The 19th AIM International Workshop

Closing Speech: AIM Modeling and its Contribution to Climate Policies

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http://www-iam.nies.go.jp/aim/

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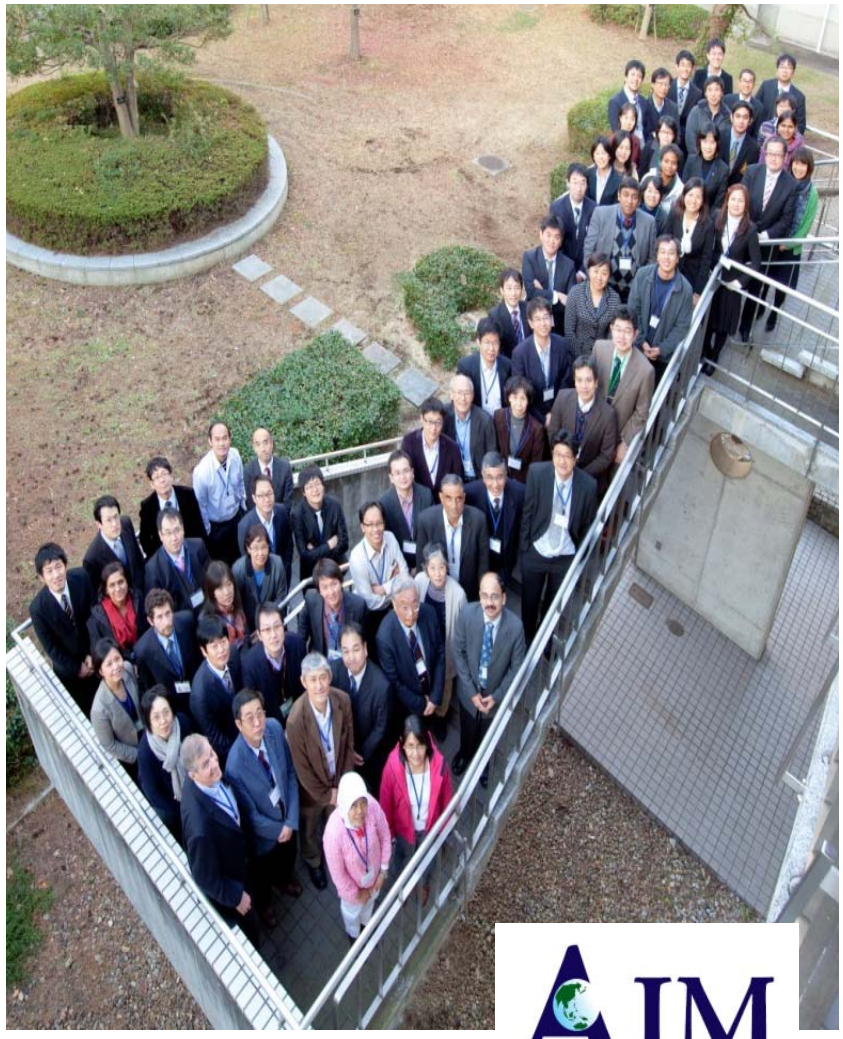
AIM (Asia-Pacific Integrated Model): A model for quantified LCS assessment

- AIM is an integrated assessment model to assess mitigation options to reduce GHG emissions and impact/adaptation to avoid severe climate change damages
- Developed since 1990
- First set of models focusing on Asia-Pacific region to assess the strategies of low carbon development plan quantitatively



AIM
ASIA-PACIFIC INTEGRATED MODEL

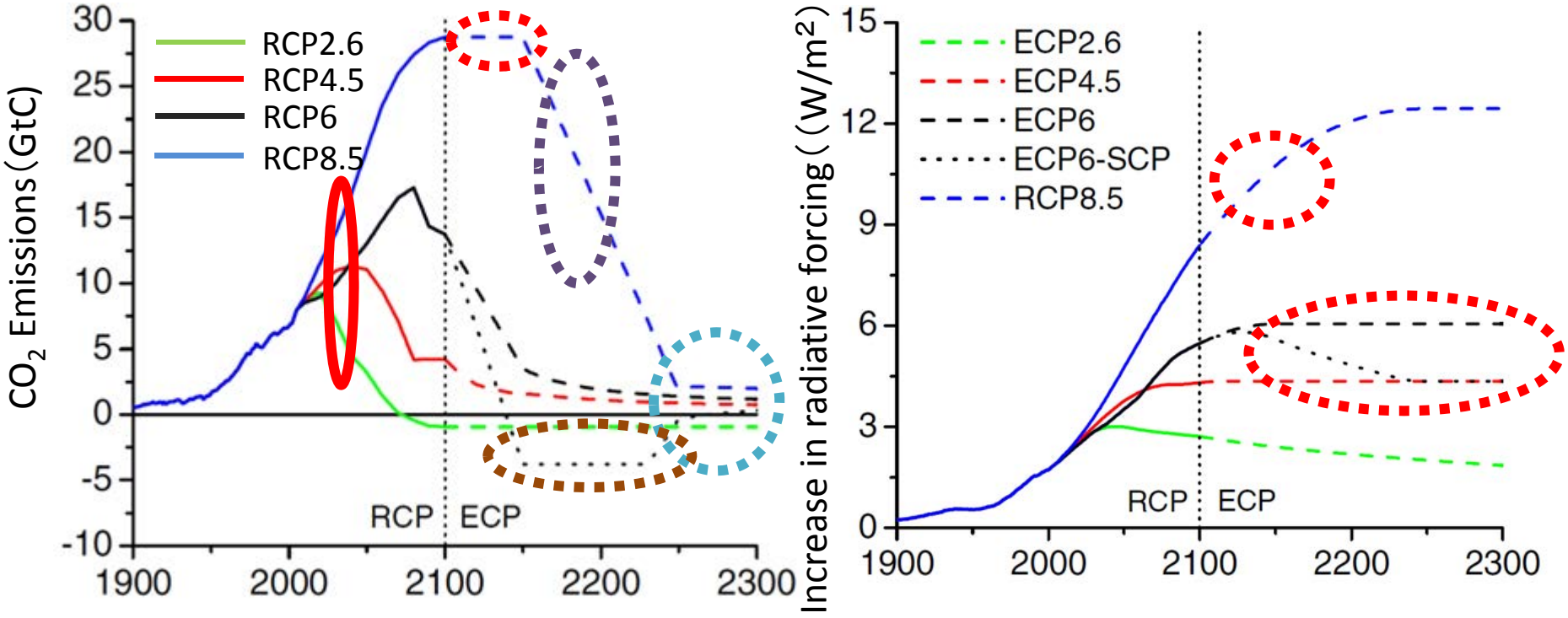
Examples of Brochures introducing Asian Low Carbon Scenarios

Communication and feedbacks of LCS study to real world

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

Lock-in high carbon infrastructure inhibits GHG emissions reduction

- Whatever pathways are followed, GHG emissions need to be reduced close to zero in the long run.
- The more the delay in timing of actions, the more is the amount of reduction needed.
- Temperature will increase as long as GHG emissions are positive.
- GHG emissions need to be below zero to decrease temperature. It takes long time.
- As climate impacts may be irreversible, recovery may not happen even if GHG emissions are decreased.



CO_2 emissions pathways in four Representative Concentration Pathway (RCP) used for IPCC 5th Assessment Report (left) and their extension through 2300, Extended Concentration Pathway (ECP) (right).

(Source: M. Meinshause, 2011)

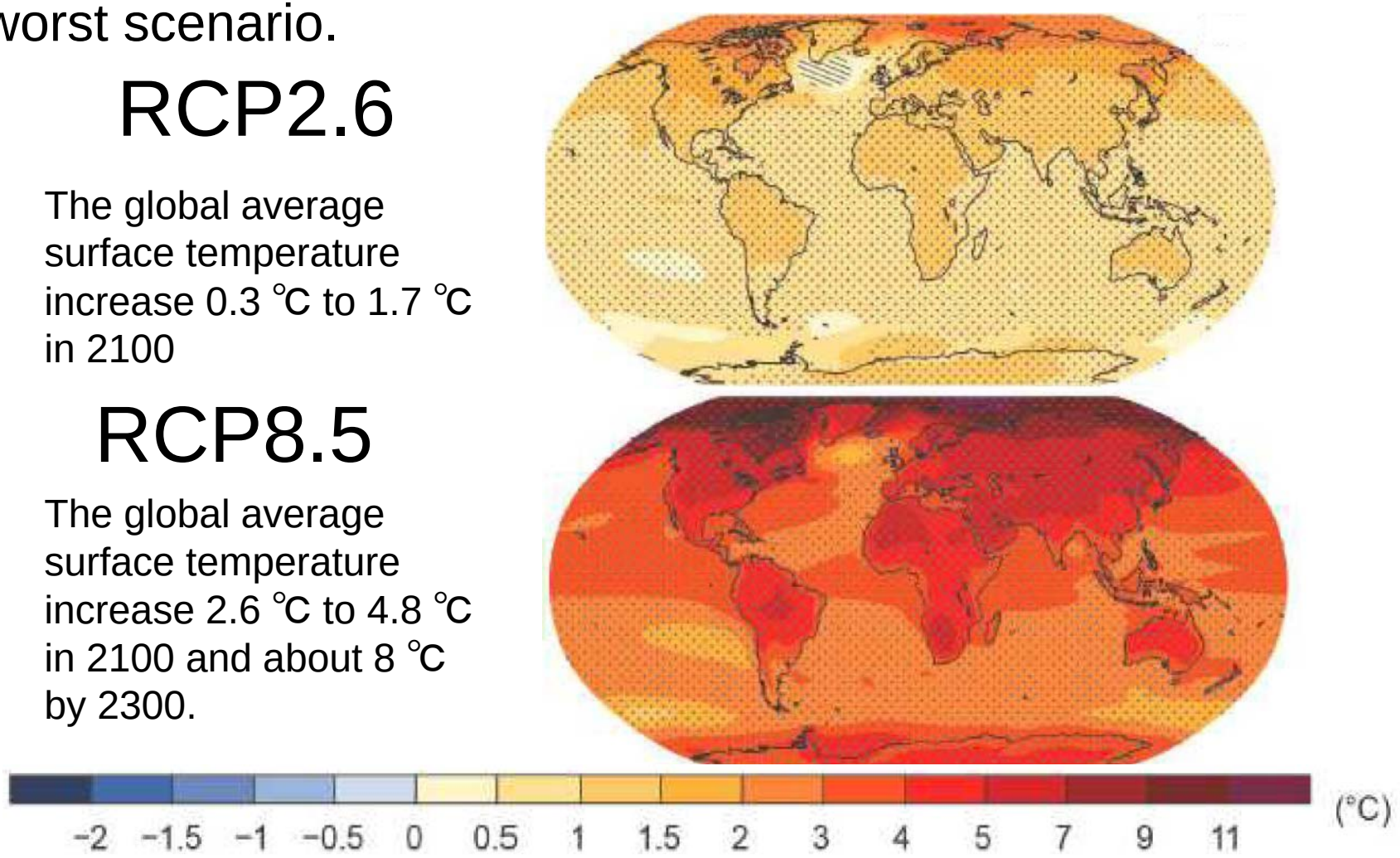
Without climate policies, the annual average temperature will increase more than 10 degrees Celsius in some regions in a worst scenario.

RCP2.6

The global average surface temperature increase 0.3 ℃ to 1.7 ℃ in 2100

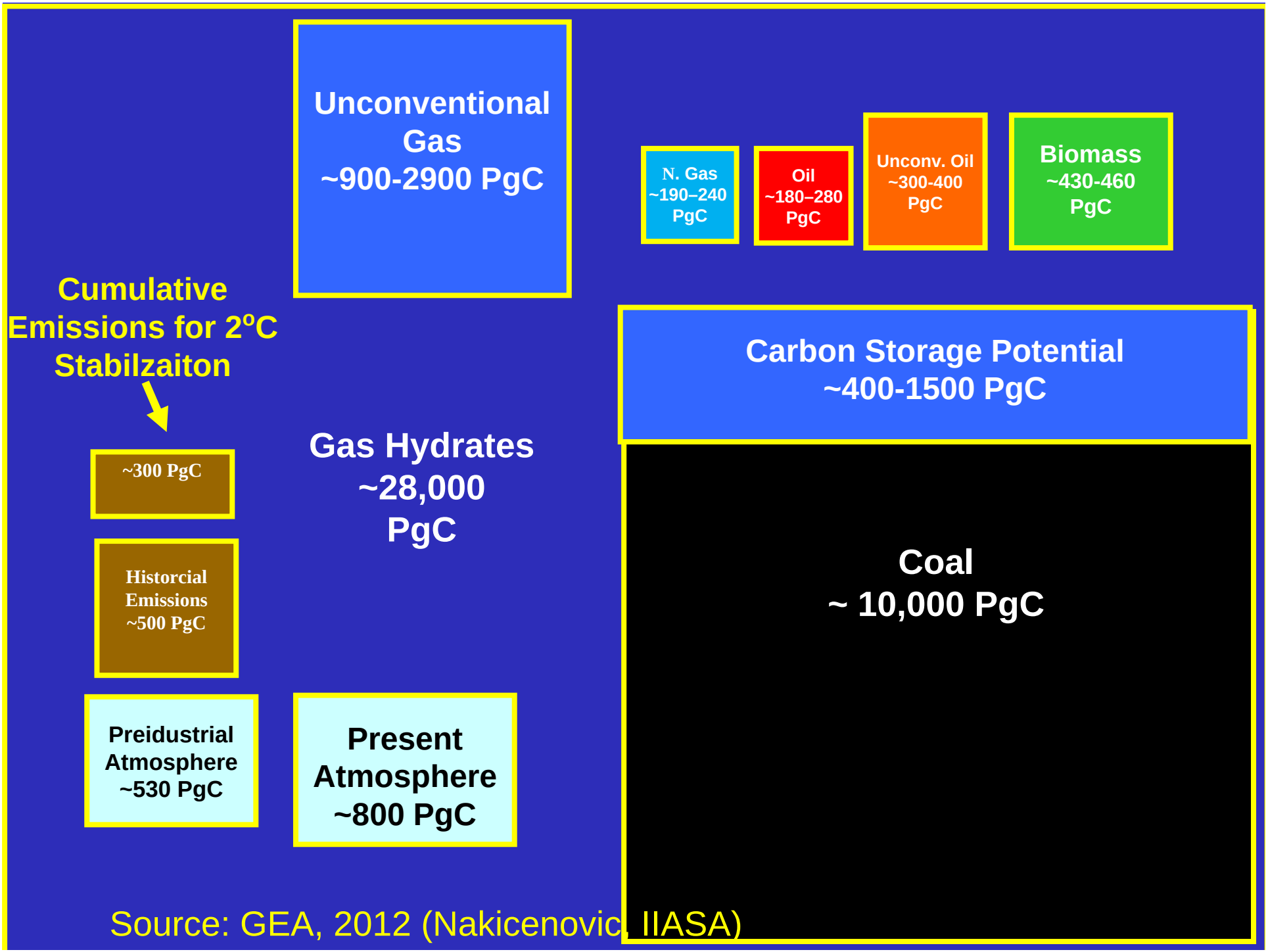
RCP8.5

The global average surface temperature increase 2.6 ℃ to 4.8 ℃ in 2100 and about 8 ℃ by 2300.



Average surface temperature change (average between 2081 and 2100) compared to the average temperature between 1986 and 2005.

Source: Fig. SPM.7 in Summary for Policy Makers, AR5, IPCC AR5

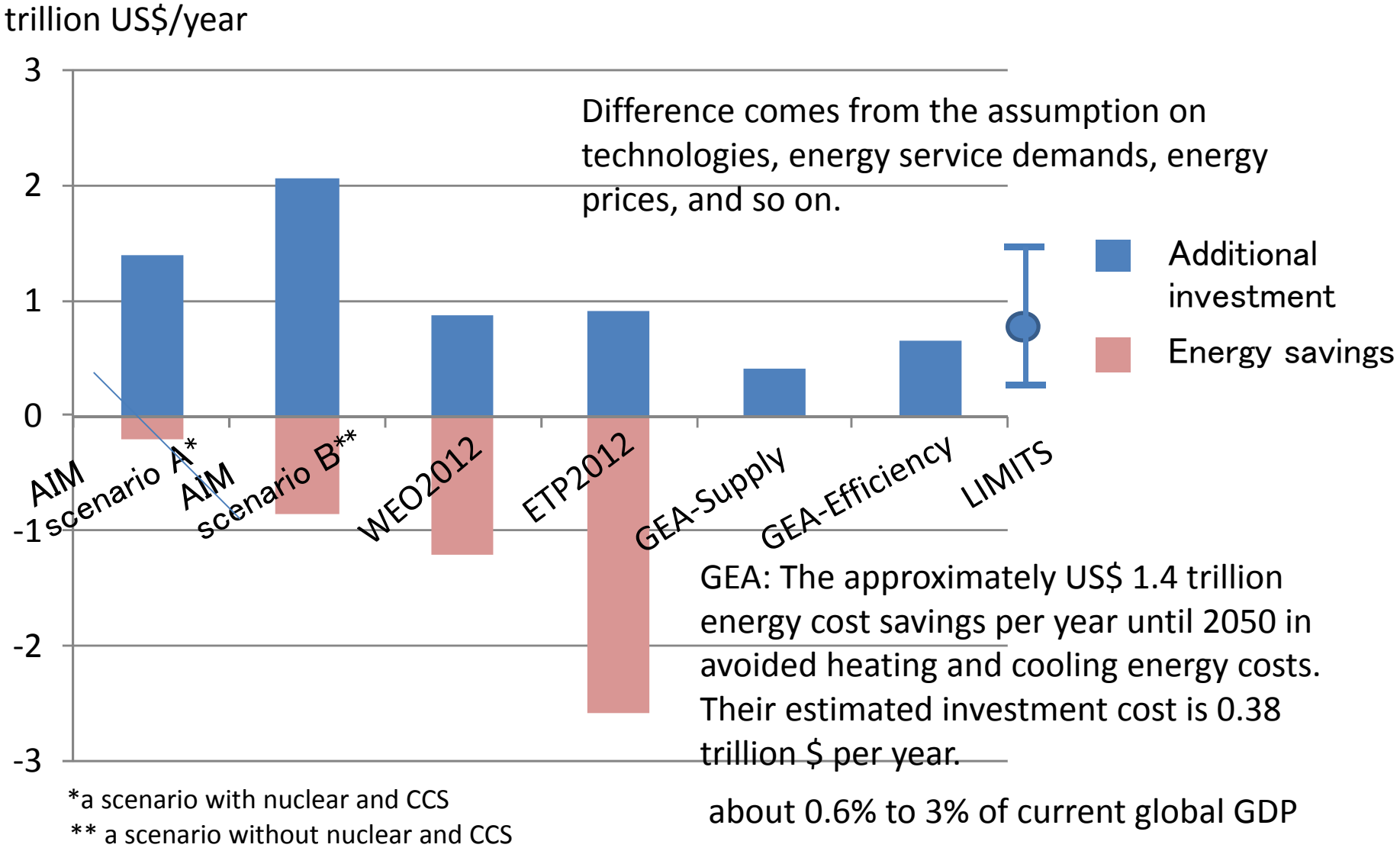


Source: GEA, 2012 (Nakicenovic, IIASA)

Additional annual investment to meet 2℃ target

(base year – 2050)

Investment can be recovered by energy saving



Difference comes from the assumption on technologies, energy service demands, energy prices, and so on.

GEA: The approximately US$ 1.4 trillion energy cost savings per year until 2050 in avoided heating and cooling energy costs. Their estimated investment cost is 0.38 trillion $ per year.

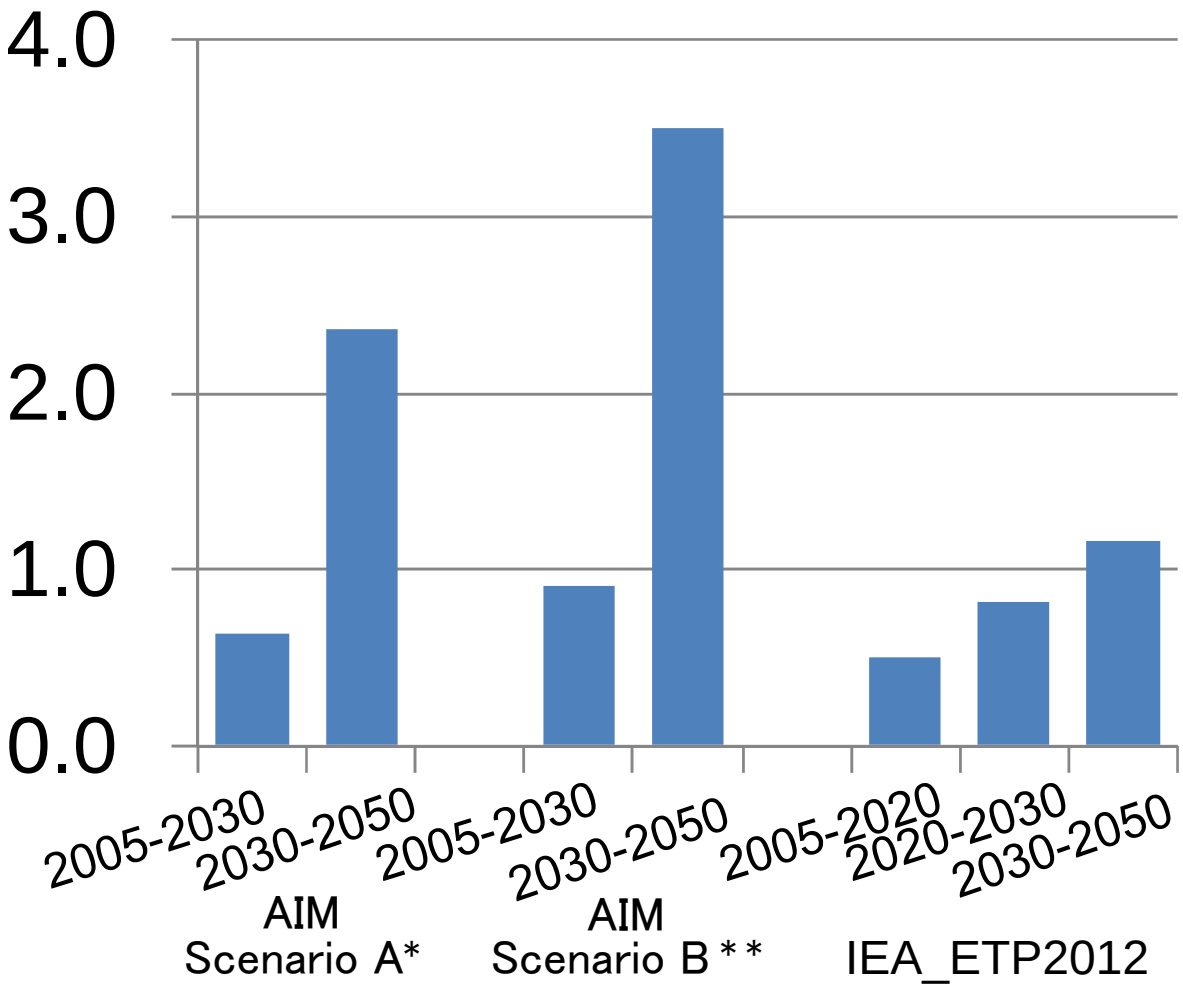
about 0.6% to 3% of current global GDP

*a scenario with nuclear and CCS

** a scenario without nuclear and CCS

Additional investment to meet 2℃ target

trillion $/year



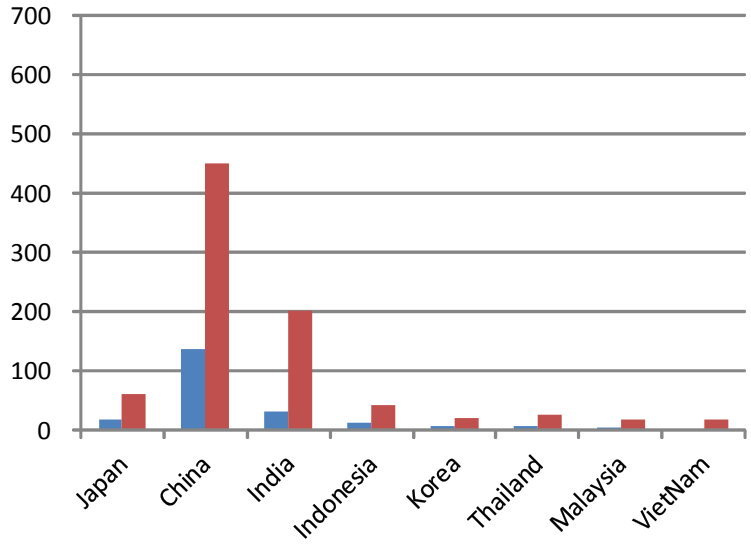
Additional investment per year by periods

*a scenario with nuclear and CCS

** a scenario without nuclear and CCS

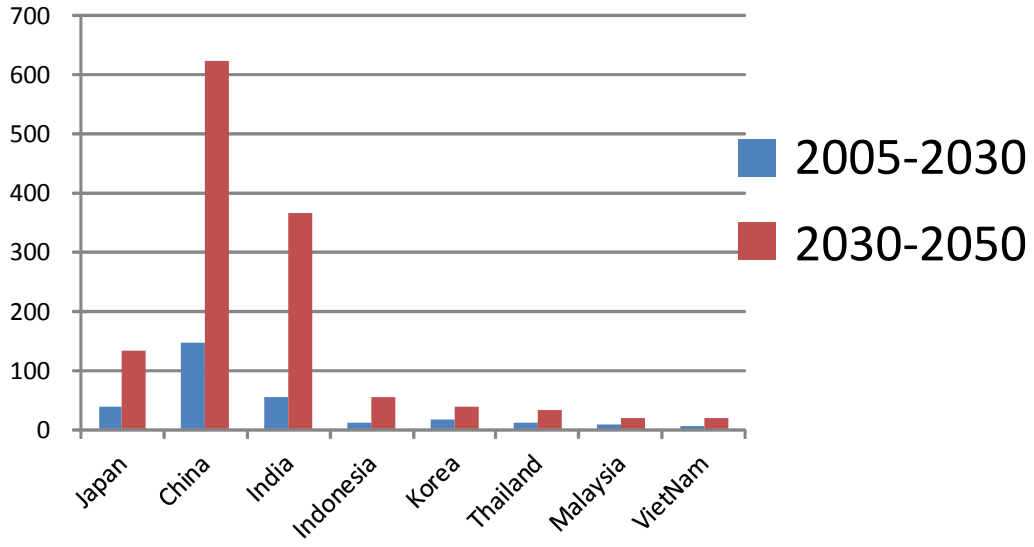
Additional Annual Investment to meet 2℃ target

billion US$/year



Scenario A (with nuclear and CCS)

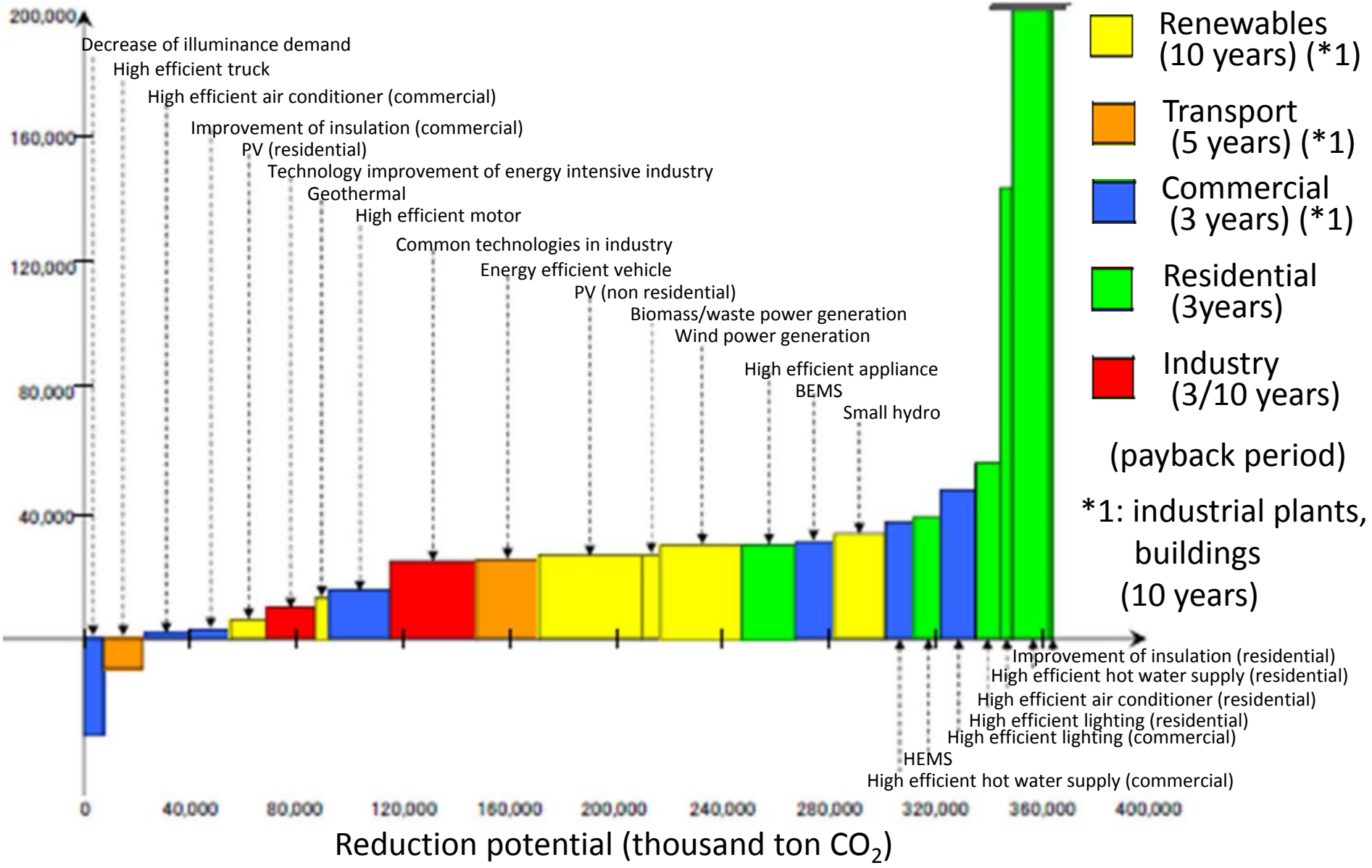
billion US$/year



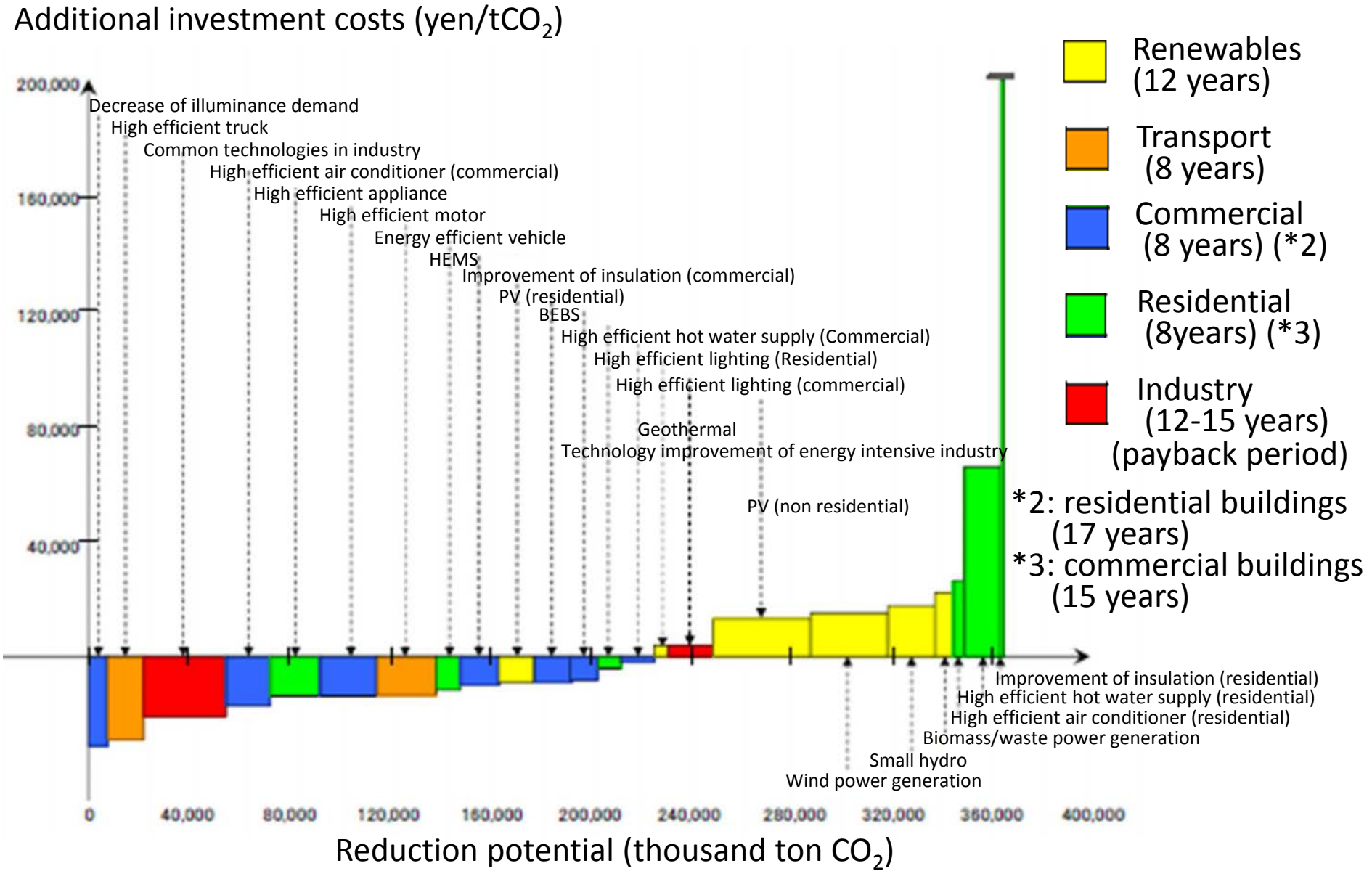
Scenario B (without nuclear and CCS)

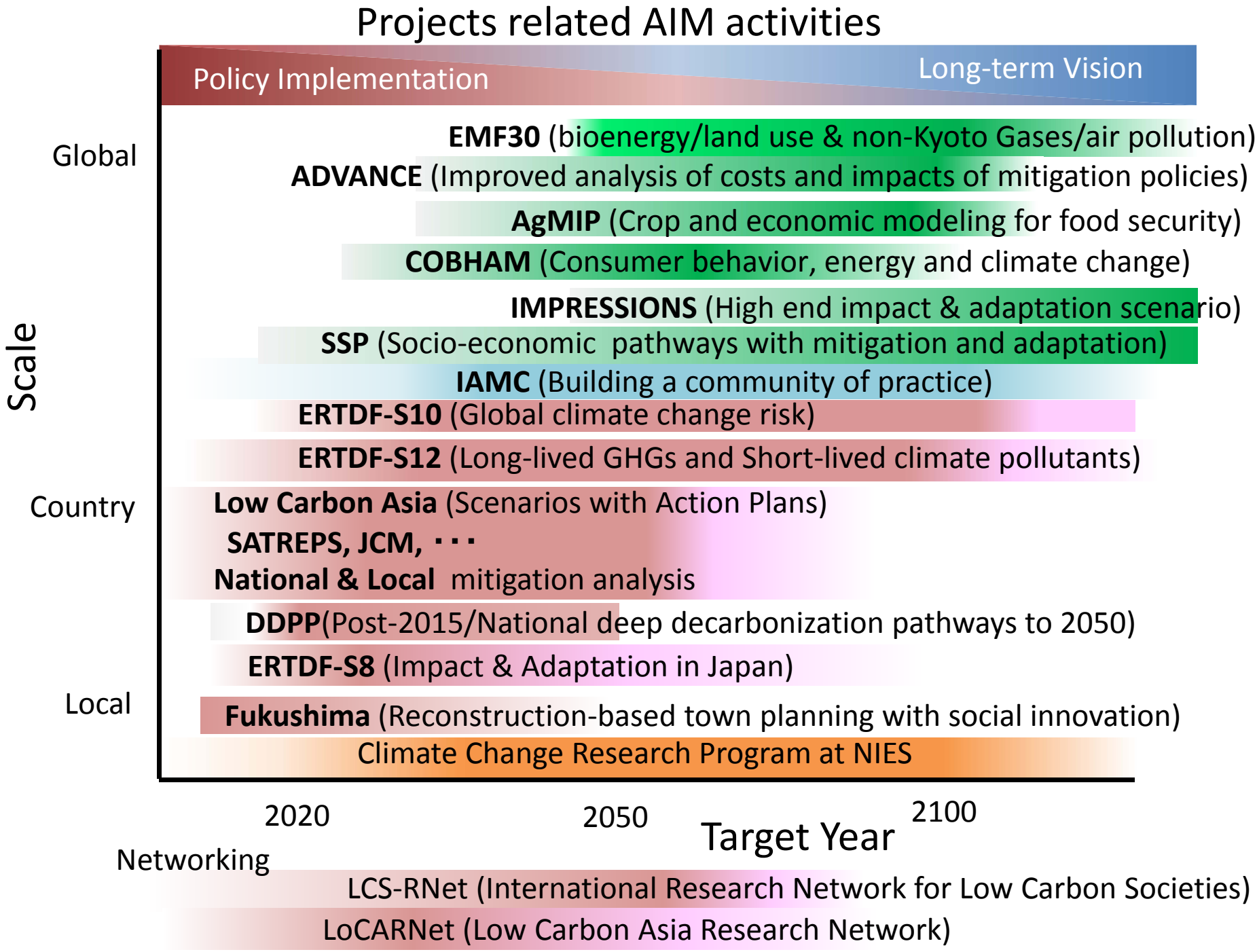
Source: Akashi

Reduction potential v.s. additional investment costs in 2030 in high efficient case with short payback period in Japan



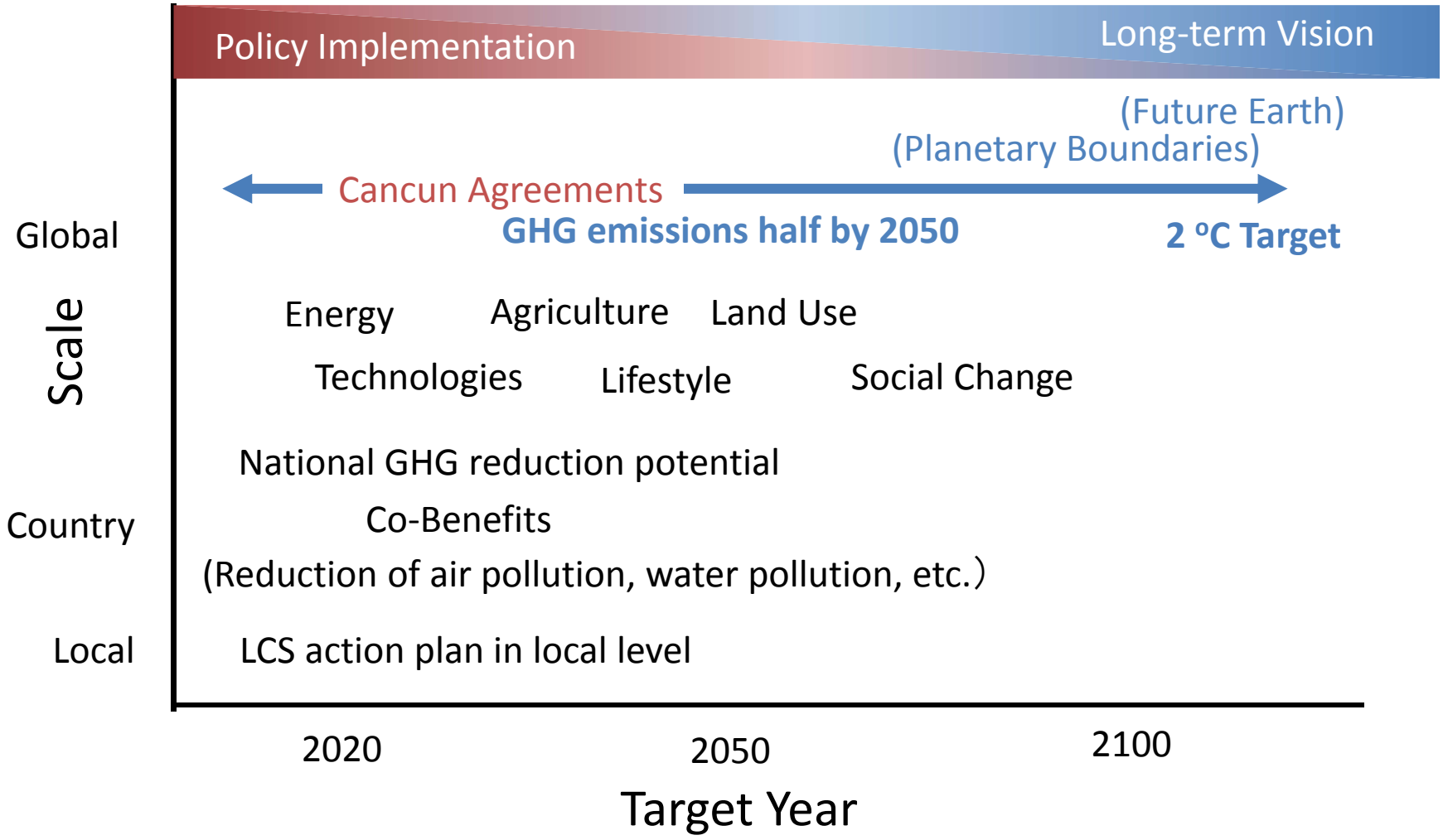
Reduction potential v.s. additional investment costs in 2030 in high efficient case with long payback period in Japan



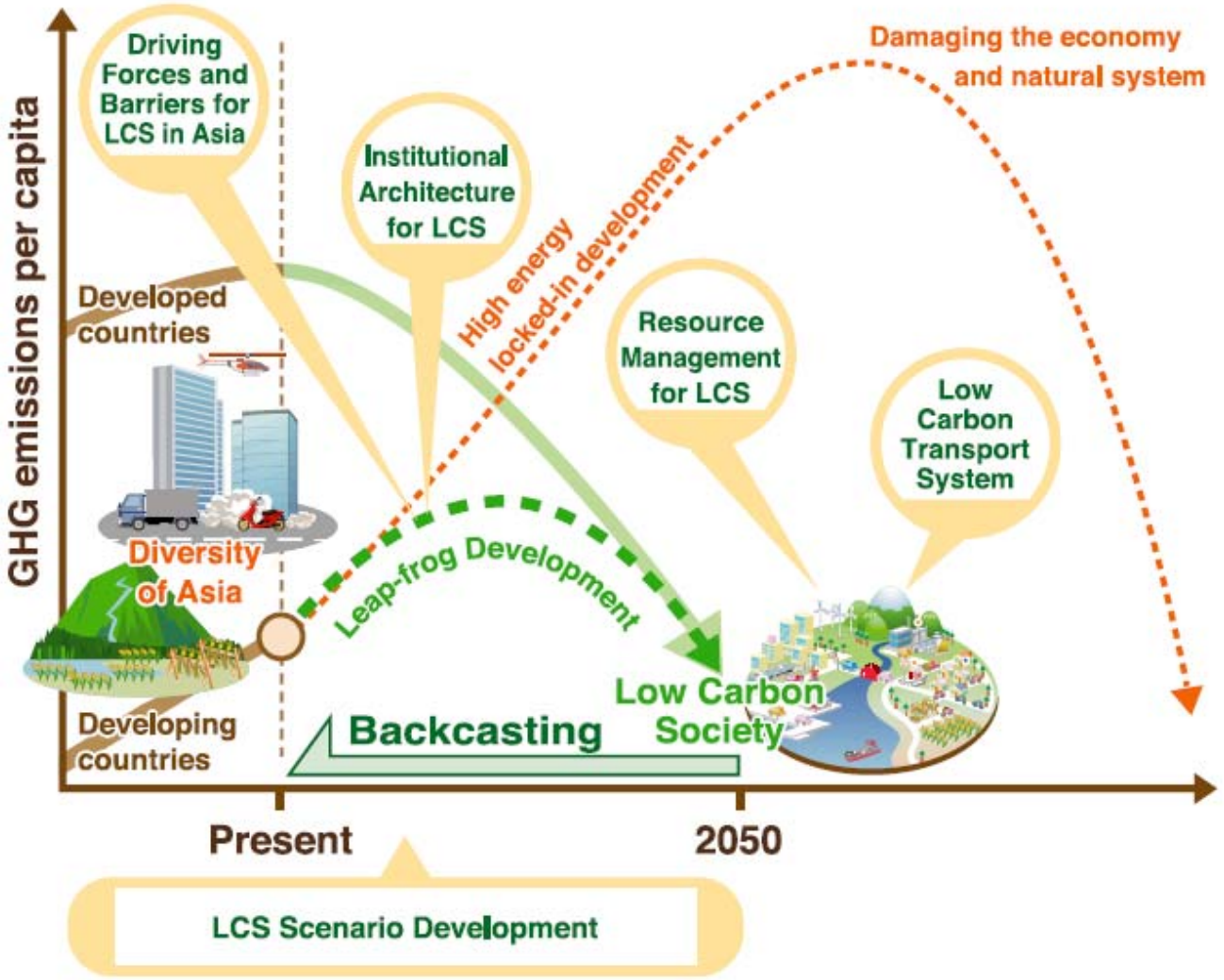

Projects related AIM activities
Policy Implementation
Long-term Vision
Scale
Global
Country
Local
EMF30 (bioenergy/land use & non-Kyoto Gases/air pollution)
ADVANCE (Improved analysis of costs and impacts of mitigation policies)
AgMIP (Crop and economic modeling for food security)
COBHAM (Consumer behavior, energy and climate change)
IMPRESSIONS (High end impact & adaptation scenario)
SSP (Socio-economic pathways with mitigation and adaptation)
IAMC (Building a community of practice)
ERTDF-S10 (Global climate change risk)
ERTDF-S12 (Long-lived GHGs and Short-lived climate pollutants)
Low Carbon Asia (Scenarios with Action Plans)
SATREPS, JCM, ・・・
National & Local mitigation analysis
DDPP(Post-2015/National deep decarbonization pathways to 2050)
ERTDF-S8 (Impact & Adaptation in Japan)
Fukushima (Reconstruction-based town planning with social innovation)
Climate Change Research Program at NIES
2020
2050
2100
Target Year
Networking
LCS-RNet (International Research Network for Low Carbon Societies)
LoCARNet (Low Carbon Asia Research Network)

Research topics on climate change related AIM activities

- Coupling models
- Model validation and quality assurance
- Uncertainty quantification
- Regional , country and local action plants/ implementation



How can we make a transition to a low carbon society?



*The low-carbon Asia research Project is supported by the Environmental Research and Technology Development Fund (S-6)

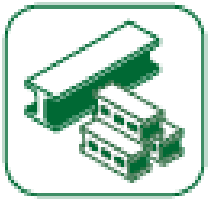
Ten Actions towards Low Carbon Asia are proposed

Action 1 **Urban Transport**

Structured Compact City

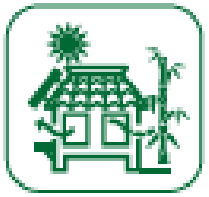
Action 2 **Interregional Transport**

Mainstreaming trains and water transportation



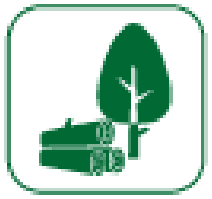
Action 3 **Resources & Materials**

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**

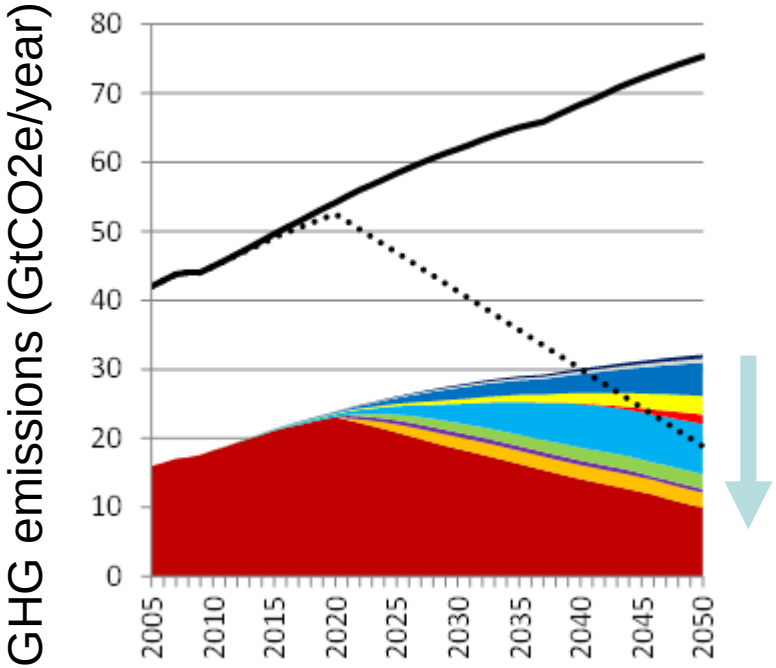
Technology and finance to facilitate achievement of LCS

Action 10 **Governance**

Transparent and Fair Governance that Supports LCS Asia

Change in GHG emissions with 10 actions in Asia

- The global emissions will become 1.8 times larger compared to the 2005 level and emissions in Asia will be doubled under the reference scenario.
- It is feasible to reduce GHG emissions in Asia by 68% by introducing ten actions and Others (CH_4 and N_2O emissions from other than agriculture and livestock) appropriately compared to the reference scenario in 2050.



Reductions by

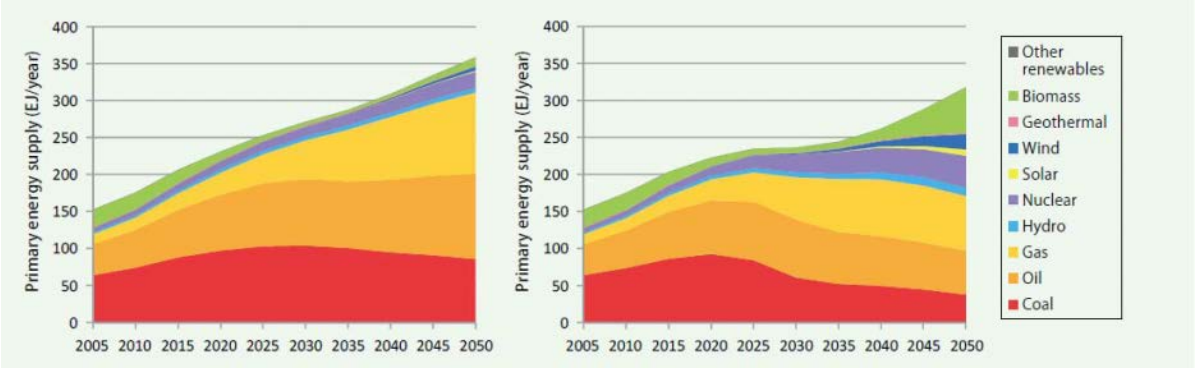
- Action1: Urban Transport
- Action2: Interregional Transport
- Action3: Resources & Materials
- Action4: Buildings
- Action5: Biomass
- Action6: Energy System
- Action7: Agriculture and Livestock
- Action8: Forest & Landuse
- Others (CH_4 and N_2O emissions from other than agriculture and livestock

GHG Emissions in

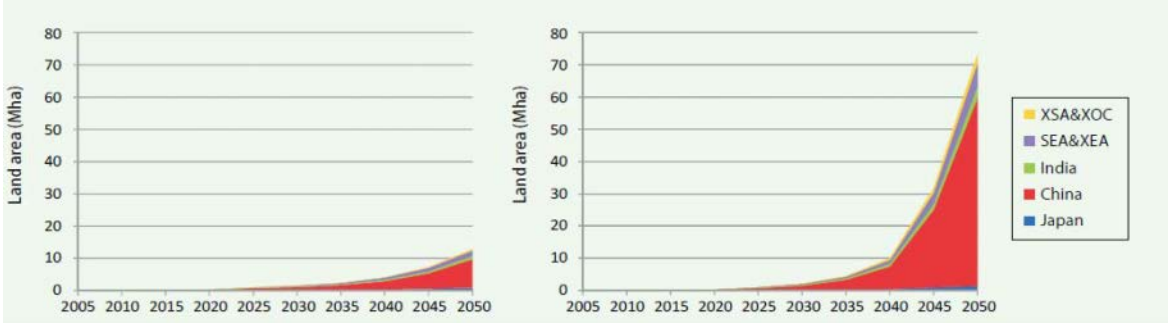
- Asia (LCS)
- the world (LCS)
- the world (Reference)

Action 5: Local Production and Local Consumption of Biomass

- Sustainable co-production of biomass energy and food
- Low carbon energy systems using local biomass resources in rural areas
- Improvement of living environments with intensive biomass utilization



Primary energy supply: Reference scenario(left) and LCS scenario (right)



Land area for biomass production: Reference scenario (left) and LCS scenario (right)

Key Messages from Low Carbon Asia Project

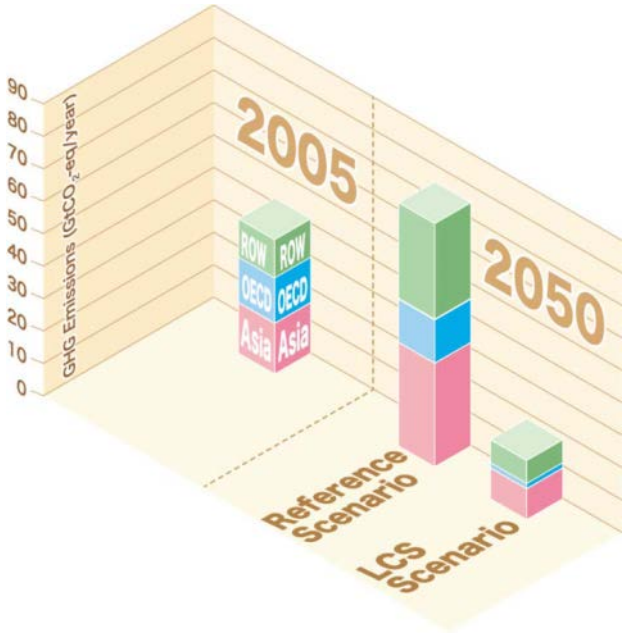
Achieving 2°C target is feasible

If all the actions proposed here are applied appropriately, 68% of the emissions in the Reference scenario can be reduced in Asia in 2050. This is in line with a global pathway with the 2°C target.

Early actions are needed

Whatever pathways are followed, GHG emissions should be reduced to zero in the long run to keep the climate at the corresponding level. More the actions are delayed, larger the reduction rates become and higher the stabilization level will be.
GHG emissions need to be below zero to lower temperature. To realize negative emissions is very tough.

There is a danger that socio-ecosystem will not be recovered even if GHG concentrations are returned to the lower level.



Leapfrogging development in Asia leads to a Low Carbon Society

Transition to low carbon emissions and low-resource consumption societies, while simultaneously improving the economic standards of living is vital for sustainable development. Asia has many opportunities to realize an LCS by leapfrogging.

Accelerating the transition towards low carbon societies

-from theory to reality -

Low Carbon Society Research Network (LCS-RNet) established in 2009 under G8 scheme

- Scientific Research Contributing to Low Carbon Policy-making Process -

The LCS-RNet 5th Annual Meeting in Yokohama

Member of Steering Committee, Advisor and Secretary General

CIRED cmcc Fondazione Eni Enrico Mattei IDDRI SciencesPo. IGES NIES JAPAN 환경부 국립환경과학원 UKERC Wuppertal Institute for Climate, Environment and Energy ENEA

IIMA ICAR IIT Delhi IIT Bombay IITM

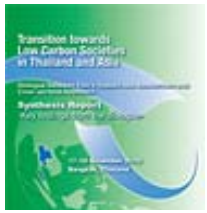
Key Issues discussed at 5th Annual Meeting of LCS-RNet

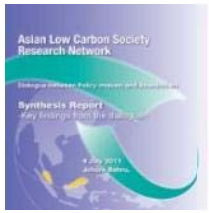
1. **Vision:** A global vision and a set of coordinated policies and measures are necessary to direct investment towards low carbon project/programmes at the global level.
2. **Governance:** Cooperation is essential if social and environmental goals are to be achieved; while competition will help to achieve goals cost-effectively.
3. **Economy:** Delays in the transition will cause lock-in of the economy into less cost-effective alternatives. Transitioning to a low carbon society can stimulate the economy and create new industries.
4. **Scale:** Local (e.g. City) level actions can accelerate the transition to low carbon societies at a global scale.
5. **Social:** The transition to a low carbon society will imply fundamental changes in the underlying culture, structure and behaviour of societies.

LoCARNet: Low Carbon Asia Research Network

An open network of researchers, research organisations, as well as like-minded relevant stakeholders that facilitates the formulation and implementation of science-based policies for low-carbon development in Asia.

Lessons learnt from activities and outcomes from dialogues between Researchers and Policy-makers in Asia





Synthesis Reports: http://lcs-rnet.org/publications


Rizaldi BOER
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Malaysia


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Cambodia


P.R. SHUKLA
India


Shuzo NISHIOKA
Japan

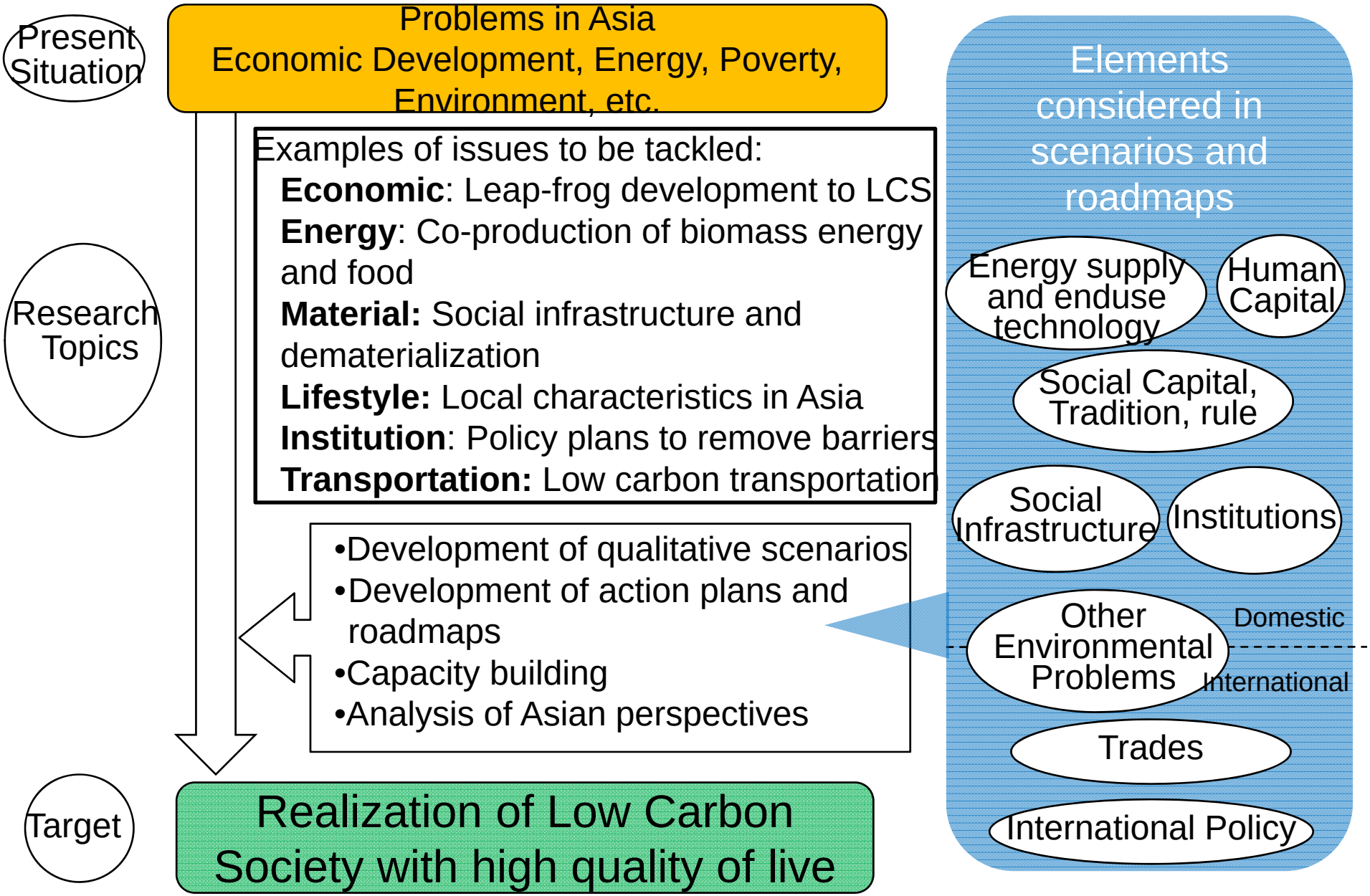
Members of Steering Committee

Secretary General

LoCARNet 2nd Annual Meeting in Yokohama, July 2013

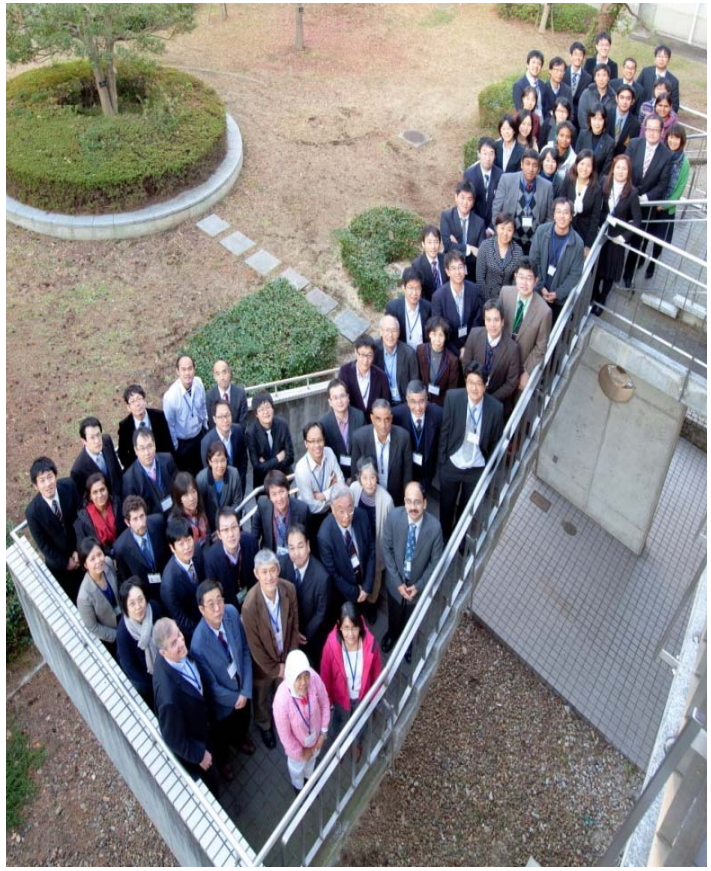
Seven priority topics were discussed: "need for capacity-development towards a year 2020 framework"; "comparison of reduction potential of Asian countries towards achieving two degrees target"; "role of cities as pioneers for low carbon societies"; "urgent issues for research common to the Asian region"; "green growth best practices"; "low carbon technologies required in Asia"; "Asian issues: emissions reduction in the agriculture, forestry and land-use sectors".

Challenges toward low-carbon societies



Challenges to LCS scenario implementation and expansion of research collaboration

- Strengthening the collaboration with researches in Asian countries such as China, India, Indonesia and Thailand
- Research Projects
  - NIES Climate Change Research Program
  - Environment Research and Technology Development Fund (ERTDF) of the Ministry of the Environment, Japan (S-6, S-7, S-8, S-10, S-12)
  - SATREPS project: Collaboration with University of Technology, Malaysia and Iskandar development agency
  - JCM project
  - Fukushima Project
- Networks
  - International Research Network for Low Carbon. Societies (LCS-RNet)
  - Low Carbon Asia Research Network (LoCARNet)



The 18th AIM International Workshop, December 2012

Thank you for your attention

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