



# 2050 Japan and Asia Low-Carbon Society (LCS) Scenarios and Actions

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AIM (Asia-Pacific Integrated Model) team  
National Institute for Environmental Studies



Government of Japan side-event,  
“How to realize global emission reductions?”  
UNFCCC AWG/LCA, November 3, 2009, Barcelona, Spain

# New Japan's Mid-term Target

Japan's mid-term target was announced by New Prime Minister Hatoyama on September 22nd, 2009. The target is

**25 percent reduction from the 1990 level by 2020**



	New Mid-term target	Old Mid-term target	Kyoto target
Target Year	2020	2020	2008 - 2012
Base Year	1990	2005(1990)	1990
Domestic reduction	<b>Totally 25%</b>	15(8)%	0.6%
Carbon sinks		-	3.8%
Credits		-	1.6%

New Prime Minister  
Hatoyama 鳩山由紀夫

\*Japan's Kyoto target (6% reduction) includes carbon sinks and credits through the Kyoto mechanisms.

# 日本国政府中期目標達成分析タスクフォース

## 1. モデル分析を行う研究機関

**NIES国立環境研究所** (増井利彦 社会環境システム研究領域統合評価研究室 室長  
他(藤野純一、肱岡靖明、花岡達也))

- AIM/Enduse[Global]モデル(世界モデル)
- AIM/Enduse[Japan]モデル(日本モデル)
- AIM/CGE[Japan]モデル(経済モデル)

**地球環境産業技術研究機構** (秋元圭吾 システム研究グループ グループリーダー 他)

- RITEモデル(DNE21+) (世界モデル)

**日本エネルギー経済研究所** (伊藤浩吉 常務理事 他)

- エネ研モデル(日本モデル)

**日本経済研究センター** (猿山純夫 研究統括部 担当部長 他)

- 日経センター・一般均衡モデル(経済モデル)
- 日経センター・マクロモデル(経済モデル)

**慶應義塾大学産業研究所** (野村浩二 商学部教授)

- KEOモデル(経済モデル)

## 2. モデル分析を評価する有識者

有村 俊秀 上智大学経済学部経済学科准教授

飯田 哲也 環境エネルギー政策研究所所長

◎植田 和弘 京都大学大学院経済学研究科教授

栗山 浩一 京都大学農学研究科生物資源経済学専攻教授

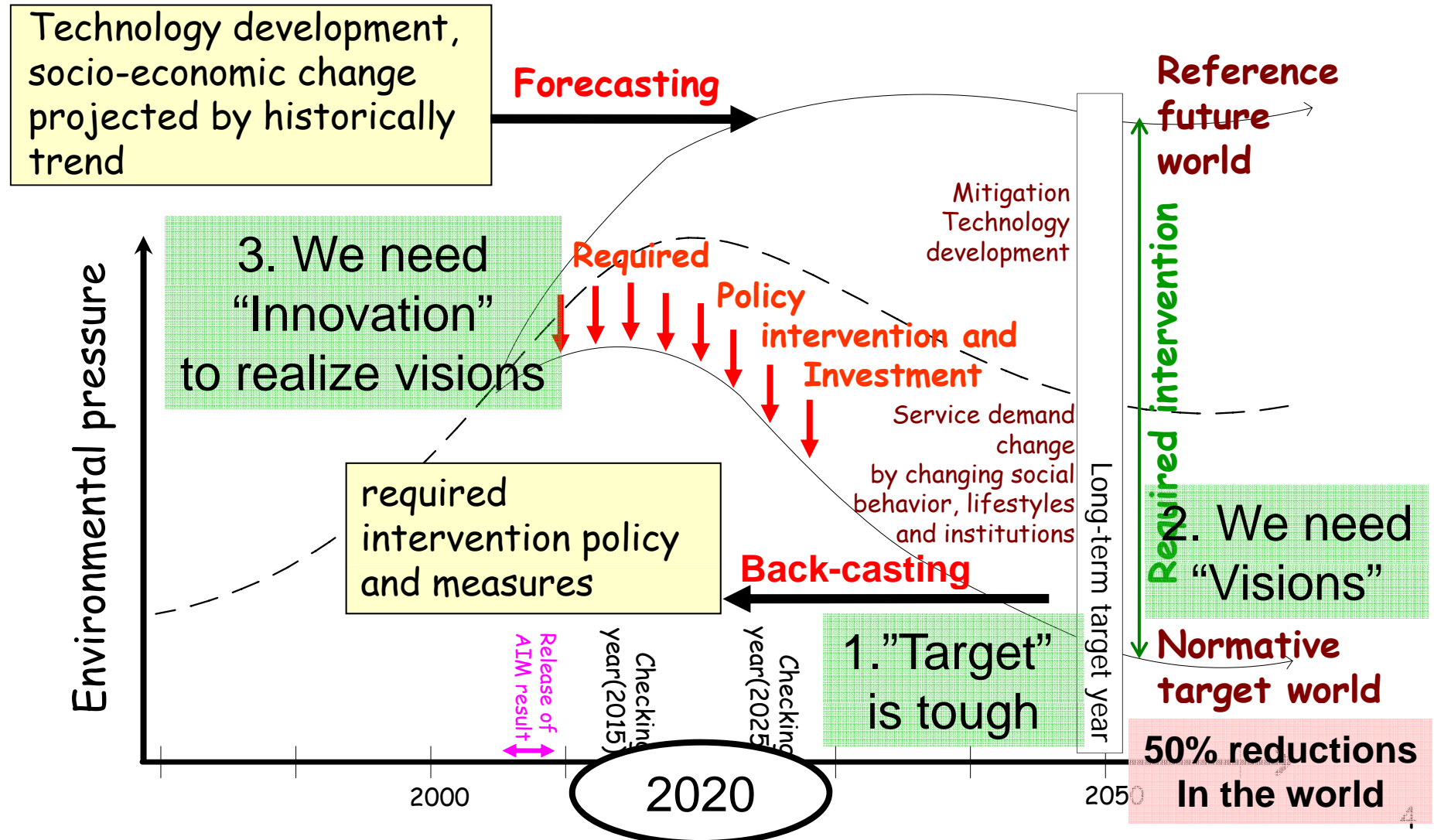
土居 丈朗 慶應義塾大学経済学部教授

屋井 鉄雄 東京工業大学大学院総合理工学研究科教授


山口 光恒 東京大学先端科学技術研究センター特任教授

# Japan Low Carbon Society Scenarios toward 2050

[FY2004-2008, Global Environmental Research Program, MOEJ]



# Japan LCS scenarios study



Y.Matsuoka  
Kyoto.Univ  
Scenario team

T.Hanaoka  
NIES,  
Scenario team

S.Nishioka  
NIES, Project  
Leader

J.Fujino  
NIES  
Coordinator

M.Kainuma  
NIES,  
Scenario  
Team  
leader

NIES has coordinated this Japan LCS research project during FY2004-2008 in collaboration with around 60 researchers from Tokyo Univ, Kyoto Univ, TIT, TSU, Forest Research Institute, etc.

# Visions and Innovations

**LCS house in 2050**  
**Comfortable and energy-saving house**

Utilizing solar power

**Photovoltaic**

34-69MW  
 (25-47% house has PV on roof (now 1%) and develop high efficiency (<30%) PV)

**Eco-life education**  
 10-20% energy demand reduction

**Solar heating**

Diffusion rate: 20-60%  
 ( currently 8% )

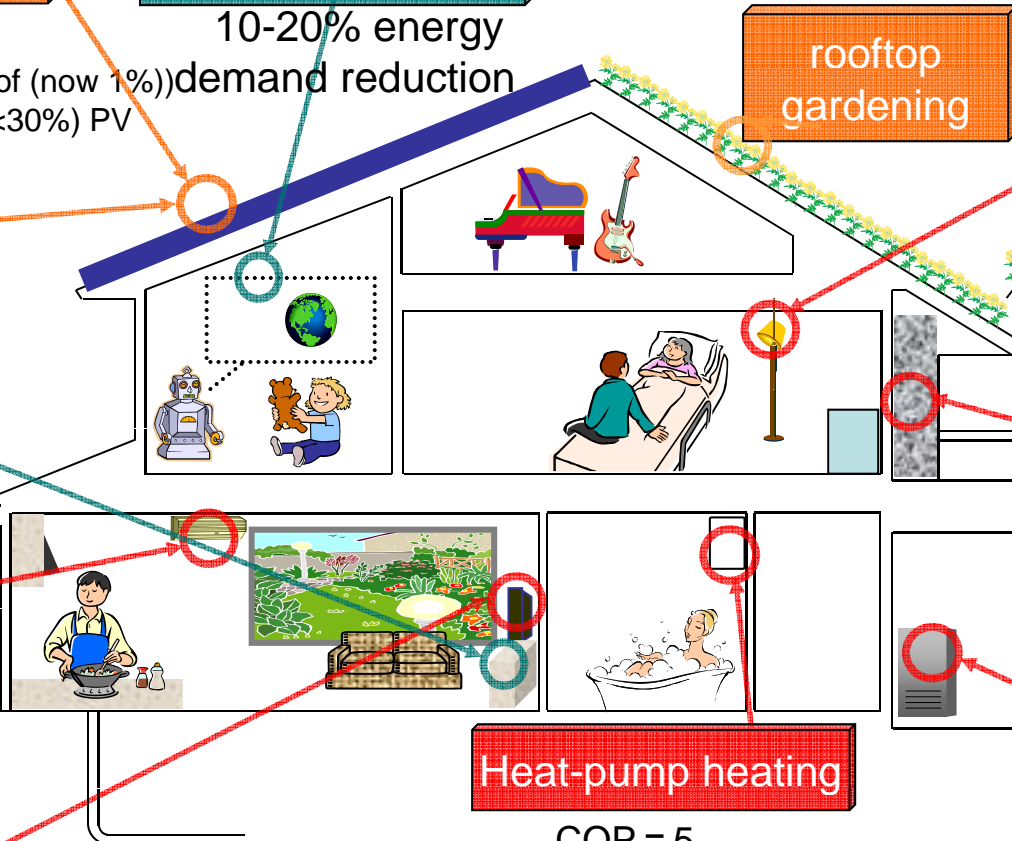
**Monitoring system equipped with appliances**

**Super high efficiency air conditioner**

COP (coefficients of performance=8),  
 share 100%

**Stand-by energy reduction**

Reduce 1/3 energy demand,  
 share 100%



**rooftop gardening**

**High efficiency lighting**  
 [eg LED lighting]

Reduce 1/2 energy demand  
 Share 100%

**High-insulation**

Reduce 60% warming energy demand,  
 share 100%

**Fuel cell**

share 0-20%

**Heat-pump heating**

COP = 5  
 share 30-70%

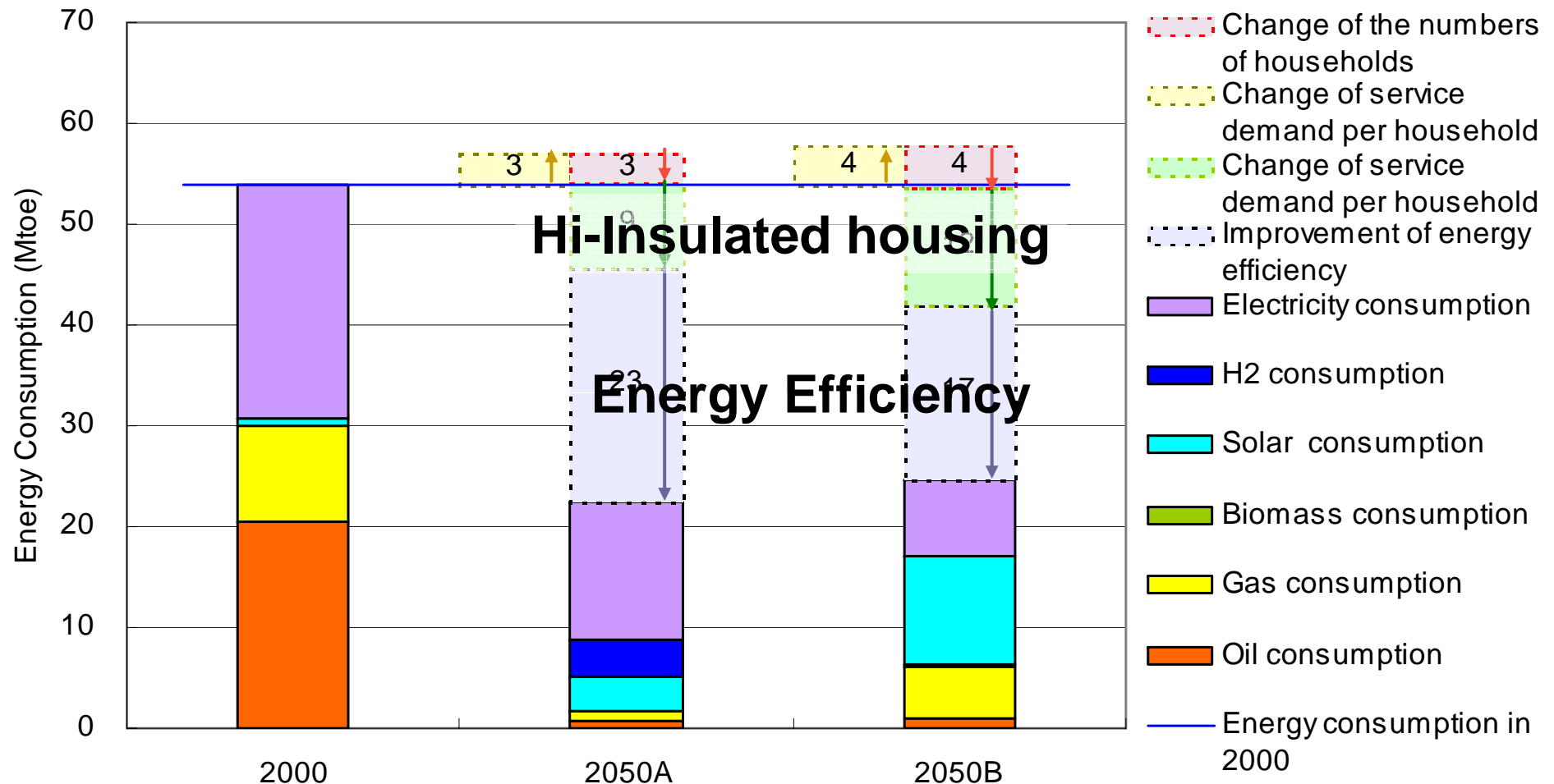
Good information for economy and environment makes people's behavior low-carbon

High efficiency appliances reduce energy demand and support comfortable and safe lifestyle

# Residential sector

## Innovations

Energy reduction potential: 40-50%



Change of the number of households: the number of households decrease both in scenario A and B

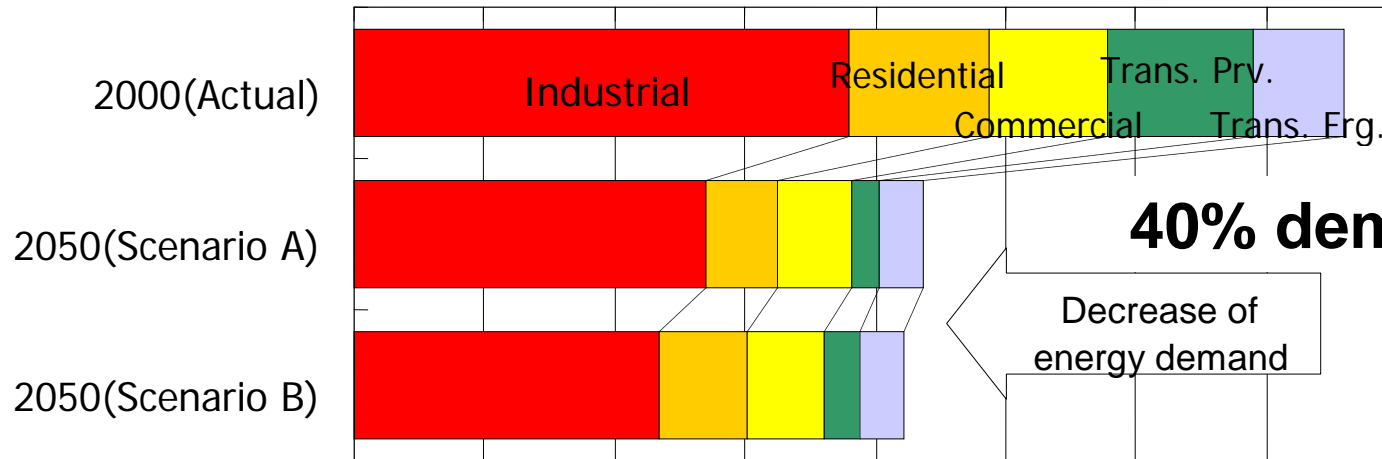
Change of service demand per household: convenient lifestyle increases service demand per household

Change of energy demand per household: high insulated dwellings, Home Energy Management System (HEMS)

Improvement of energy efficiency: air conditioner, water heater, cooking stove, lighting and standby power

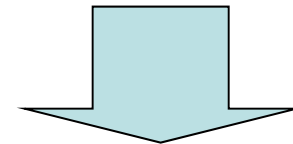
### Secondary Energy Consumption (Mtoe)

50 100 150 200 250 300 350 400



**40% demand reductions**

Decrease of energy demand



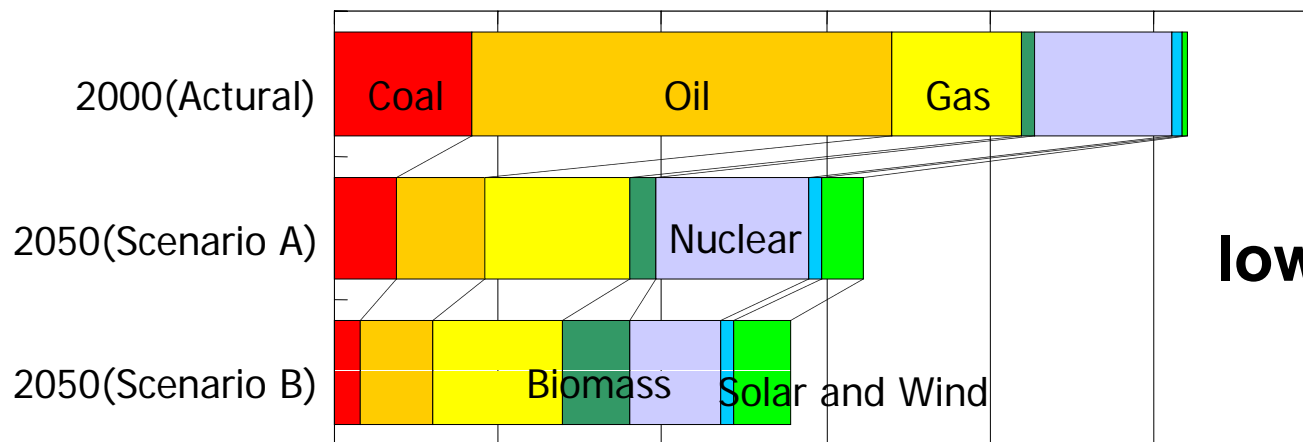
Industrial Residential Commercial Trans. Prv. Trans. Frg.

Trans. Prv.: Transportation (Private), Trans. Frg.: Transportation (Freight)

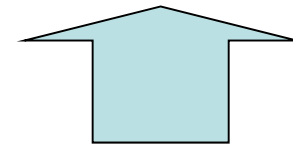
**70% CO2 cut by 2050**

### Primary Energy Consumption (Mtoe)

100 200 300 400 500 600



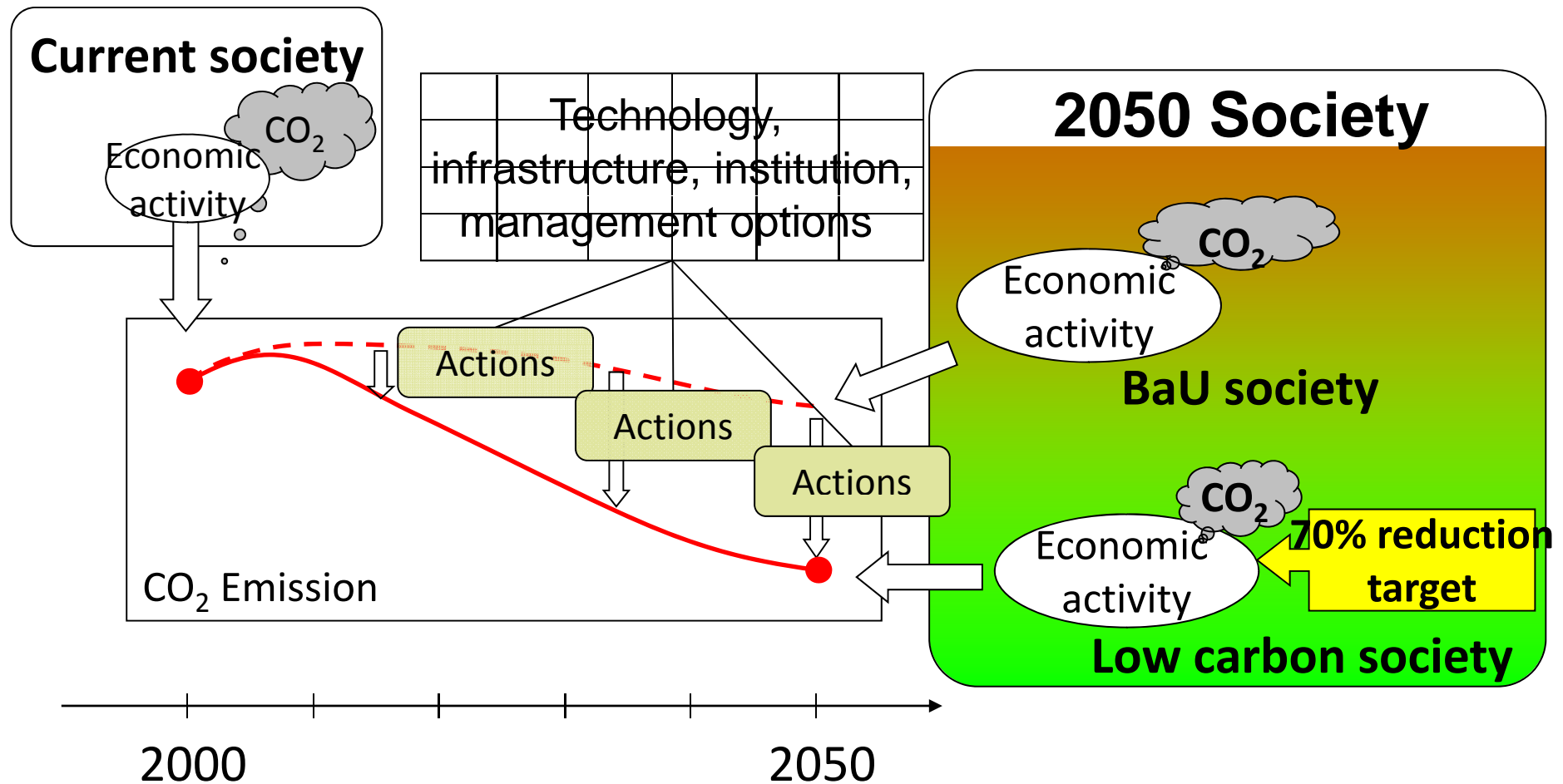
**low-carbon energy**



Coal Oil Gas Biomass Nuclear Hydro Solar and Wind



# To achieve 70% CO<sub>2</sub> reduction by 2050, we need “Actions”!



# A Dozen Actions towards Low-Carbon Societies

Press release  
on May 22, 2008

## Residential/commercial sector actions

### 1. Comfortable and Green Built Environment

Efficiently use of sunlight and energy efficient built environment design. Intelligent buildings.

### 2. Anytime, Anywhere Appropriate Appliances

Use of Top-runner and Appropriate appliances. Initial cost reduction by rent and release system resulting in improved availability.

## Industrial sector actions

### 3. Promoting Seasonal Local Food

Supply of seasonal and safe low-carbon local foods for local cuisine

### 4. Sustainable Building Materials

Using local and renewable buildings materials and products.

### 5. Environmentally Enlightened Business and Industry

Businesses aiming at creating and operating in low carbon market. Supplying low carbon and high value-added goods and services through energy efficient production systems.

## Transportation sector actions

### 6. Swift and Smooth Logistics

Networking seamless logistics systems with supply chain management, using both transportation and ICT infrastructure

### 7. Pedestrian Friendly City Design

City design requiring short trips and pedestrian (and bicycle) friendly transport, augmented by efficient public transport

## Energy supply sector actions

### 8. Low-Carbon Electricity

Supplying low carbon electricity by large-scale renewables, nuclear power and CCS-equipped fossil (and biomass) fired plants

### 9. Local Renewable Resources for Local Demand

Enhancing local renewables use, such as solar, wind, biomass and others.

### 10. Next Generation Fuels

Development of carbon free hydrogen- and/or biomass-based energy supply system with required infrastructure

## Cross-sector actions

### 11. Labeling to Encourage Smart and Rational Choices

Visualizing of energy use and CO2 costs information for smart choices of low carbon goods and service by consumers, and public acknowledgement of such consumers

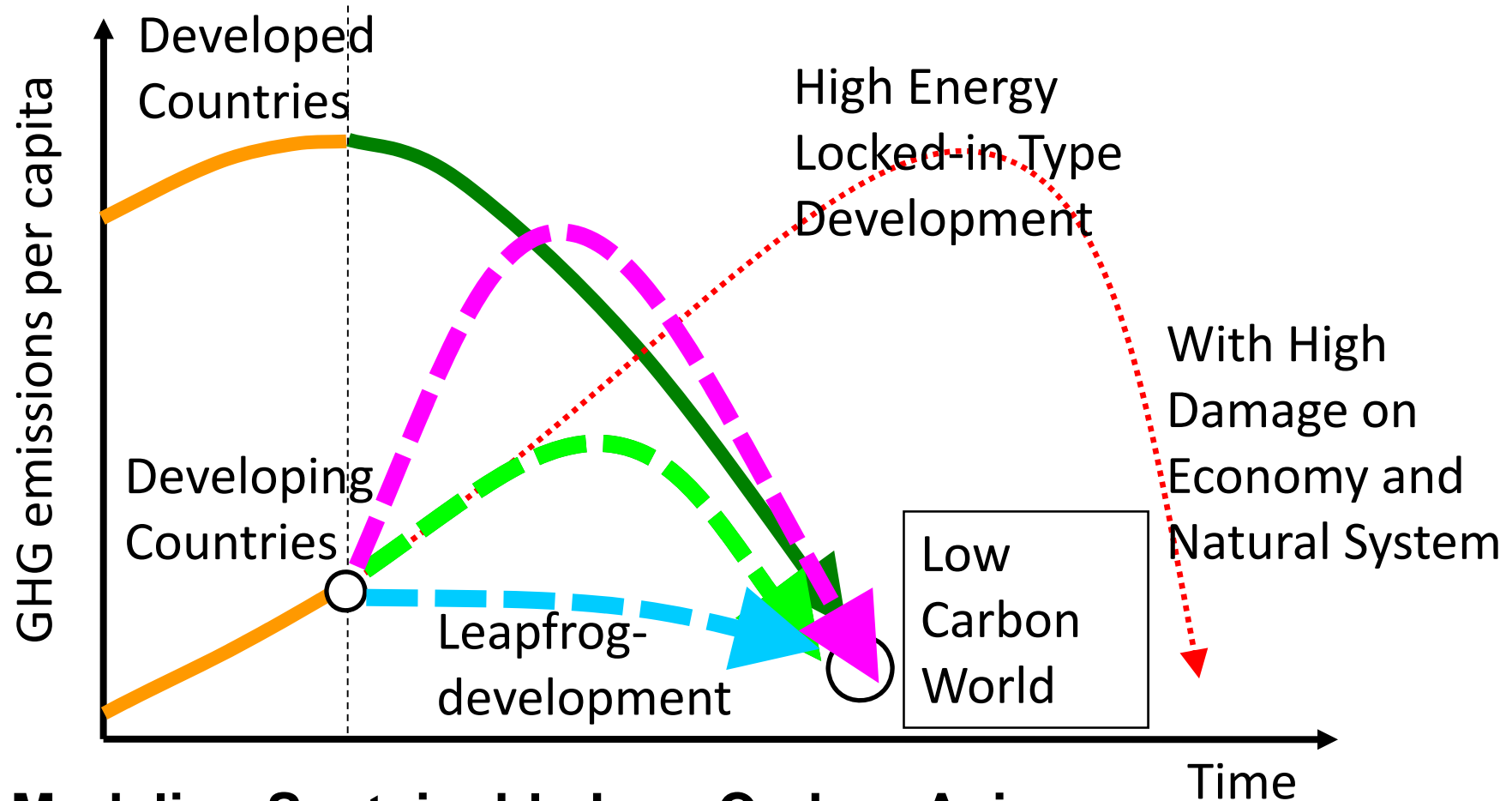
### 12. Low-Carbon Society Leadership

Human resource development for building "Low-Carbon Society" and recognizing extraordinary contributions.

# Japan LCS research project and Japanese CC policy

1. Feb 13<sup>th</sup> 2007 Interim Report “Japan Scenarios towards Low-Carbon Society (LCS) -Feasibility study for 70% CO2 emission reduction by 2050 below 1990 level-”
  - May 24<sup>th</sup> 2007 Former Prime Minister Abe launched “Cool Earth 50” to reduce 50% GHG emissions by 2050
  - June 9<sup>th</sup> 2008 Former Prime Minister Fukuda set the target of Japanese CO2 emissions reduction by 60-80% in 2050
2. May 22<sup>nd</sup> 2008 Interim Report “Dozen Actions towards LCSs”
  - July 29<sup>th</sup> 2008 Japanese government set “Action Plan for Achieving a Low-carbon Society”
3. March 2008 Japan-UK joint LCS research project released “Call for Action” to G20 in Chiba and G8 EMM in Kobe
  - May 24<sup>th</sup> 2008 G8EMM strongly supports to launch International LCS Research Network (LCS-RNet)

## 2. Asian LCS scenarios study



### Modeling Sustainable Low-Carbon Asia

We have just started new research project “Asian Low-Carbon Society Scenario Development Study” (project leader: Mikiko Kainuma) during FY2009-2013, funded by Global Environmental Research Program, MOEJ

20090526 @ Bangkok



20090603 @ Beijing



20090713@Jakarta



20090816@Ahmedabad



20091026@  
Guangzhou  
China

20090824@  
Johor Bahru  
Malaysia



# LCS Scenarios for Asian countries and cities

Jilin

Japan

Shiga

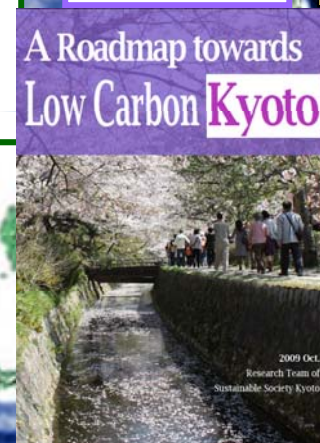
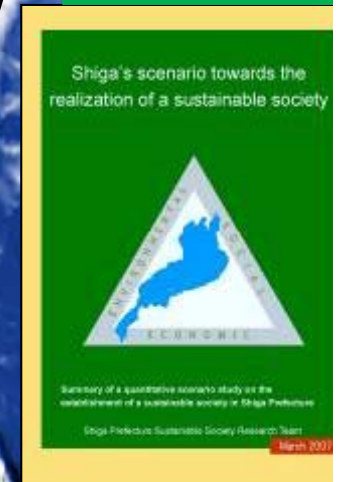
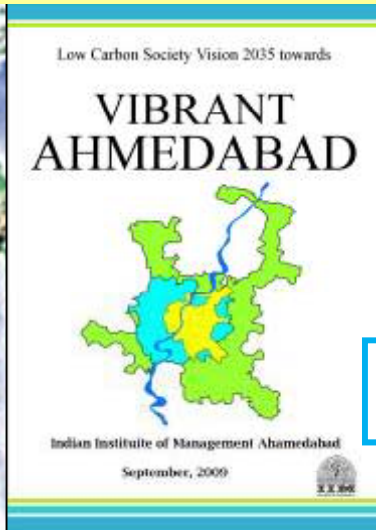
India

Ahmedabad

Kyoto

Iskandar  
Malaysia

A Roadmap towards  
Low Carbon Kyoto



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



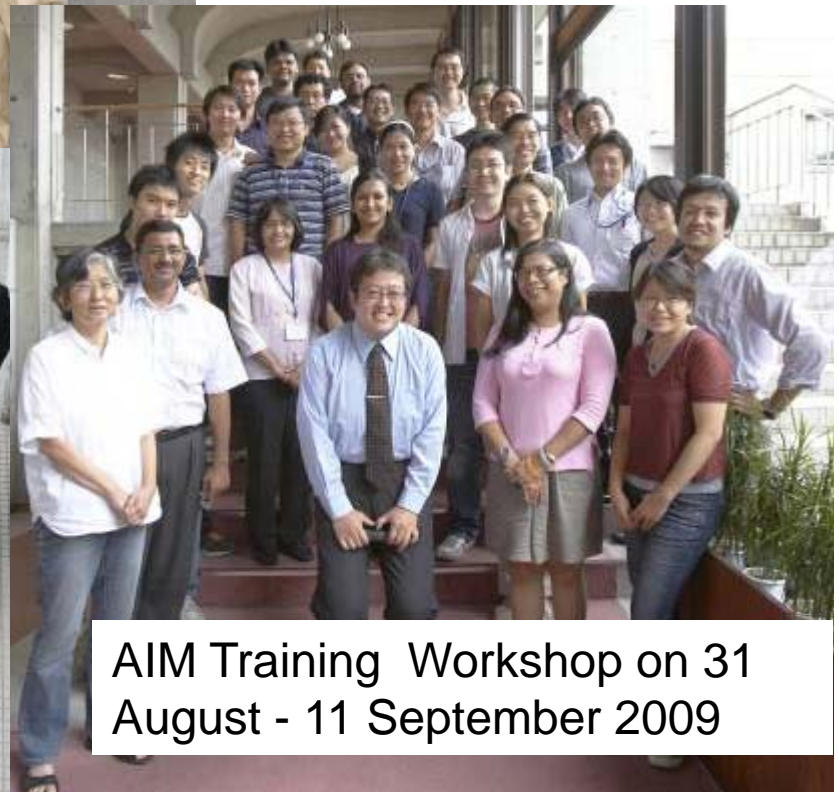
# Asia Modeling Network



Asian Modeling Meeting at Tsukuba on 17-18  
September 2009



14<sup>th</sup> AIM International  
Workshop on 14-15  
February 2009



AIM Training Workshop on 31  
August - 11 September 2009

# Thank you for your attention!

## Timing is important!

