How Low-Carbon research has been applied in Asian LC Development

1. If we cannot go to LCS,…
2. LCS offers higher QOL with less energy demand and lower-carbon energy supply
3. LCS needs good design, early action, and innovations

Designed by Hajime Sakai

Junichi FUJINO (fuji@nies.go.jp)

NIES (National Institute for Environmental Studies), Japan

Low-carbon development plan scoping meeting

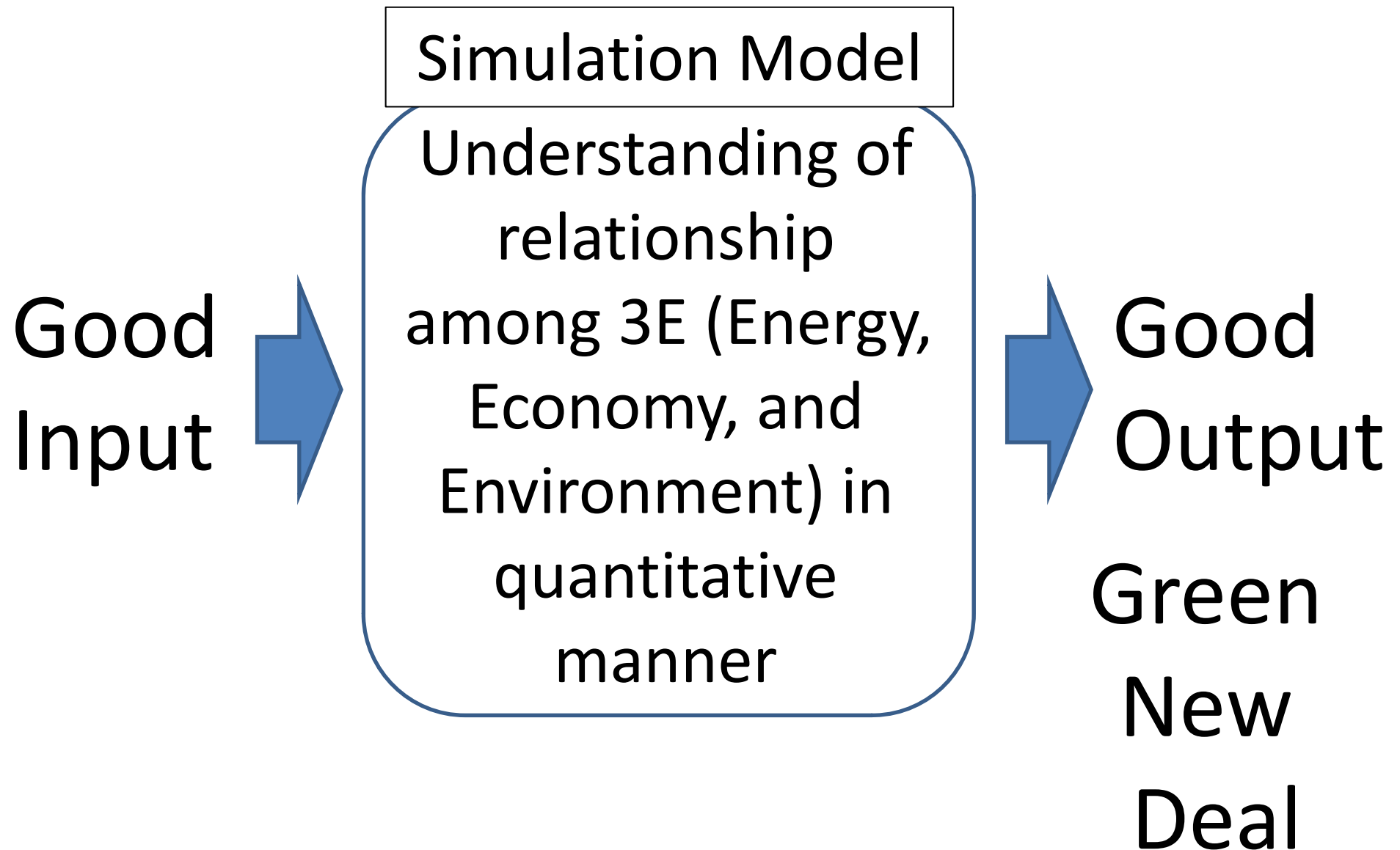Phnom Penh Cambodia, January 10th, 2011

AIM is an abbreviation of
"Asia-Pacific Integrated Model"
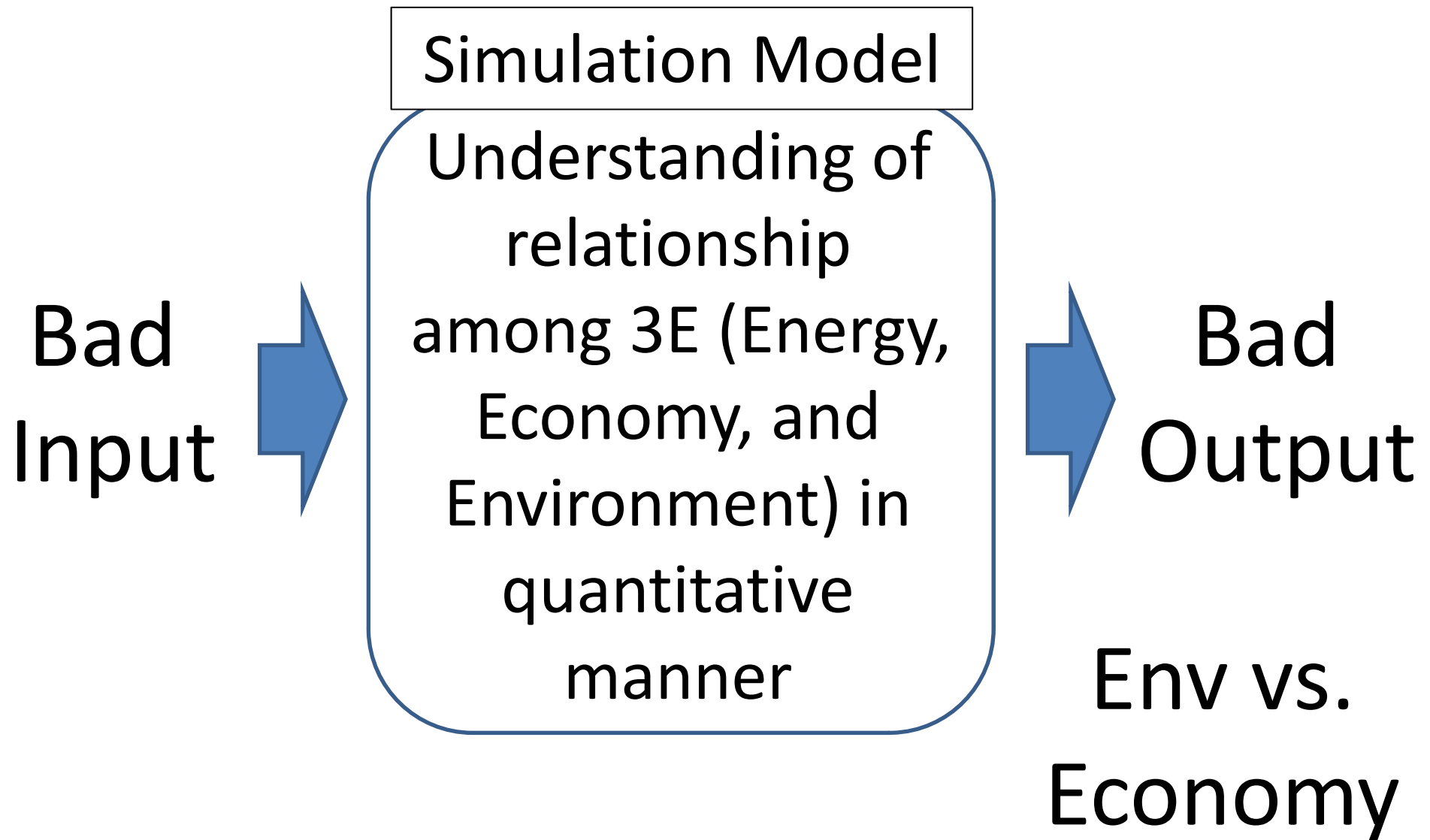
AIM

ASIA-PACIFIC INTEGRATED MODEL

to support
design sustainable societies
and suggest actions
comprehensively and
consistently
in quantitative manner

AIM has more than
20 simulation models such as
top-down economy models,
bottom-up technology models,
and environmental aspect models
in global/national/sub-national scale.

Good Input → **Simulation Model** Understanding of relationship among 3E (Energy, Economy, and Environment) in quantitative manner → Good Output

Green New Deal

Bad Input

Simulation Model

Understanding of relationship among 3E (Energy, Economy, and Environment) in quantitative manner
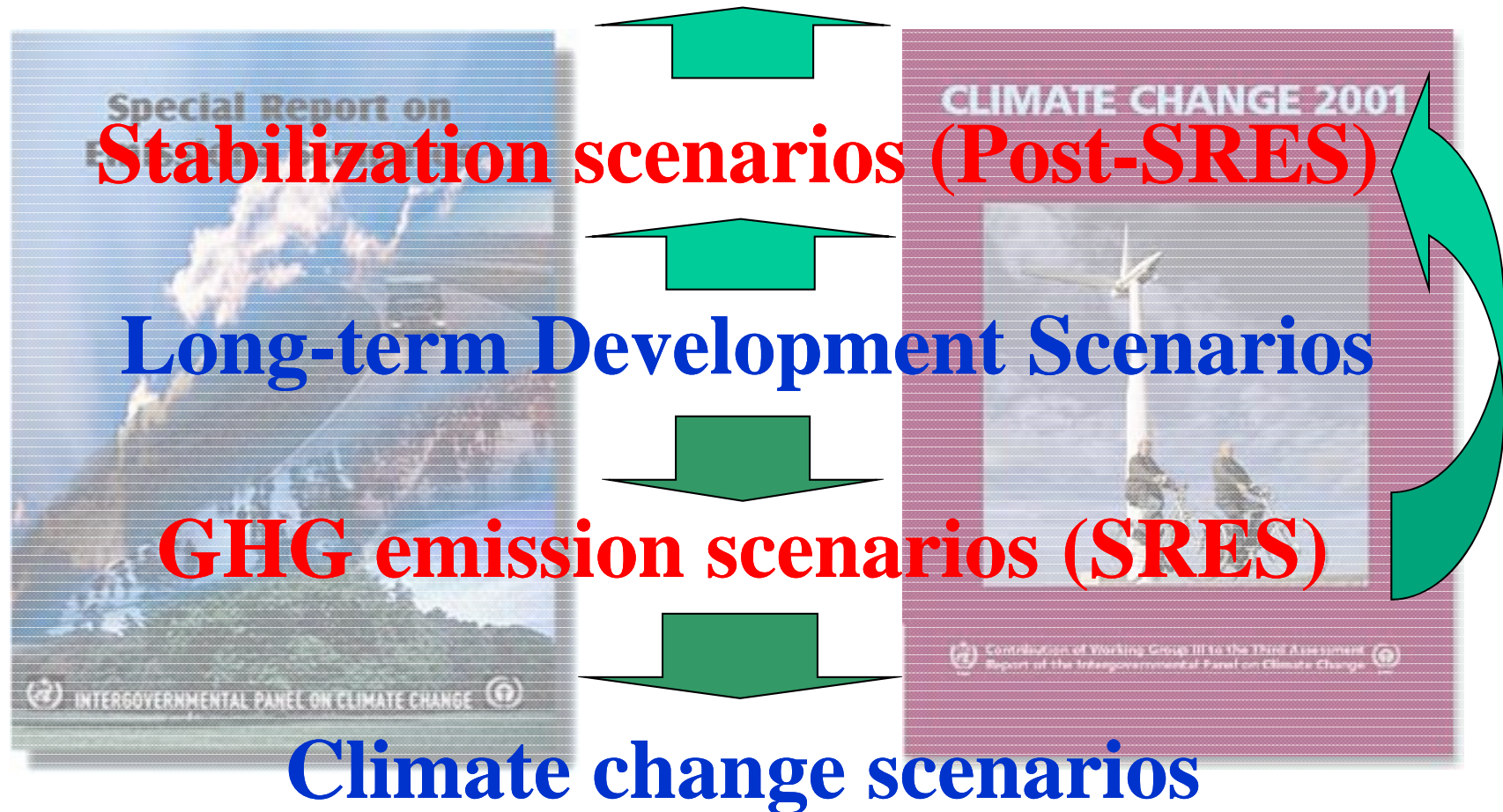
Bad Output

Env vs. Economy

Shifting to Low-carbon and Climate-resilient Development in Asia and the Pacific
ADB/IGES/NIES Side Event,
UNFCCC COP-16, Cancun, Mexico on 3rd Dec 2010

Global scenarios by AIM

2 degree target

450ppm-CO2eq pathway

Robust technology/policy measures

Stabilization scenarios (Post-SRES)

Long-term Development Scenarios

GHG emission scenarios (SRES)

Climate change scenarios

IPCC Scenario Development

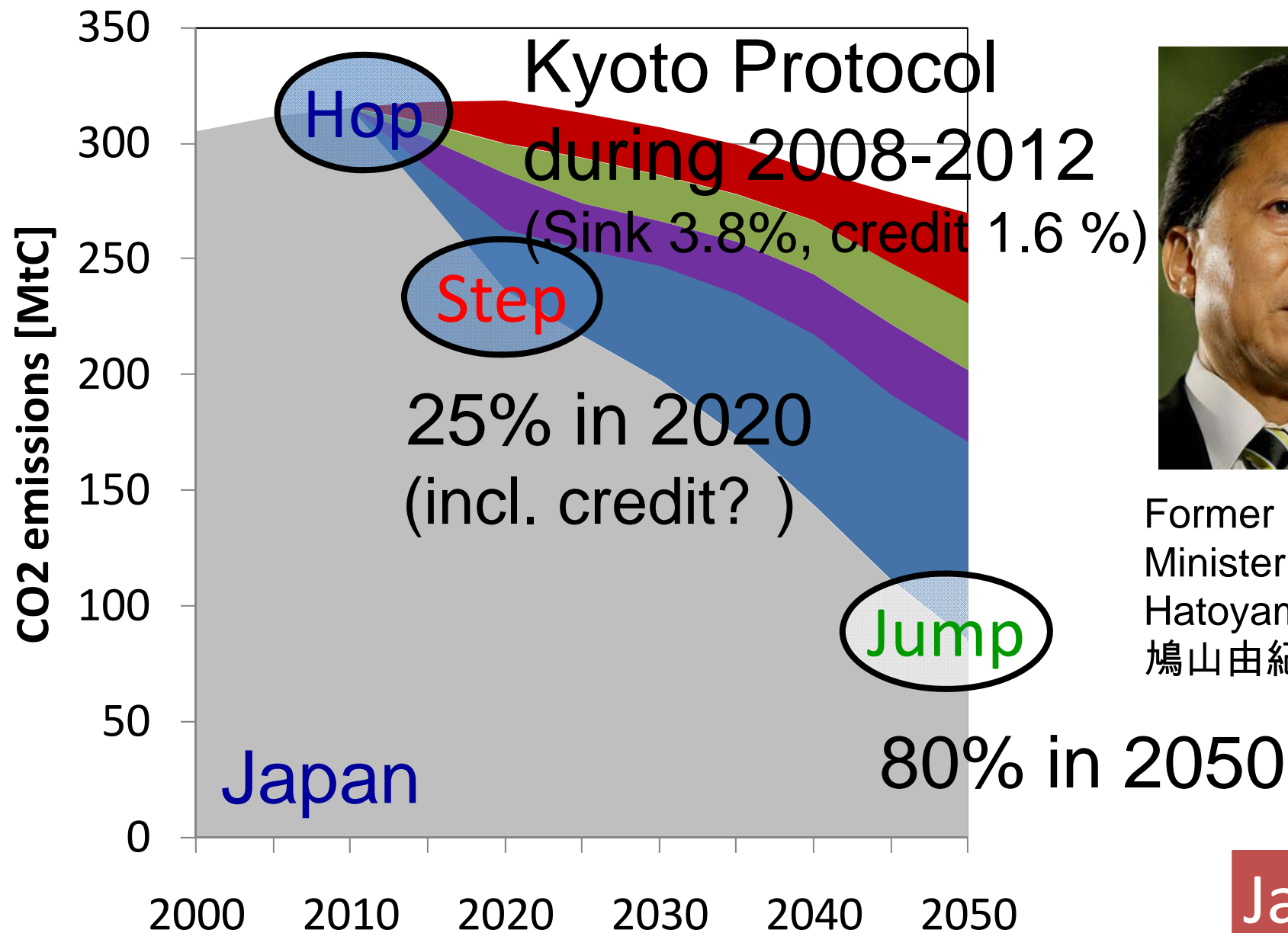# RCPs and an Element of the New Scenario Development Process to be Published in IPCC 5th Assessment Report

▶ RCP = "Representative Concentration Pathway"

▶ Developed to quickly deliver emissions scenarios to the climate modeling community as a way to "jumpstart" the Noordvijkerhout Scenario Process.

■ Taken from the open, peer-reviewed literature.

■ Updated to the most recent data, harmonized to a common base year.
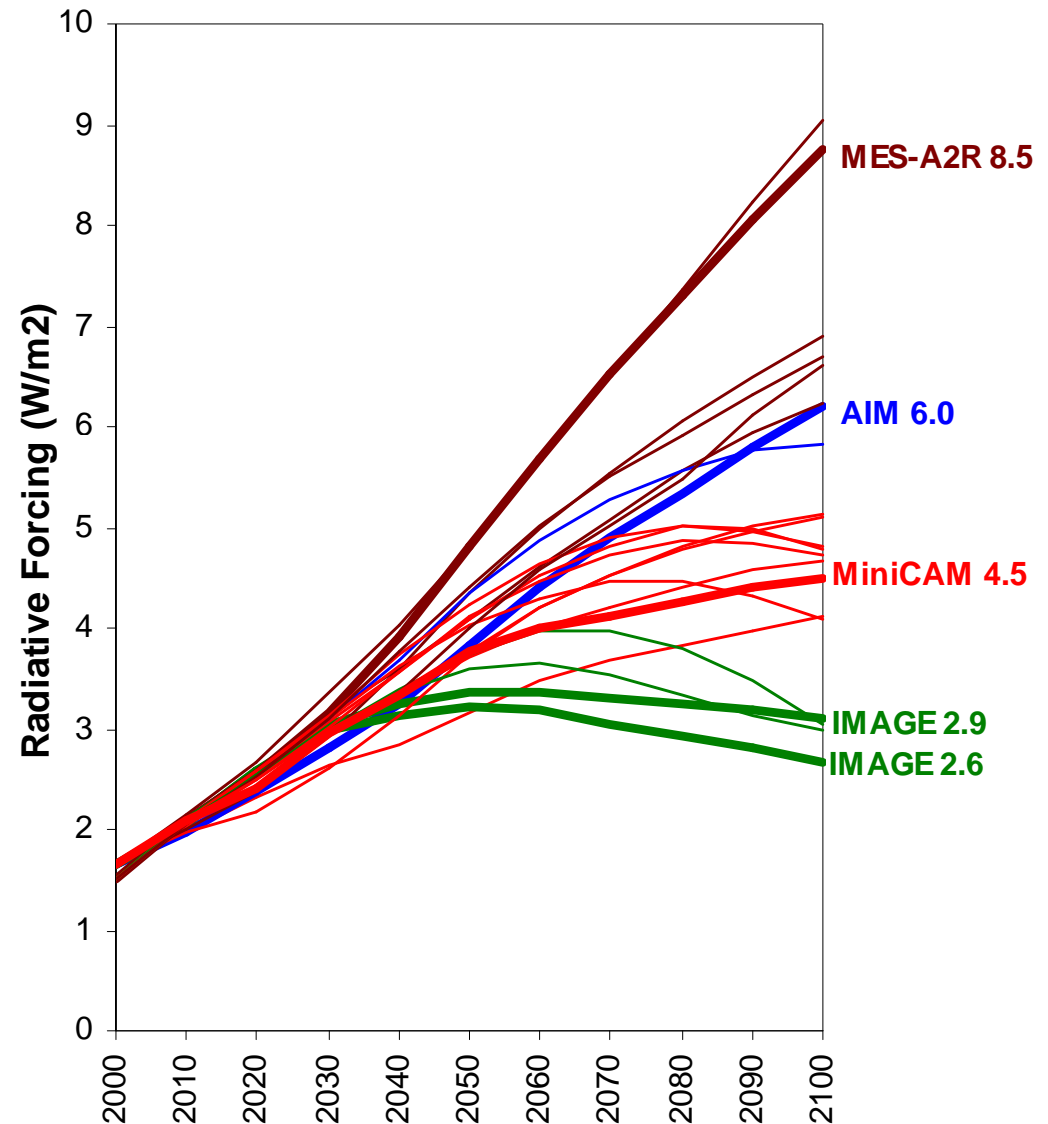
National scenarios by AIM

Japanese GHG emissions target

NAMAs

Japanese Emissions Targets towards 2050

CO2 emissions [MtC]

350
300
250
200
150
100
50
0

Hop

Step

Kyoto Protocol
during 2008-2012
(Sink 3.8%, credit 1.6 %)

25% in 2020
(incl. credit?)

Jump

Japan

80% in 2050

2000 2010 2020 2030 2040 2050

Former Prime
Minister
Hatoyama
鳩山由紀夫

Japan

Scenario Approach to Develop Japan Low-Carbon Society (LCS)

Depicting socio-economic visions in 2050

Step1

Estimating energy service demands

Step2

Exploring innovations for energy demands and energy supplies

Step3

Quantifying energy demand and supply to estimate CO_2 emissions

Checking potentials for energy supply

Step5

Step4

Achieving energy-related CO_2 emissions target

14
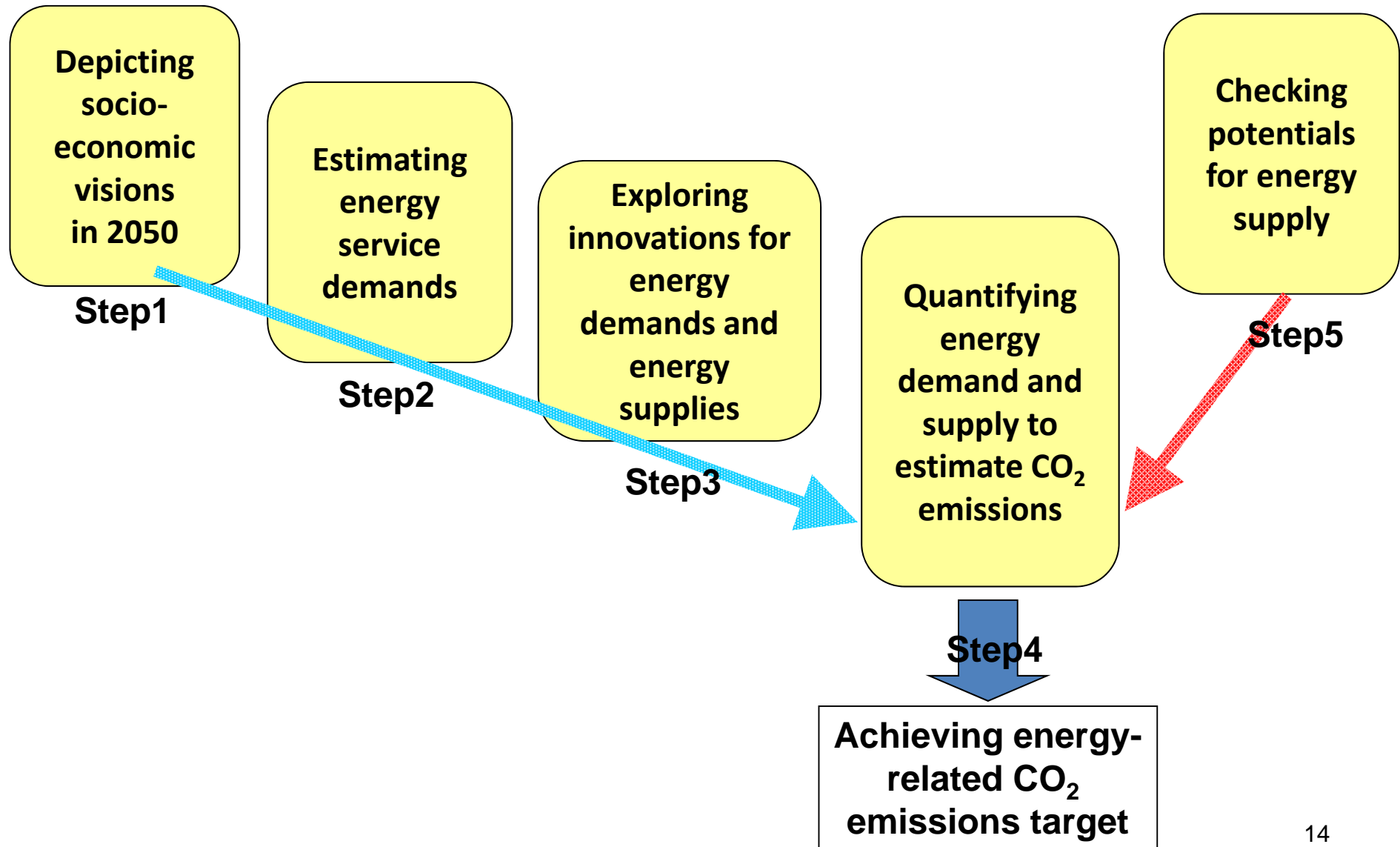
Volume of greenhouse gas emissions [2020/2030]

- It is technically possible to domestically reduce the volume of greenhouse gas emissions by 25% in 2020 compared to the level in 1990.
- Efforts in daily life (household, operations, transportation) will have a major effect.
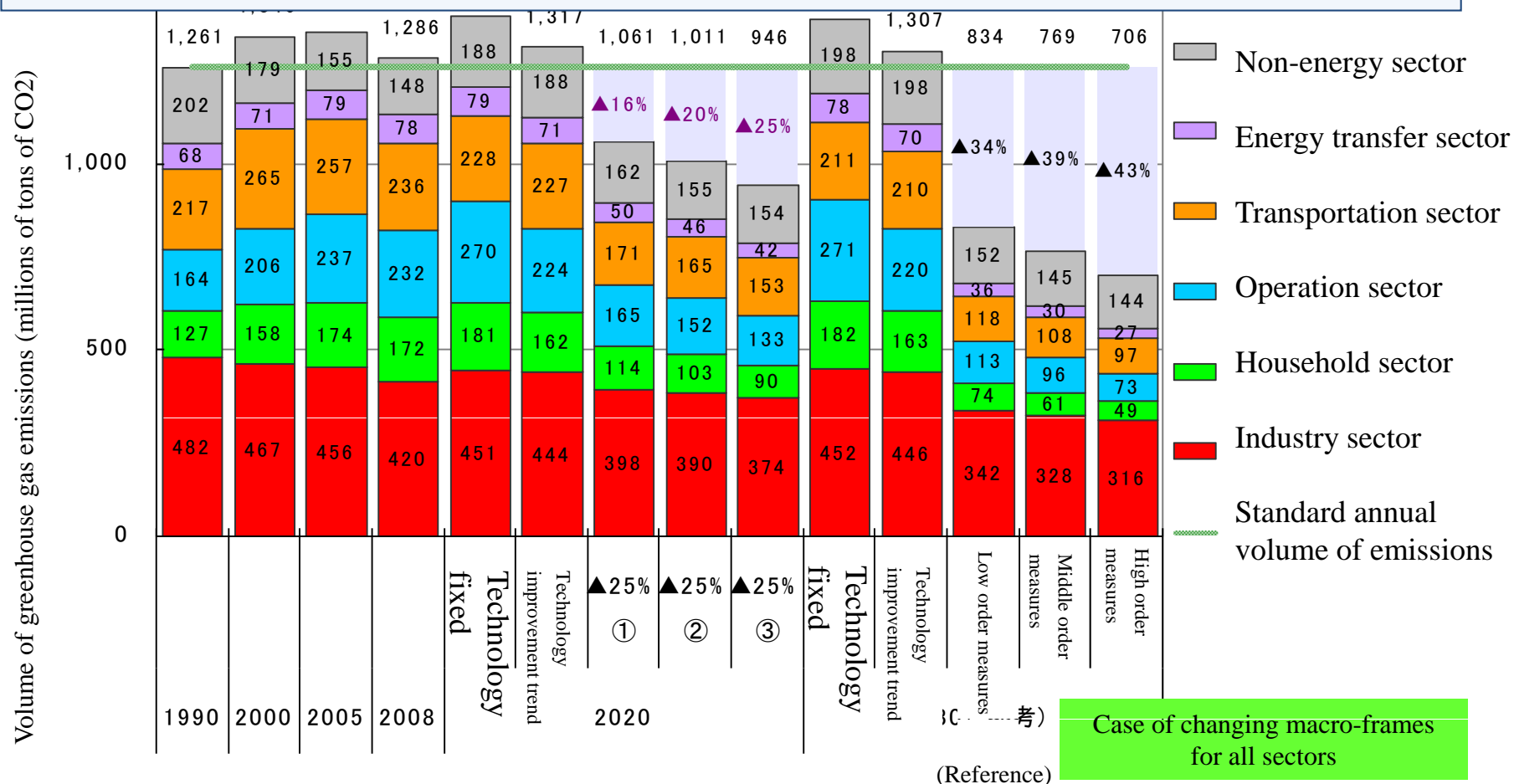
Note: 2020 25% (1): case including around 10% of international contribution and sinks; 25% (2): case including around 5% of international contribution and sinks; 25% (3): case including no international contribution and sinks. 2030 lower order to high order measures: the emissions volume for 2030 is done assuming that the measures that have been carried out in order to reduce emissions toward the 25% reduction in 2020 will continue to be carried out in 2012 through 2030.

Mitigation cost curve in Japan to achieve 25% GHG emissions reductions by 2020 compared with 1990 level
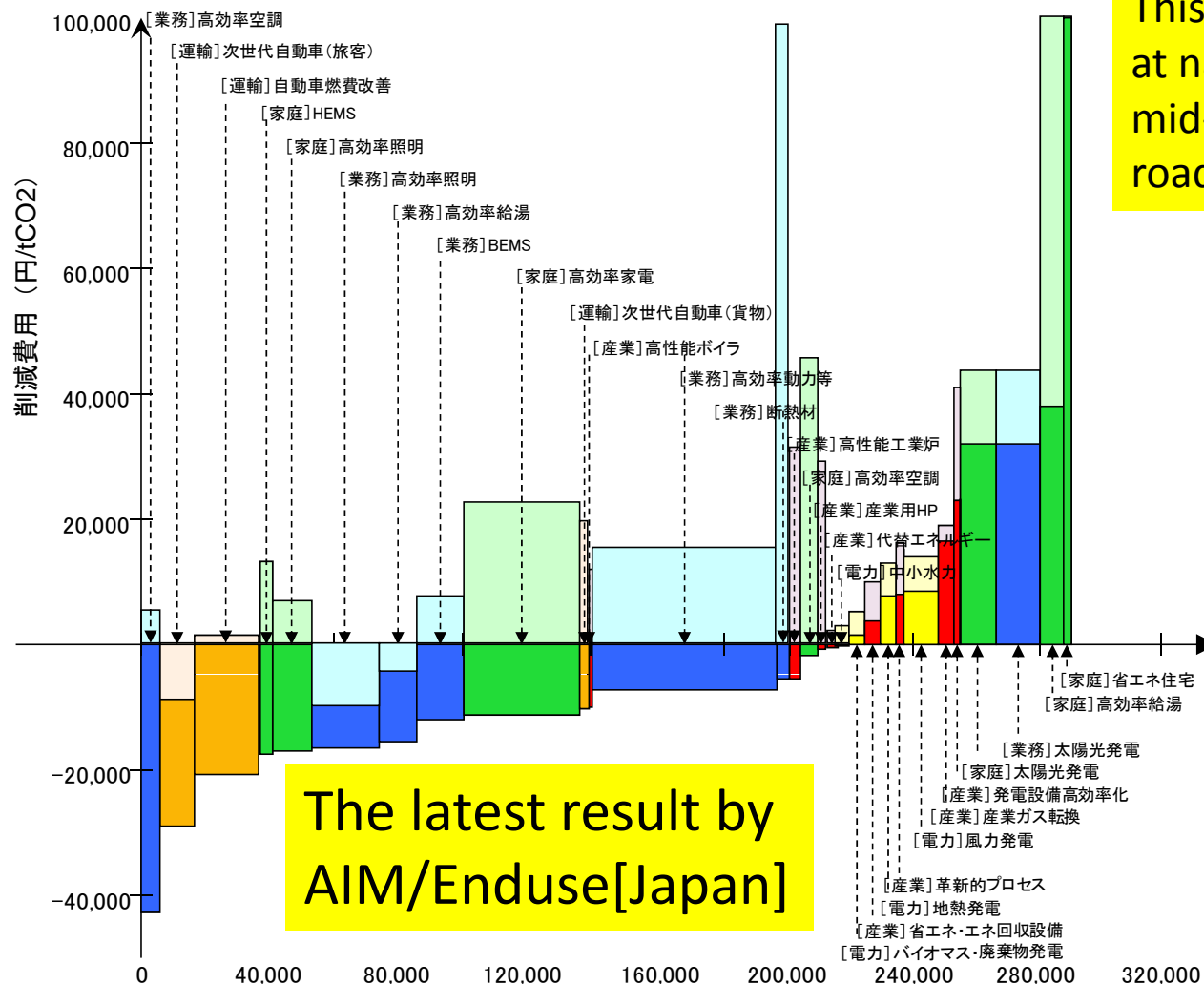
Relationship between low-carbon investment amount and energy reduction expense

• As for the investment amount for global warming, half of the overall investment amount will be collected by 2020 and an amount equal to the investment amount will be collected by 2030 based on energy expenses that can be saved through technologies introduced.

<Low-carbon investment amount and energy reduction expense>

■ Additional investment ('11 – '20 total)

■ Energy reduction expense ('11 – '20 total)

■ Energy reduction expense ('21 – '30 total)

Energy saving investment through 2020

Volume of reduction from energy saving technologies

In the case of device with 10 year lifespan

Energy reduction expense from energy saving investment = approx. 51 trillion yen (25% reduction (3))

Energy reduction expense from energy saving investment = approx. 53 trillion yen (25% reduction (3))

Interactions between simulations and policy assessments

- The model calculations maintain the overall alignment of the path, and the estimated volume of emissions and economic impact are evaluated.
- The overall review panel / WG examines a specific plan that will enable reductions in each field.

Premise for the Macro-frame

At time of November 11 task force

Model calculations

Case setting for 2020 estimate
- 25% (1): including about 10% of international contribution and sinks
- 25% (2): including about 5% of international contribution and sinks
- 25% (3): Not including international contribution and sinks

Suppositions for the introduction of countermeasures, etc.

Display as rough draft

Overall review panel / working group

Model calculations

Examination results

Checking of consistency

Examination of specific plan

Social and economic impact

Volume of emissions Volume of reduction

Necessary promotion policy

Structure of Mid- and Long-Term Roadmap
Review Panel since Dec 2009

- The review panel is implemented as an operation commissioned by the Ministry of the Environment. A total of 29 review panel meetings have been held bringing together 52 experts from various fields.

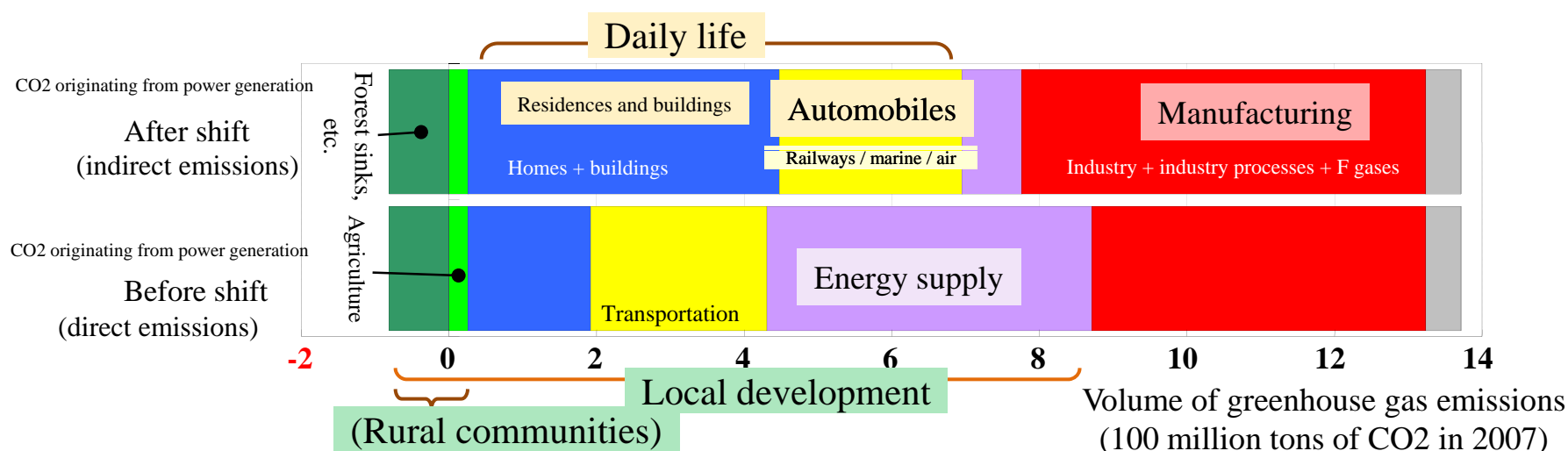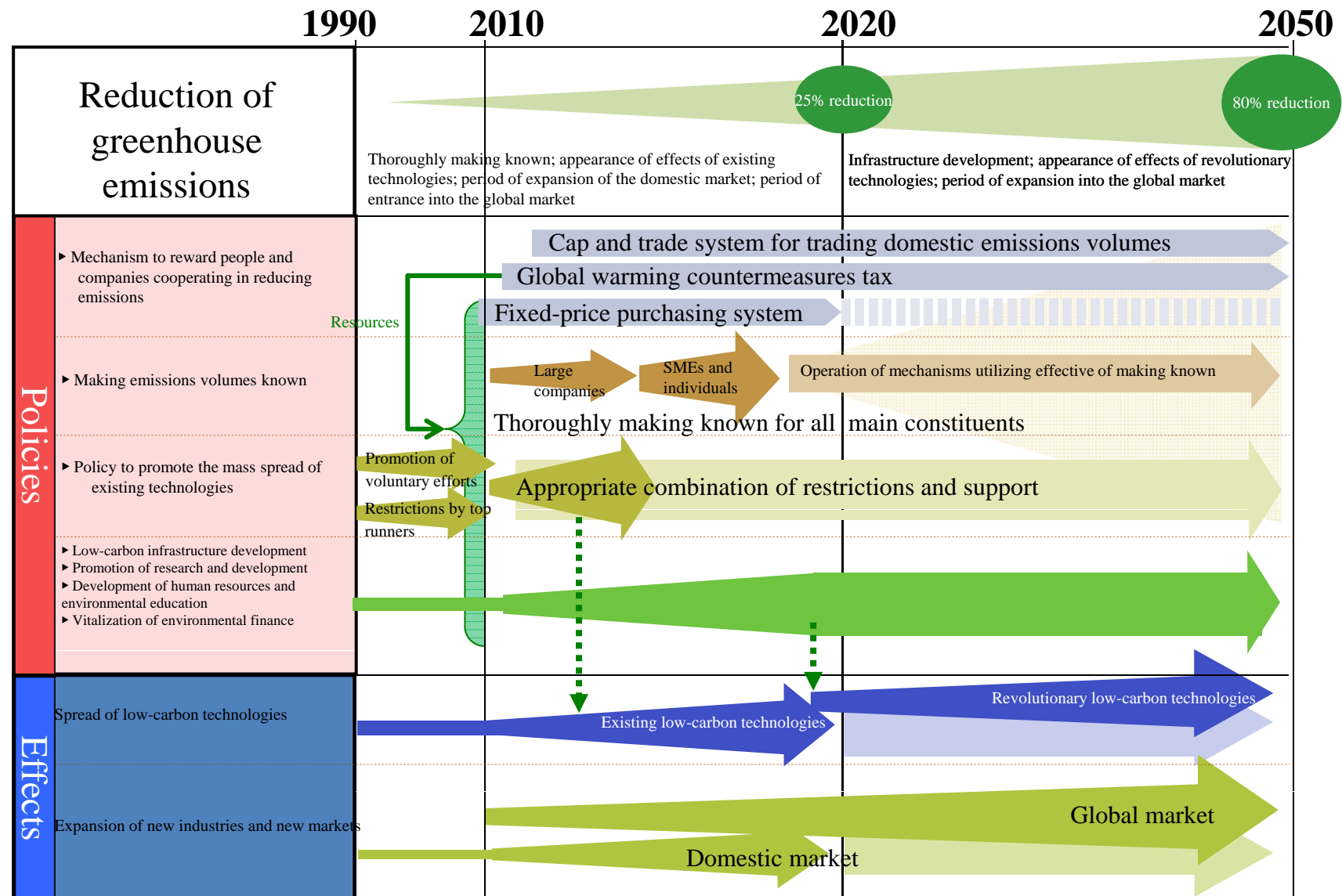| < Working groups >	< Assigned area >	< Chairman >
Residences and Buildings WG	Daily life – field of residences and buildings	Building Research Institute Shuzo Murakami
Automobiles WG	Daily life – field of automobiles	Waseda University Yasuhiro Daisho
Local Development WG	Local development	Tokyo Institute of Technology Tetsuo Yai
Rural Communities Sub-WG	Local development (rural communities)	Forestry and Forest Products Research Institute Mitsuo Matsumoto
Energy Supply WG	Energy supply	Waseda University Tadashi Otsuka
Overall Review Panel	Overall and manufacturing	National Institute for Environmental Studies Shuzo Nishioka

(Honorary titles omitted)

◆ Relationship between assigned areas of working groups and emission sectors
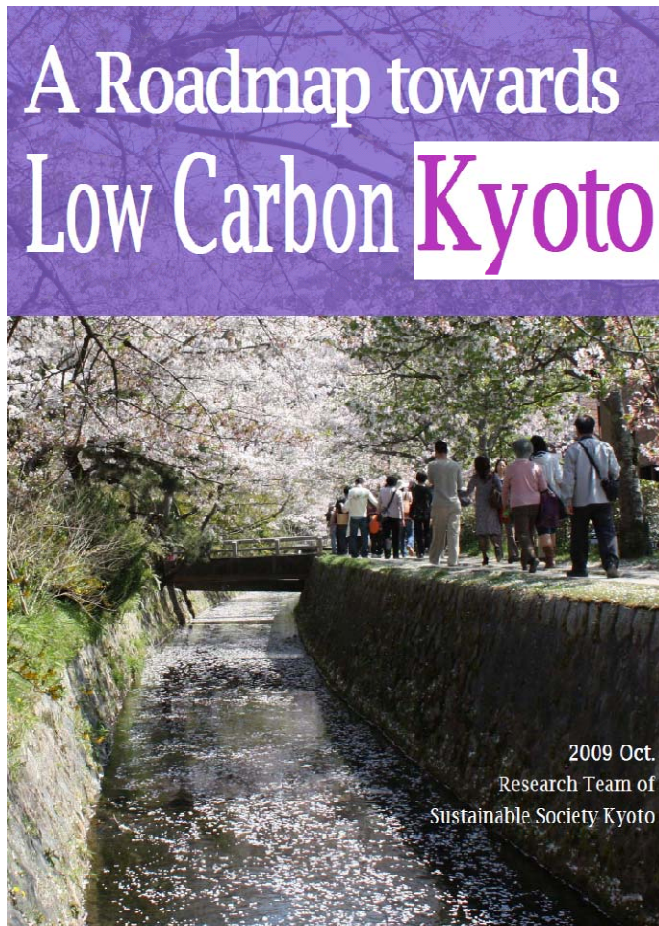
Overall roadmap: order of policies and effects

	1990	2010	2020	2050

Reduction of greenhouse emissions

25% reduction

80% reduction

Thoroughly making known; appearance of effects of existing technologies; period of expansion of the domestic market; period of entrance into the global market

Infrastructure development; appearance of effects of revolutionary technologies; period of expansion into the global market

Policies

▸ Mechanism to reward people and companies cooperating in reducing emissions

Cap and trade system for trading domestic emissions volumes

Global warming countermeasures tax

Fixed-price purchasing system

Resources

▸ Making emissions volumes known

Large companies

SMEs and individuals

Operation of mechanisms utilizing effective of making known

Thoroughly making known for all main constituents

▸ Policy to promote the mass spread of existing technologies

Promotion of voluntary efforts

Restrictions by top runners

Appropriate combination of restrictions and support

▸ Low-carbon infrastructure development
▸ Promotion of research and development
▸ Development of human resources and environmental education
▸ Vitalization of environmental finance

Effects

Spread of low-carbon technologies

Existing low-carbon technologies

Revolutionary low-carbon technologies

Expansion of new industries and new markets

Global market

Domestic market

Sub-national/local scenarios by AIM
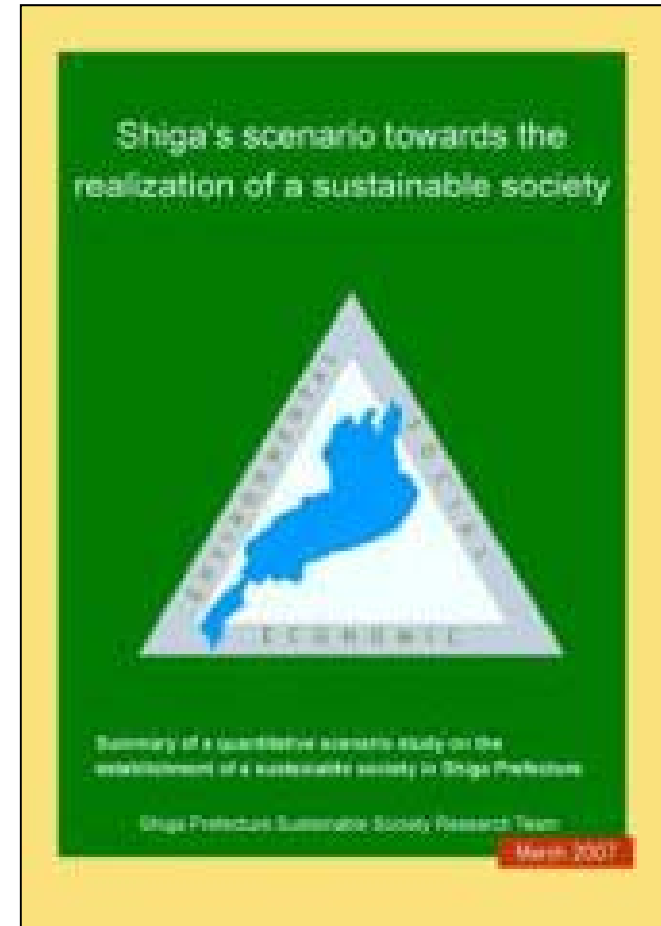
Shiga prefecture scenarios

Kyoto city scenarios

"Future city" planning

Local initiatives in Japan

GHG reduction ordinance (25% cut by 2020 and 40% by 2030) is proposed on 7th July 2010 and adopted on 30th Sep 2010
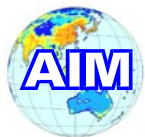
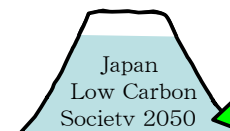Mitigation roadmap is discussed at local congress and stakeholders dialogue

Low-Carbon Scenarios for countries and sub-countries in Asian

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

[SATREPS] PROJECT FOR DEVELOPMENT OF LOW CARBON SOCIETY
-SCENARIOS FOR ASIAN REGIONS-

RESEARCH WORKSHOP
UNDER JICA-JST PROGRAM
7 - 8 JANUARY 2011

TECHNICAL COOPERATION PARTNERS:

UTM

NIES JAPAN

AIM
ASIA-PACIFIC INTEGRATED MODEL

FUNDED BY:

JST Japan Science and Technology Agency

JICA

We support country/local-wise LCS modeling through SD for Asia-Pacific and the world
- We have continued AIM Training Workshops since 1997 -

2010 AIM Training Workshop at Tsukuba (August 2-6)

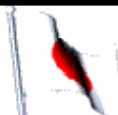India   China   Thailand   Korea   Malaysia   Indonesia   Vietnam   Taiwan, China   Japan

http://2050.nies.go.jp

Low-carbon society model capacity building workshop
- Bridge simulation scenarios and sustainable LCS policy
implementation using AIM (Asia-Pacific Integrated Model) -
Organized by TGO, SIIT-TU, JGSEE, NIES
November 19 (Friday) 2010 at Bangkok, Thailand

The presentations and model can be downloaded from the following
website:**http://2050.nies.go.jp/sympo/101119/**

Objectives:
1) Introduce LCS scenario making process to stakeholders for better
understanding how to use simulation studies for policy formulation
and implementation
2) Learn to operate LCS simulation model (simple version) and assess
the CO_2 reduction possibilities effected by change of driving forces
(population, GDP etc.) and countermeasures (energy savings in
buildings and industries, modal shift in transportation etc.)
3) Communicate between policymakers, business, researchers to
discuss how to develop feasible LCS scenarios and policy options

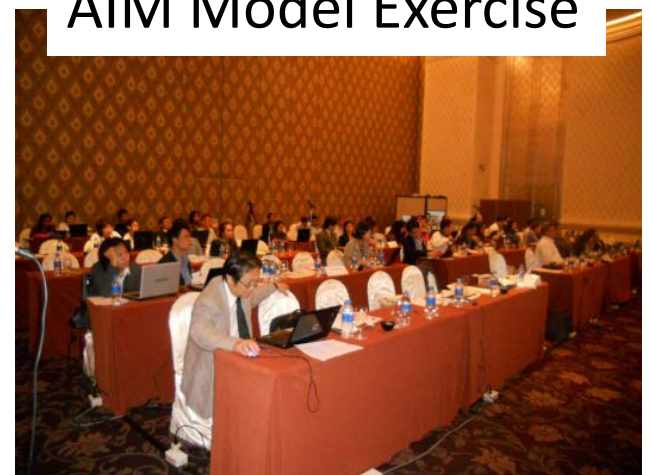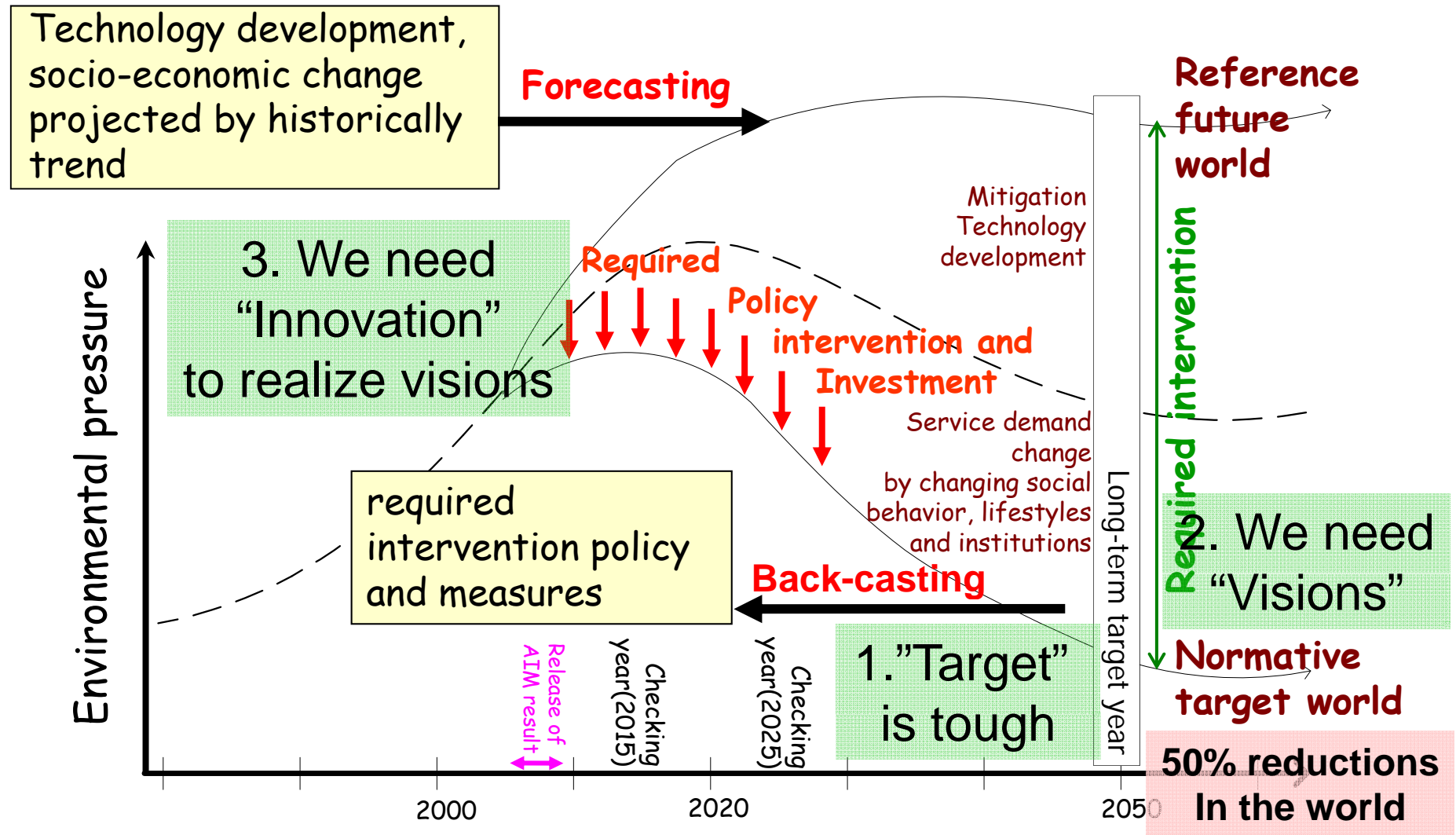Welcome speech   Presentations on LCS   Model operation lecture

80 participants

AIM Model Exercise

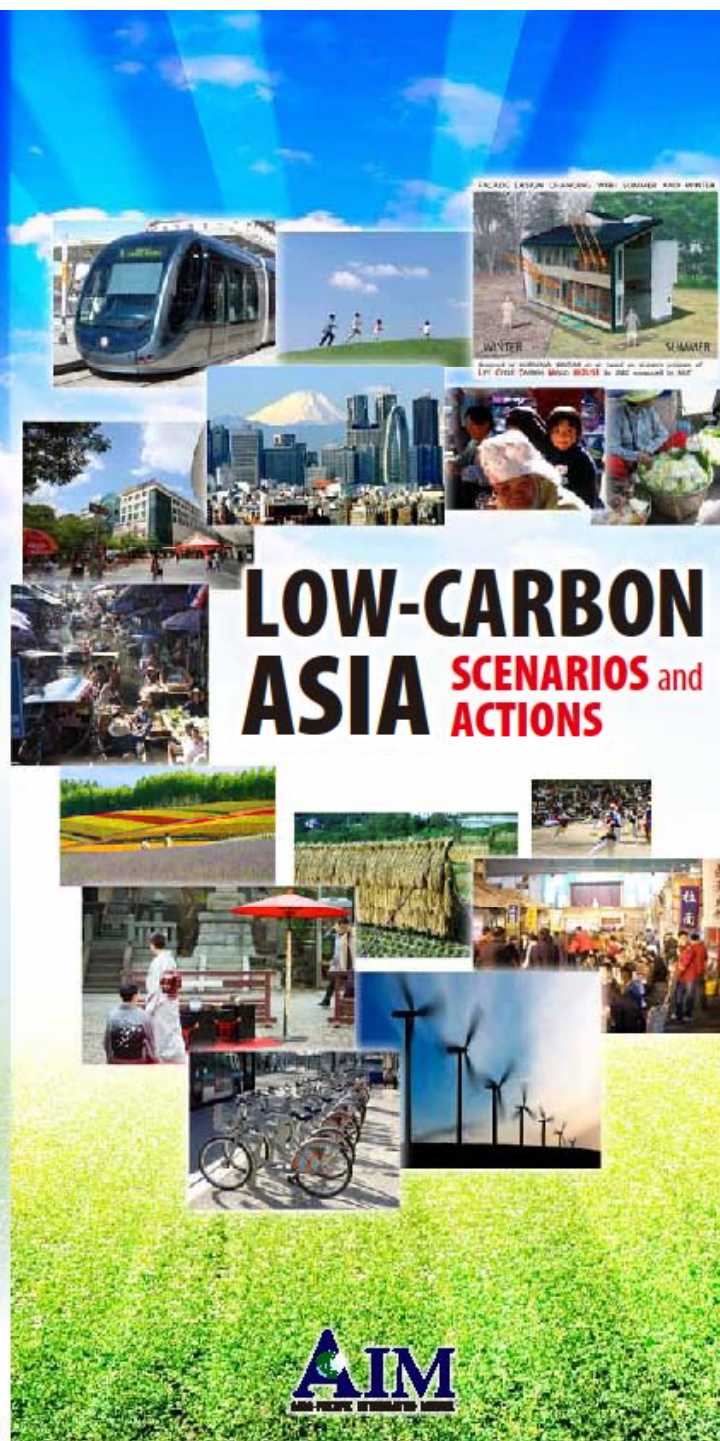# Forecasting from now and Backcasting from future prescribed/normative world

Jilin
(China)

Japan

Shiga
Kyoto

Ahmedabad

India

Thailand

Vietnam

Iskandar
(Malaysia)

Indonesia

Scenario development status

Japan

Shiga
(Japan)

Kyoto
(Japan)

Vietnam

Indonesia

Jilin
(China)

Thailand

Ratchaburi
(Thailand)

India

Ahmedabad
(India)

Iskandar
(Malaysia)

Putrajaya
(Malaysia)

AIM Family

National Institute for Environmental Studies (NIES)

Asian Institute of Technology (AIT)

Kyoto University (KU)

Sirindhorn International Institute of Technology, Thammasat University (SIIT-TU)

MIZUHO Mizuho Information and Research Institute (MHIR)

JGSEE The Joint Graduate School of Energy & Environment, King Mongkut's University of Technology Thonburi (JGSEE)

Indian Institute of Management Ahmedabad (IIMA)

Institut Teknologi Bandung

Energy Research Institute, China (ERI)

Universiti Teknologi Malaysia (UTM)

URL: http://2050.nies.go.jp/LCS/
Contact Address: Junichi Fujino (Email: lcs@nies.go.jp)

Google   LCS 2050   Search

Nov. 2010

LOW-CARBON
ASIA SCENARIOS and ACTIONS

AIM
ASIA-PACIFIC INTEGRATED MODEL

Let's innovate good evidence for happy LCS!

Junichi Fujino

fuji@nies.go.jp