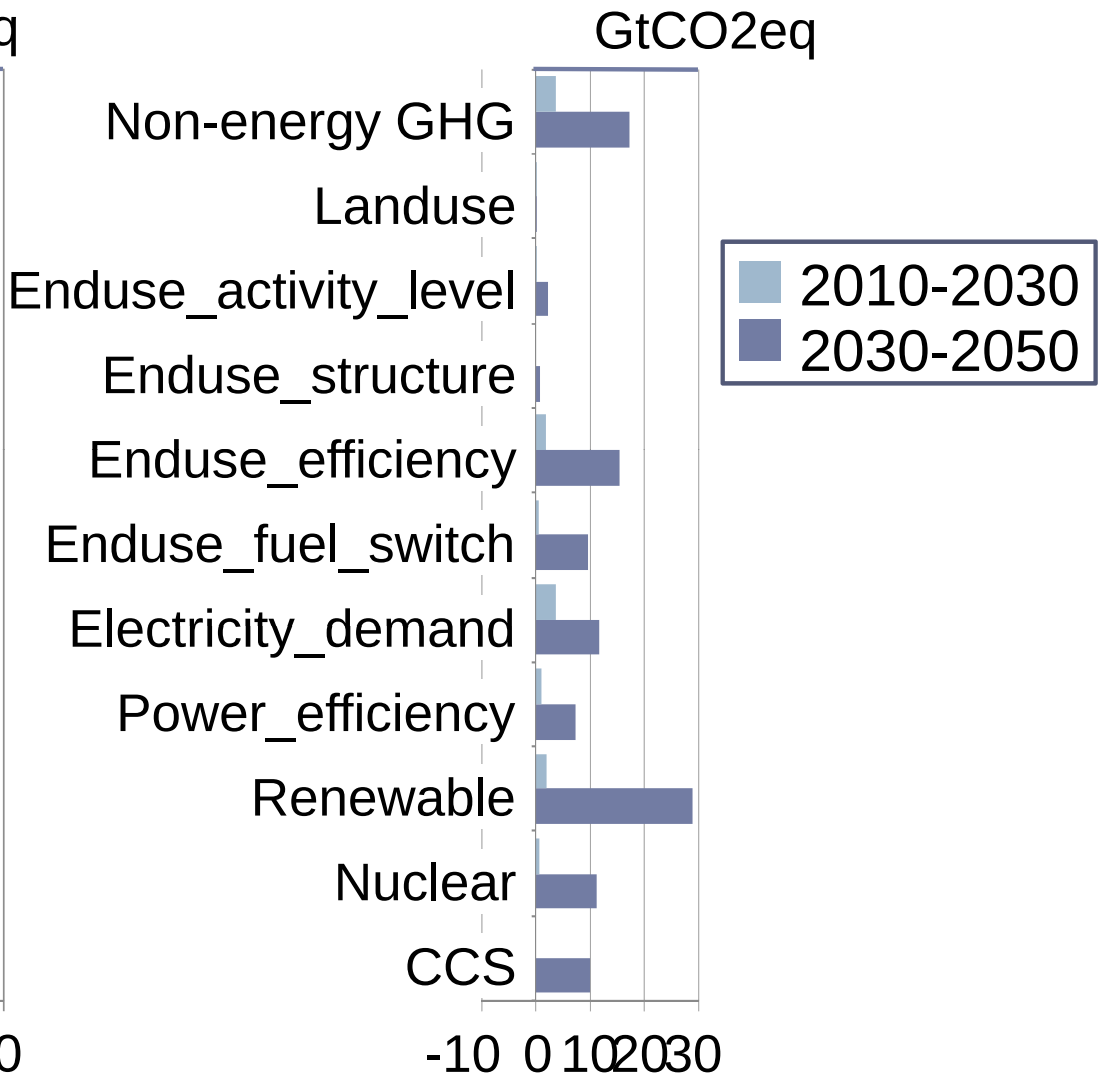
Cumulative reduction potential

China



Projected emissions in China：2030年 6.85 GtCO2eq, 2050年 2.41 GtCO2eq

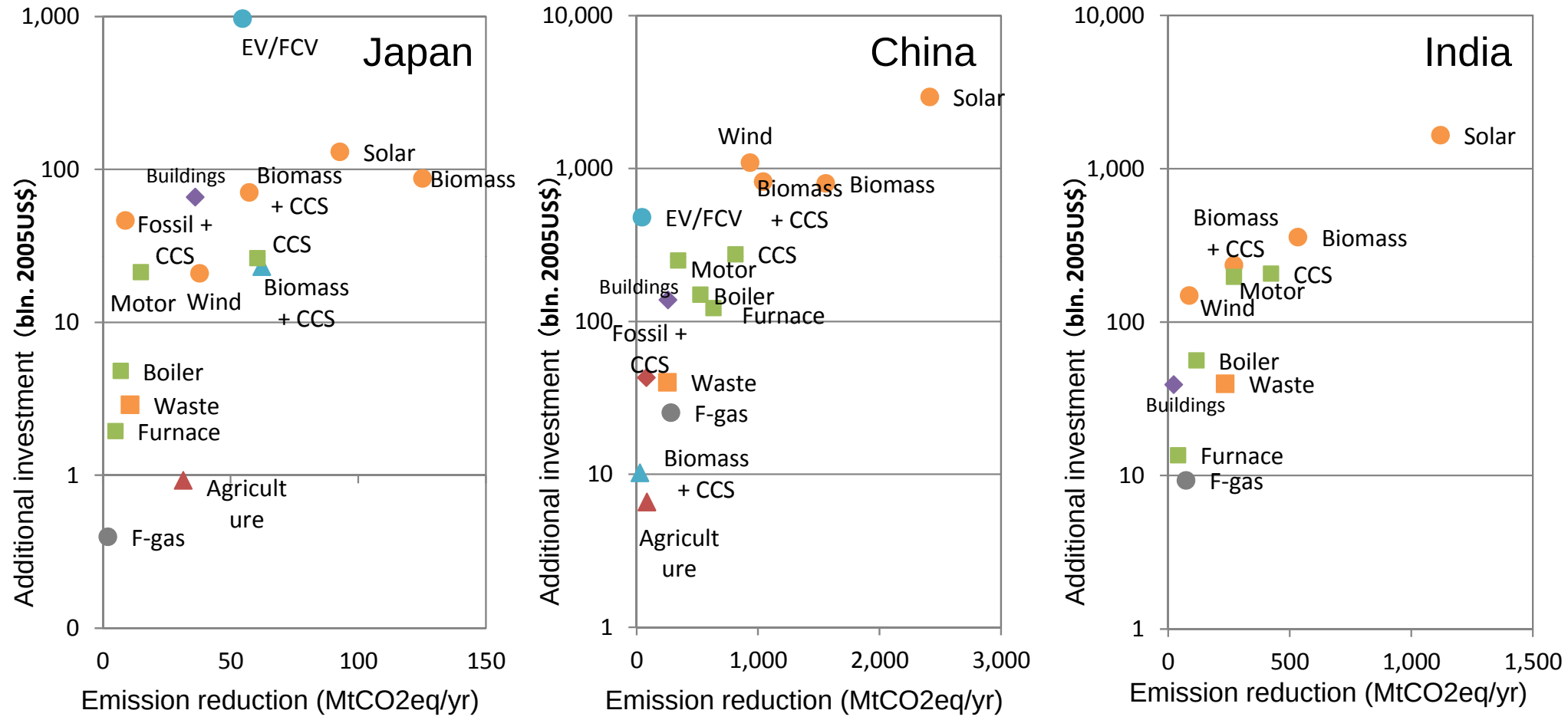
India



Projected emissions in India：2030年 4.33 GtCO2eq, 2050年 3.25 GtCO2eq

Source: AIM/CGE[Country] , Namazu et al.

Additional Investment for GHG emission reductions in some Asian countries until year 2050



Source: AIM/Enduse[Global], Akashi et al.

Actions towards a low carbon society

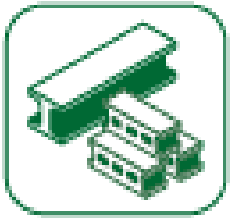
Ten Actions towards Low Carbon Asia

Action 1 **Urban Transport**

Structured Compact City

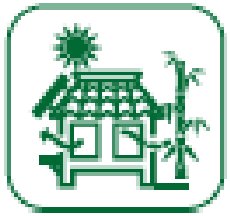
Action 2 **Interregional Transport**

Mainstreaming trains and water transportation



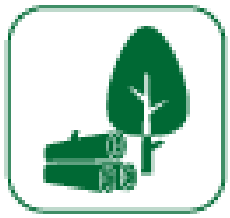
Action 3 **Resources & Materials**

Smart material use that realizes the full potential of resources



Action 4 **Buildings**

Smart buildings that utilize natural systems



Action 5 **Biomass**

Local production and local consumption of biomass

Action 6 **Energy System**

Low carbon energy system with local resources

Action 7 **Agriculture & Livestock**

Spread of high yields and low emission agricultural technologies

Action 8 **Forest & Landuse**

Sustainable forest management

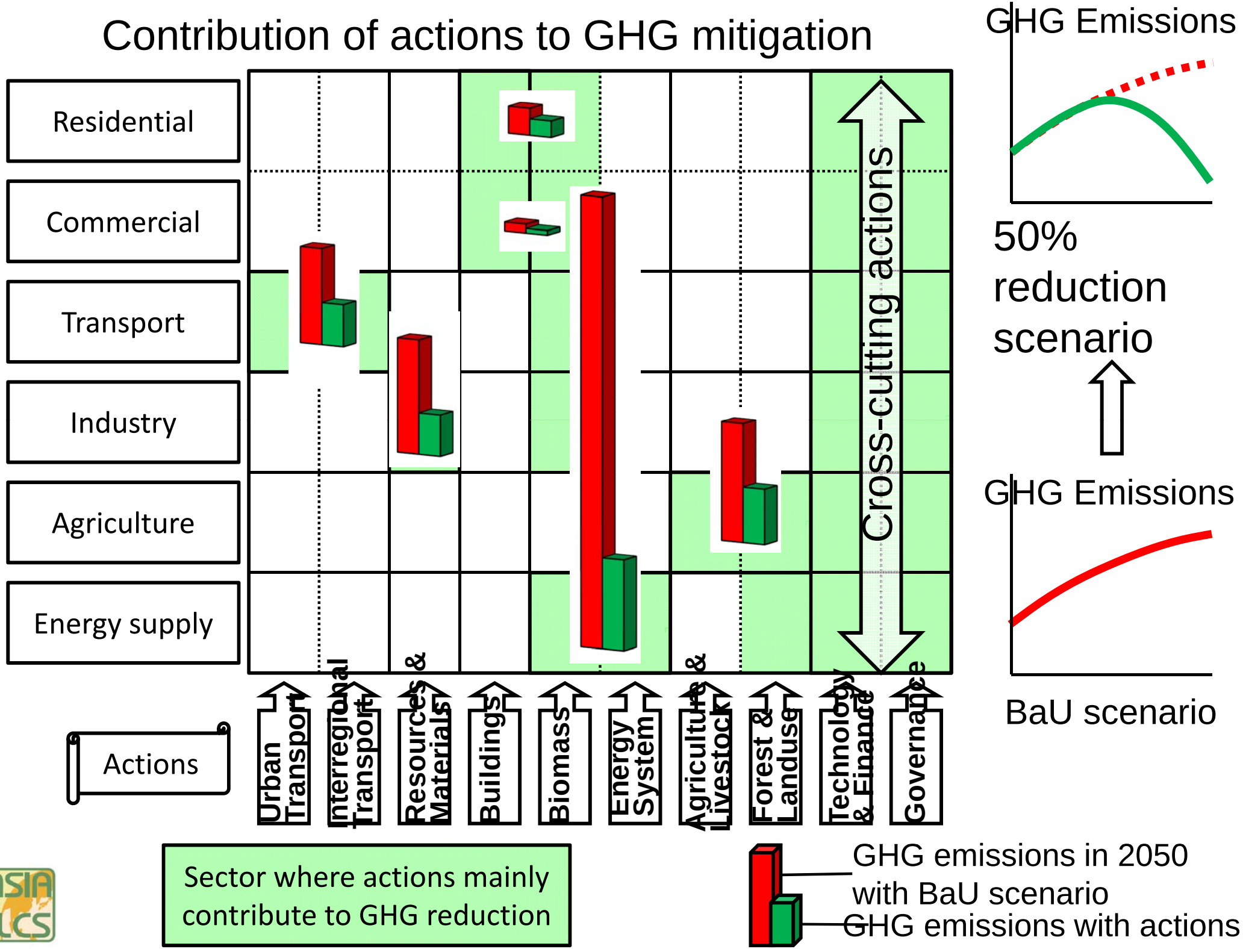
Action 9 **Technology & Finance**

Technology and finance to facilitate achievement of LCS

Action 10 **Governance**

Transparent and Fair Governance that Supports LCS Asia

Contribution of actions to GHG mitigation



Example of LCS Roadmap: Action 6: Low Carbon Energy System

Current Situation

The electrification rate of Asia is roughly 80%, but 800 million people still do not have access to electricity, particularly in South Asia. The intro
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Challenges

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conditions.

Vision in 2050

The near-total electrification will be completed across Asia. While the urban areas' energy supply will be provided by the core system, the rural areas' energy will be provided by a micro-grid connected with renewable energies. By sophisticated projections of power generation and highly-developed power storage technologies, the capacity of renewable energies will increase significantly. The efficiency of thermal power generation will be dramatically improved, the carbon capture storage will be effectively developed by appropriate management.

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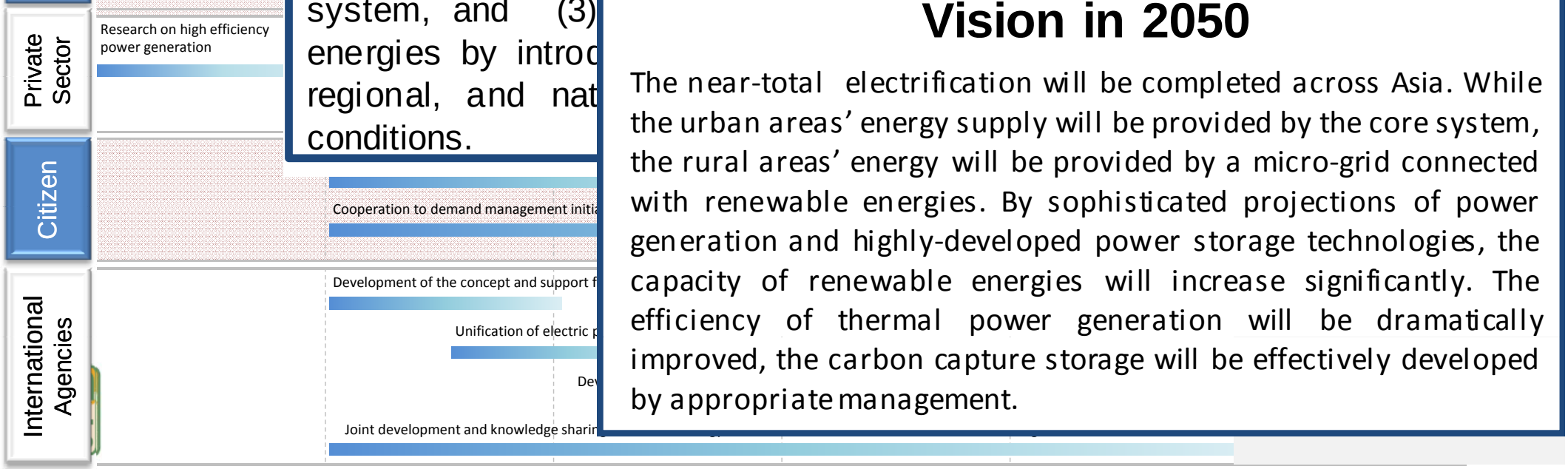
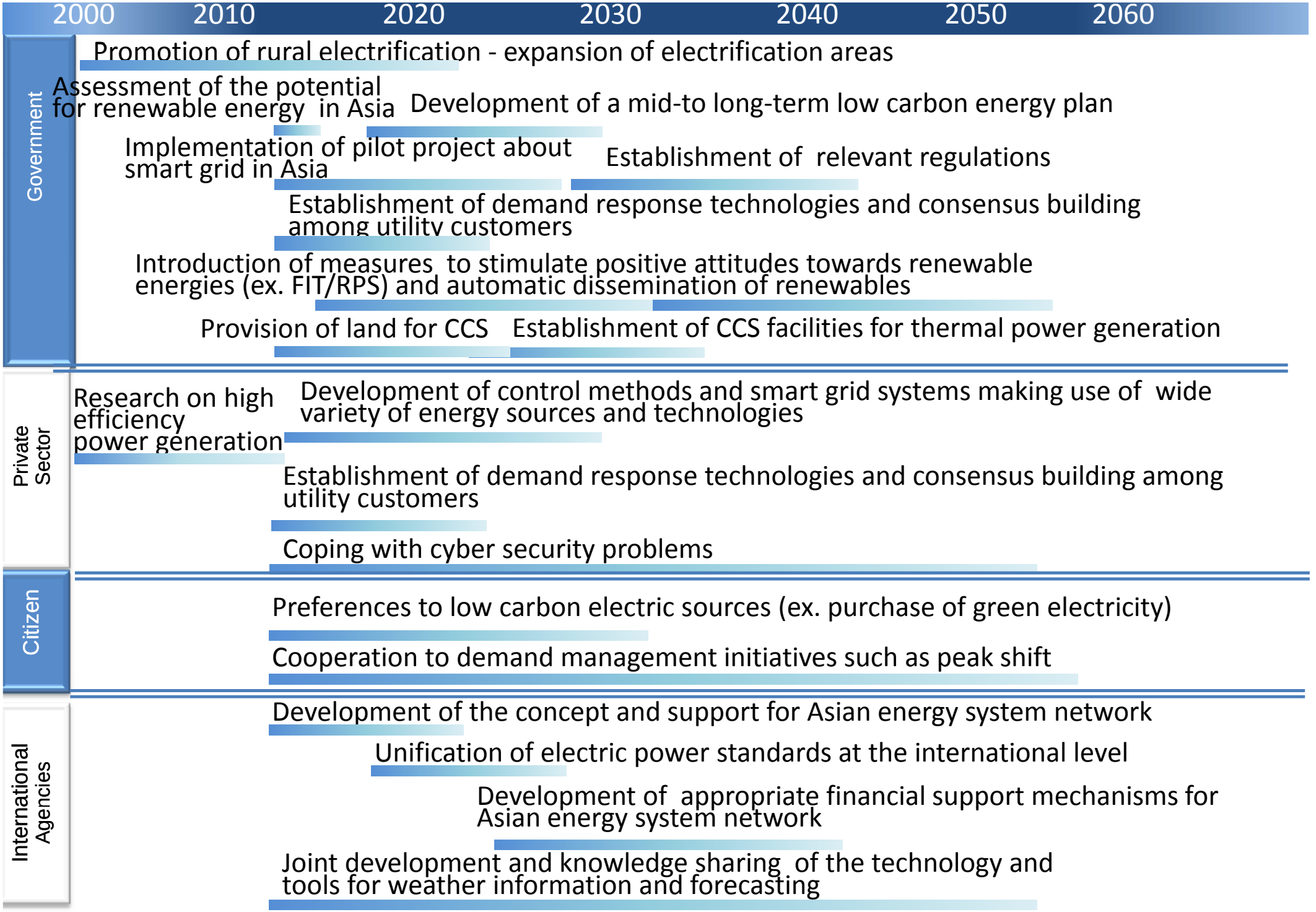


Example of LCS Roadmap: Action 6: Low Carbon Energy System



Asian countries' LCS Study with AIM

Policy makers
Central/regional government administration
Development Agencies
NGOs

Collaboration for LCS scenario development and building roadmaps

Request of more practical, realistic roadmaps and also tractable tools for real world

Each country's domestic/ local research institute

Core research members

Application and development to actual LCS processes

Development and maintenance of study tools/models

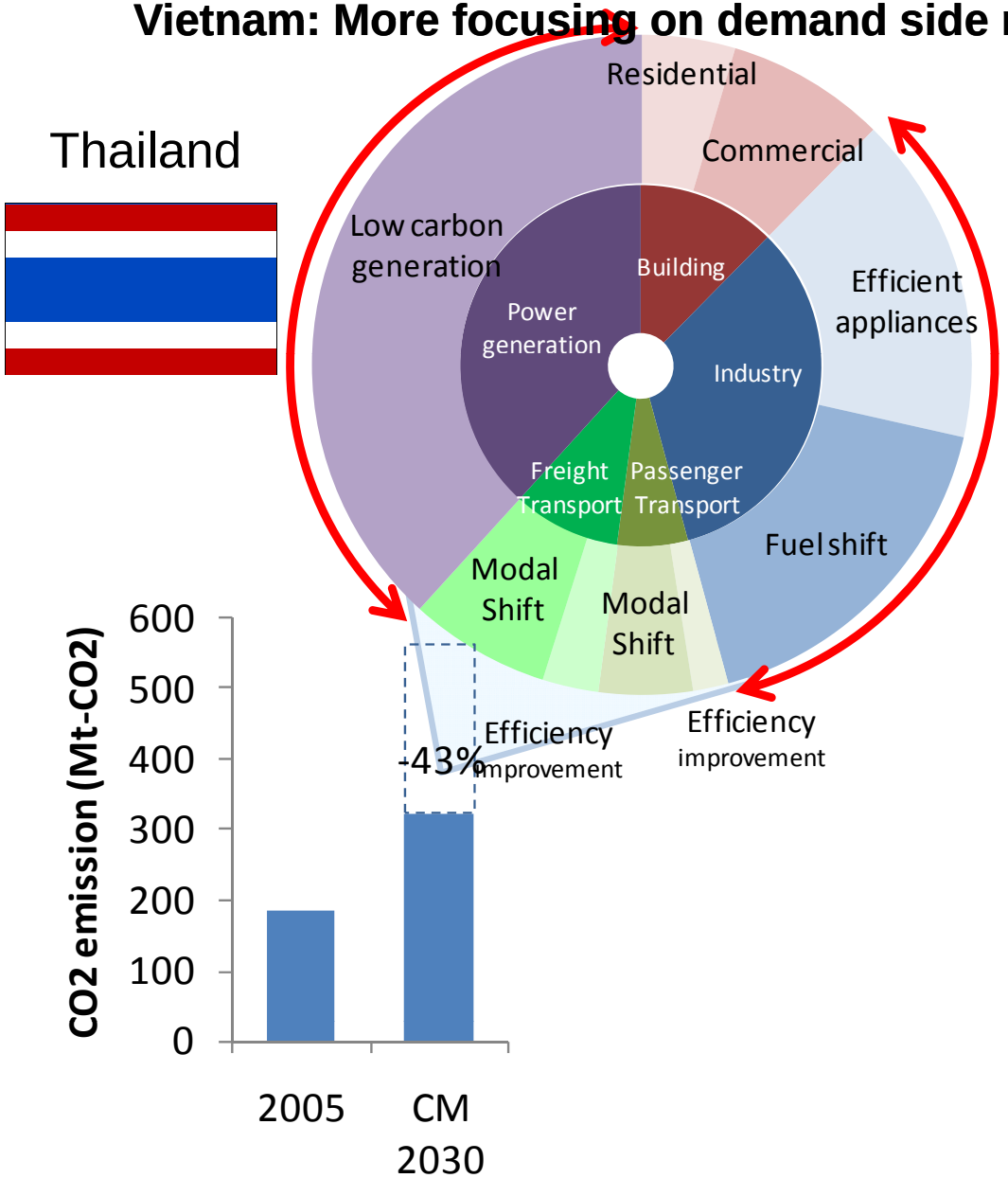
http://2050.nies.go.jp/LCS

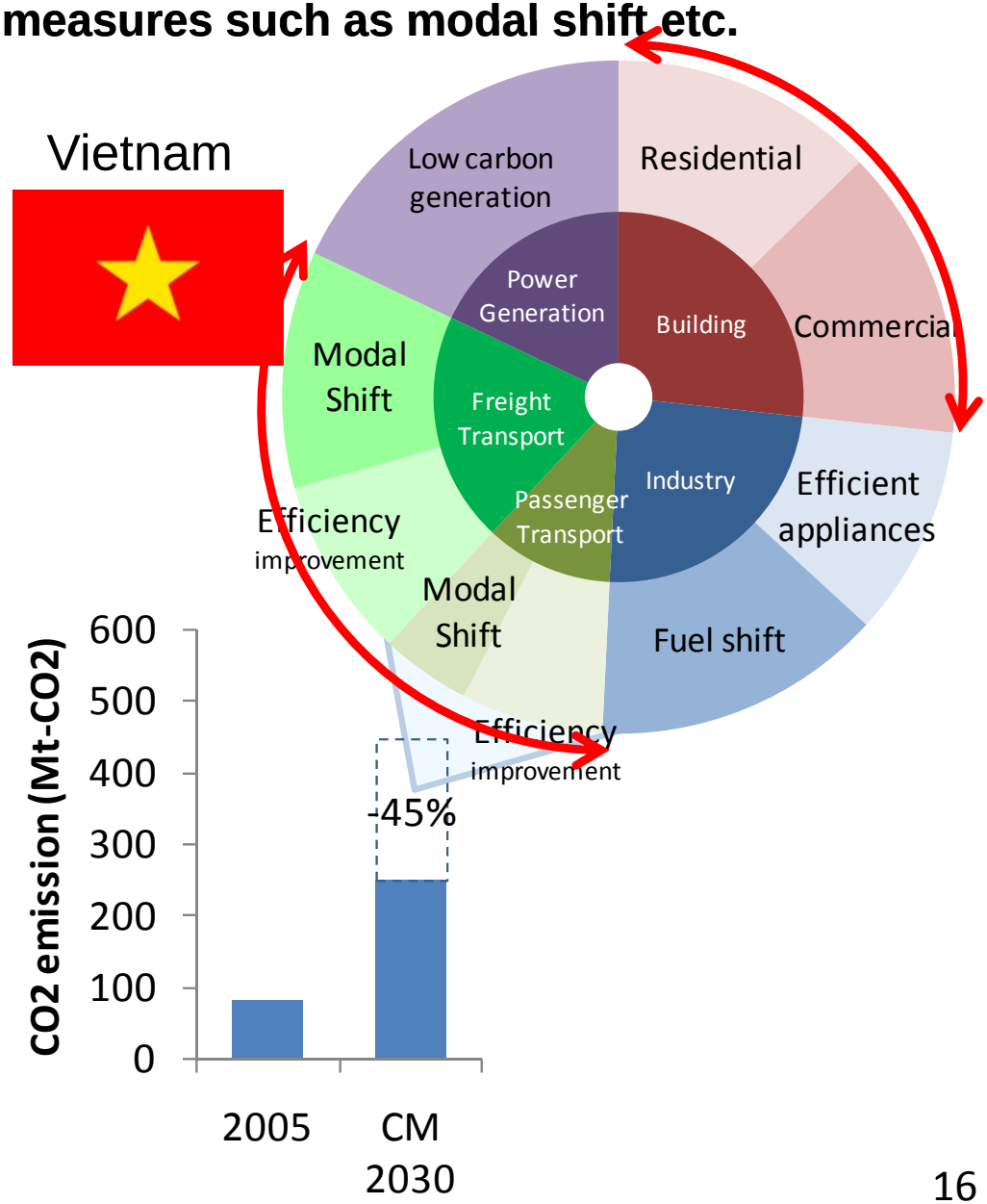
The effects of countermeasures differ by country

Scenarios of each region vary in terms of combination of actions and their effects.

Ex) Thailand: Higher reductions from power generation and fuel shift in Industry

Vietnam: More focusing on demand side measures such as modal shift etc.





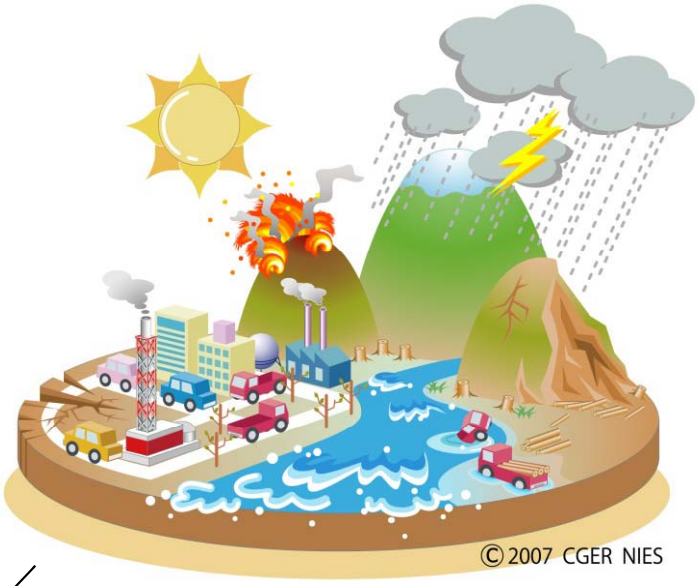
Continuation and Extension of AIM activities

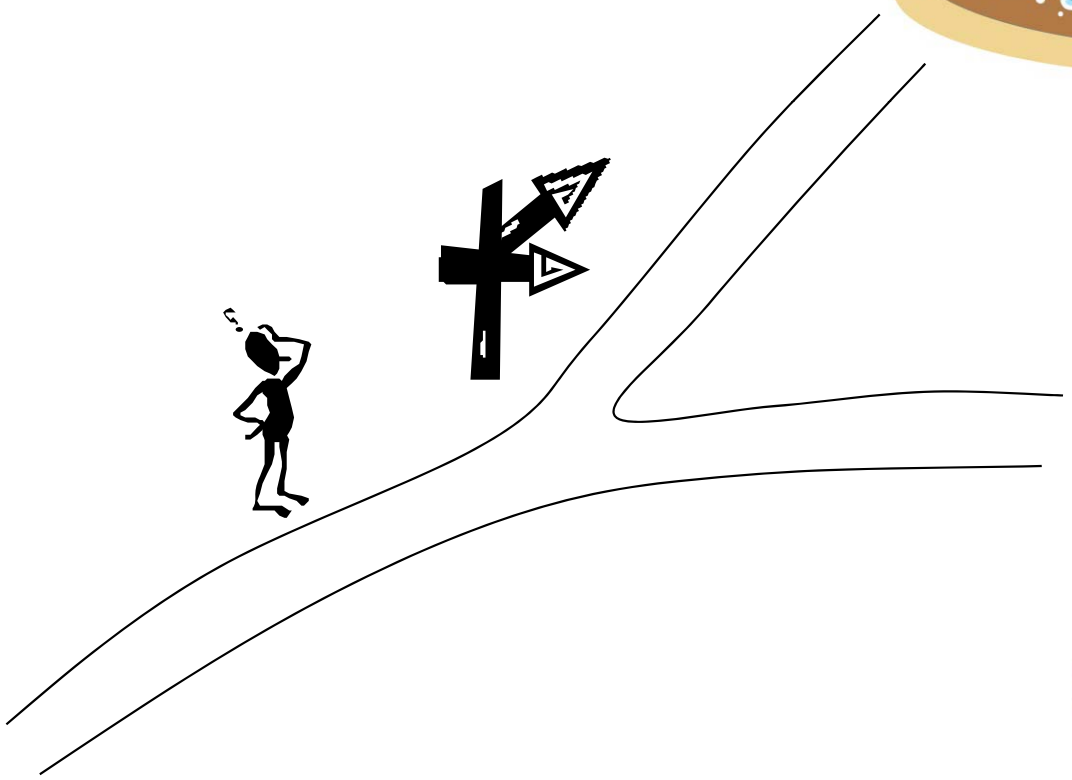
- East Asia Low Carbon Growth Knowledge Platform (Input to East Asia Summit through East Asia Low Carbon Growth Partnership)
  - the Climate Change International Training Center (*CITC*), Thailand
- Development and implementation of low carbon scenarios

  Bangladesh, Cambodia, China, India, Indonesia, Korea, Malaysia, Thailand, Vietnam, etc.
- Applicability of AIM to NAMA, e.g. Thailand Case Study
- Collaboration towards low carbon cities

  Ahmedabad, Bangkok, Bhopal, Iskandar, etc.
- Collaboration with policymakers, researchers and other stakeholders through LoCARNet towards Aisa LCS

Thank you for your attention!





A Policy Package towards Low-Carbon Thailand

43% reduction to BaU

Residential and Commercial

▼ 30 MtCO2 (12%)

- Building insulation
- Energy efficiency labeling
- Green purchasing policy
- Energy performance standard of equipment and evaluation of buildings

Electricity Generation

▼ 92 MtCO2 (38%)

- Subsidy in investment to energy efficient equipment
- Promotion of technology transfer
- Promotion of renewable energy
- Fuel switching
- Reduce own usage and transmission loss

Transportation

▼ 38 MtCO2 (16%)

- Environmental performance standard of vehicles
- Tax rate adjustment to energy efficient vehicles
- Promotion of natural gas and hybrid cars
- Promotion of renewable energy
- Promotion of mass transit system

Industry

▼ 80 MtCO2 (33%)

- Subsidy in investment to energy efficient equipment
- Promotion of technology transfer
- Promotion of alternative and renewable energy

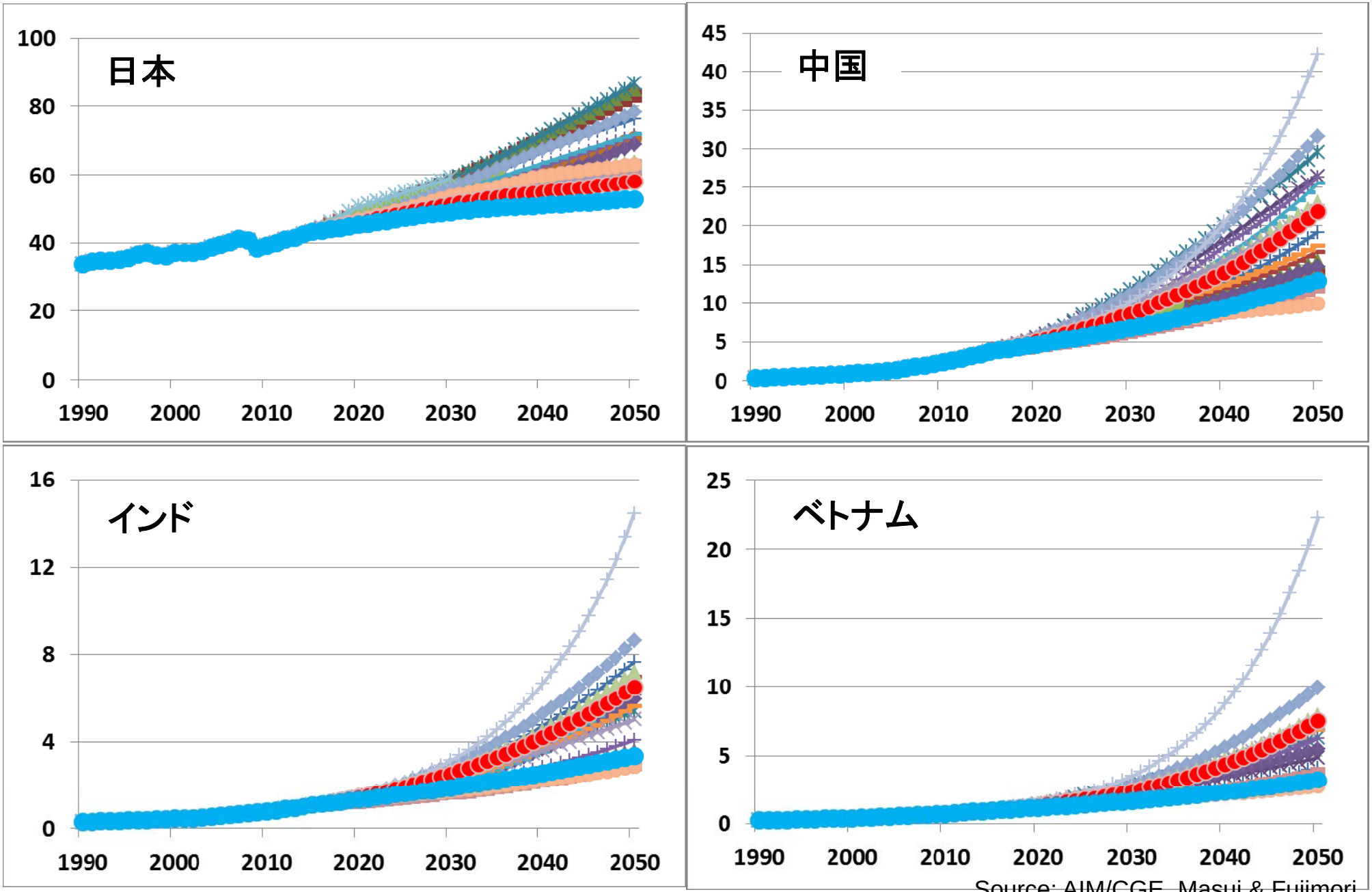
Source: Bundit Lim, Thammasat University

既往研究による各国の一人当たりGDP推移の幅

AIMモデルによる幅

ADV　CNV

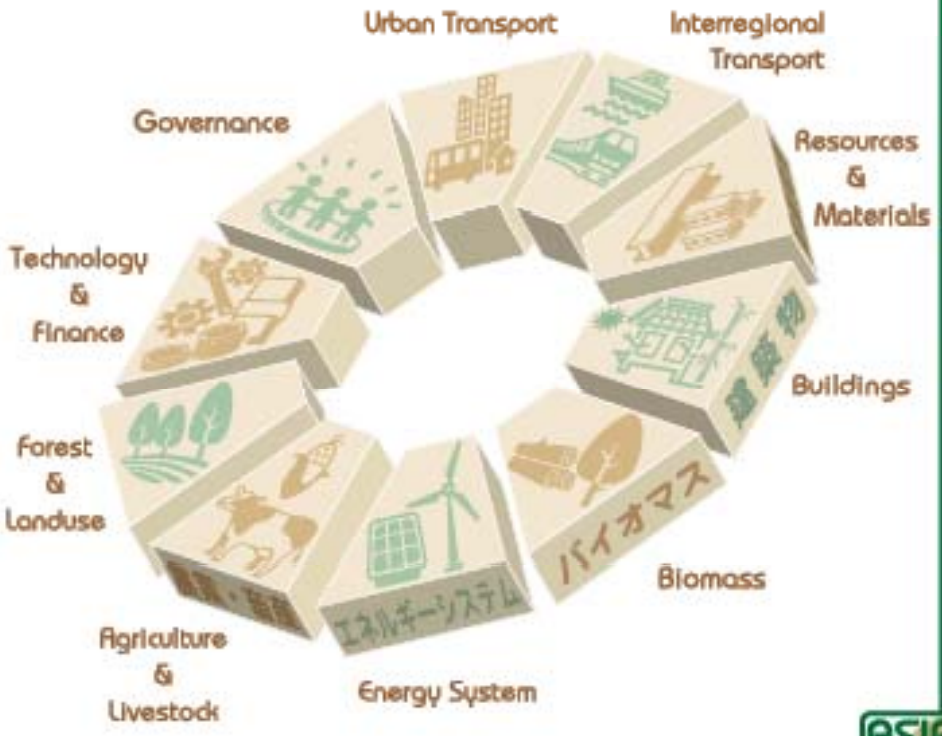
一人あたりGDP（1000 USD 2000price）



Source: AIM/CGE, Masui & Fujimori

Low-Carbon Asia Research Project

10 Actions towards Low Carbon Asia



http://2050.nies.go.jp/

Example of Action: Action 6

Energy system: Low Carbon Energy System with Local Resources

3 key points:

- Sustainable local energy system with renewables
- Smart energy demand-supply system
- Enhancing energy security with collaboration between low carbon energy sources and fossil fuels

Example of LCS Roadmap: Action 6: Low Carbon Energy System

Current Situation

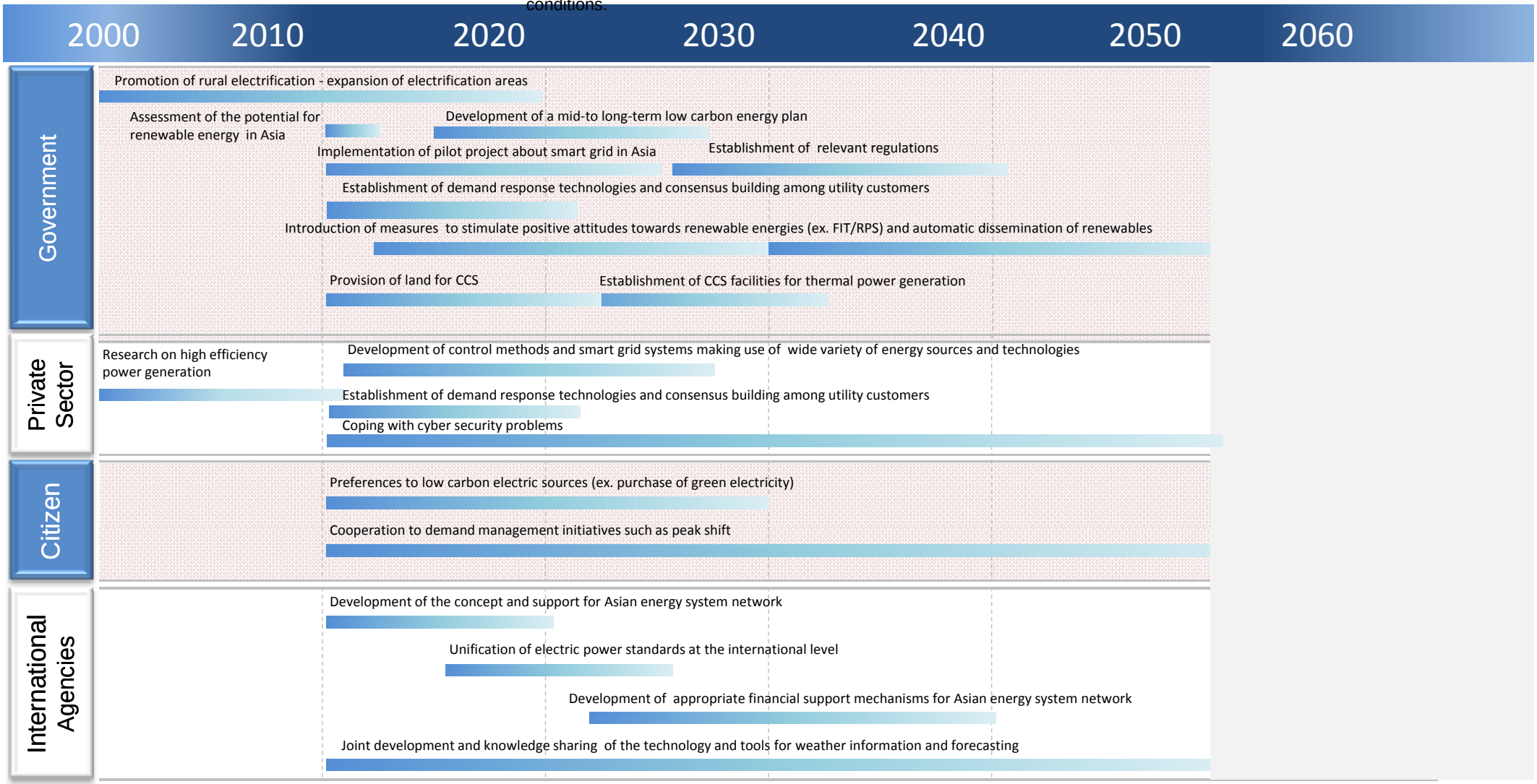
The electrification rate of Asia is roughly 80%, but 800 million people still do not have access to electricity, particularly in South Asia. The introduction of renewable energies is now spreading in rural areas, but they do not go as far as being the core energy resources. While nuclear energy is being promised as an option for low carbon and large scale power generation, its prospect in Asia remains uncertain due to the fallout of the nuclear accident in Fukushima, Japan.

Challenges

The Challenges for the future are: (1) to develop a power grid connecting all countries Asia in order to improve the energy supply in each country and to enable flexible power interchange between countries, (2) to promote a decentralized energy supply system particularly in rural areas, and provide a stable energy supply through micro-grids connected with the core electric system, and (3) to enable the effective use of renewable energies by introducing power storage systems at the local, regional, and national levels in regions with good weather conditions.

Vision in 2050

The near-total electrification will be completed across Asia. While the urban areas' energy supply will be provided by the core system, the rural areas' energy will be provided by a micro-grid connected with renewable energies. By sophisticated projections of power generation and highly-developed power storage technologies, the capacity of renewable energies will increase significantly. The efficiency of thermal power generation will be dramatically improved, the carbon capture storage will be effectively developed by appropriate management.



Action9:Technology and finance to facilitate achievement of LCS

Sept. 26

Current Situation

Quick transfer and diffusion of existing technologies, as well as development of innovate technologies are indispensable for the Asian countries to achieve LCS. Today, however, there are many reasons that hamper such diffusion and development. There is a need to eliminate such hurdles, while increasing positive incentives for private firms to invest in new technology development. There is also a need for financial support for private firms and least developing countries to stimulate technology development and diffusion.

Challenges

Development of institutions for swift technological development and diffusion in Asia is necessary. Meanwhile, it is also necessary to consider sufficient protection of intellectual property rights (IPR) and other related rights. The challenge for Asia is to achieve a society where all necessary technology to decrease GHG emissions is diffused by 2050. Financial assistance from developed countries is not sufficient to invest in technological development and diffusion. All countries need to play their respective role in technological investment and diffusion.

Vision in 2050

Gaps between countries in Asia in terms of economic development have decreased. Products of the best available technology is used in all countries. These products are subsidized, so that the prices are lower than less-GHG-emitting products. Low carbon businesses are flourished in many countries. Private firms and research institutes compete for innovative technologies that further reduce GHG emissions. Investments for technological development is financially supported by private investments and international funding mechanisms.