http://2050.nies.go.jp/interimreport/20070215_report_e.pdf

# Japan: Clear Visions Make It Possible to Reduce of 70% $CO_2$ Emissions by 2050

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

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"Low-Carbon Asia: To be or not to be"
How to Align Climate Change and Sustainable Development
COP13 and CMP3 Side Event, 8 December 2007

# Invitation to "Cool Earth 50"

## ~ 3 Proposals, 3 Principles ~

【Year 2050】

【National Campaign】

<For achieving Japan's Kyoto Protocol target>

With the motto of "1 person, 1 day, 1 kg", calling upon the people for efforts and creative ideas.

【Mid-Term Strategy】

<"3 principles" in designing a concrete framework beyond 2013>

(1) **All major emitters must participate, thus moving beyond the Kyoto Protocol, leading to global reduction** of emissions.

(2) The framework must be **flexible and diverse**, taking into consideration the circumstances of each country.

(3) The framework must **achieve compatibility between environmental protection and economic growth** by utilizing energy conservation and other technologies.

【Long-Term Strategy】

<For halving emissions by 2050>

**「Innovative Technology Development」**

- Eliminating emissions from coal-fired power generation
- Expanding safe and peaceful use of nuclear power
- Efficient solar power generation
- Promoting the use of next-generation automobiles such as fuel cell vehicles
- Technological innovation in industries such as iron production

**「Building a Low Carbon Society」**

- Lifestyles in harmony with nature
- Efficient public transportation system
- Compact urban development
- Demonstrating the sentiment of "mottainai" and the "Japan model" in the world

【Current Emissions】

1. U.S.A. 22%
2. China 18%
3. Russia 6%
4. Japan 5%
5. India 4%

Developing Countries: about 60% (estimate)

【Target which we propose setting as a common goal for the world】

**Cutting global emissions by half from the current level**

Curbing to **the same level** as the capacity of **natural sinks**

Stabilizing the level of greenhouse gas concentrations in the atmosphere

**To make "Cool Earth" a reality**

<Japan's Role>

- Oil consumption has been reduced by 8% even though the GDP has doubled over the past 30 years.
- CO2 emission per GDP is the least in the major countries.
- Japan will create a new financial mechanism for assistance to the developing countries which respond to its proposals.
- Japan will expand the endeavor in East Asia for improving energy efficiency to the entire world.

| 2007. Apr. | Jun. | Sep. | Nov. | Dec. | 2008. Jul. |
|---|---|---|---|---|---|
| Japan-China, Japan-U.S. Summit | Heiligendamm Summit (G8) | APEC Leaders' Meeting | East Asia Summit | COP13 | Hokkaido Toyako Summit (G8) |

http://www.kantei.go.jp/foreign/abespeech/2007/05/24speech_e.html

Research project on Japan Low-Carbon Society (LCS) scenarios development
FY2004-2008 sponsored by Ministry of the Environment, Japan

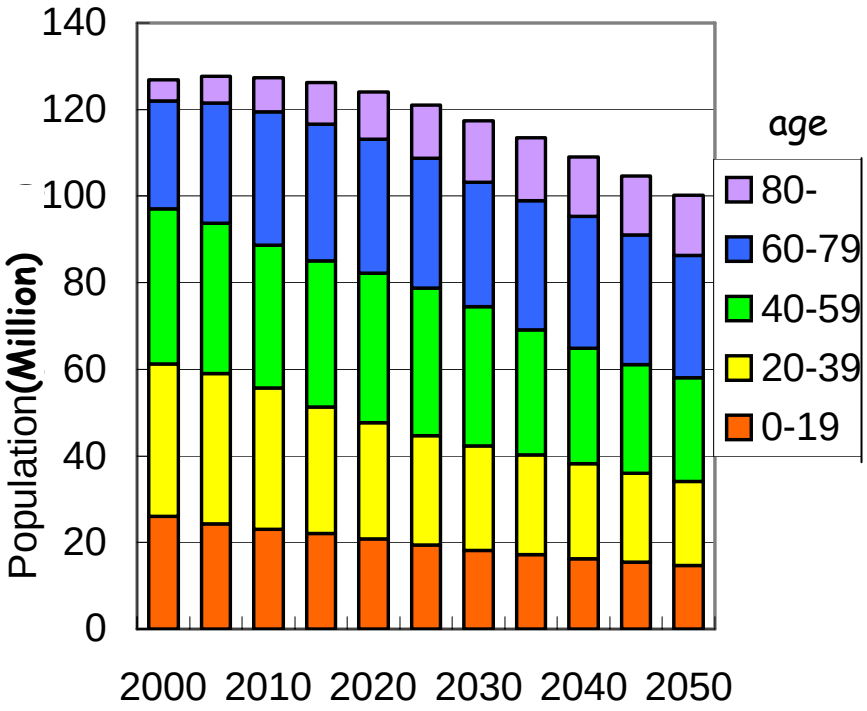
# As for LCS visions, we prepared two different but likely future societies

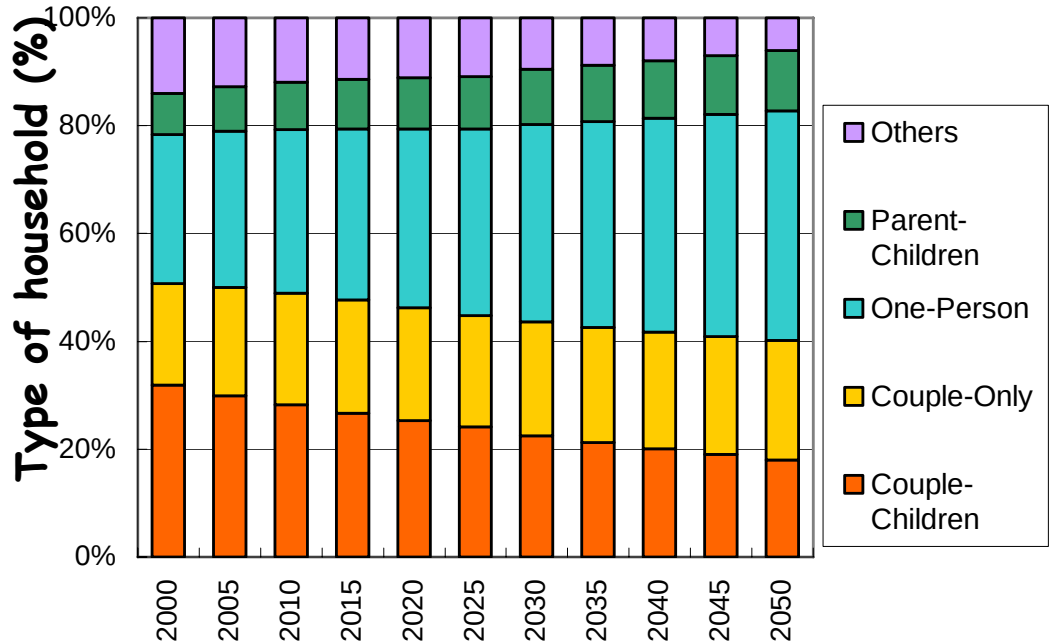
| Vision A "Doraemon" | Vision B "Satsuki and Mei" |
|---|---|
| Vivid, Technology-driven | Slow, Nature-oriented |
| Urban/Individual | Decentralized/Community |
| Technology breakthrough, Centralized production /recycle | Self-sufficient, Produce locally, consume locally |
| Individual Comfort and Convenience | Social and Cultural Values |
| 2%/yr GDP per capita growth | 1%/yr GDP per capita growth |
|  |  Akemi Imagawa |

Doraemon is a Japanese comic series created by Fujiko F. Fujio. The series is about a robotic cat named Doraemon, who travels back in time from the 22nd century. He has a pocket, which connects to the fourth dimension and acts like a wormhole.

Satsuki and Mei's House reproduced in the 2005 World Expo. Satsuki and Mei are daughters in the film "My Neighbor Totoro". They lived an old house in rural Japan, near which many curious and magical creatures inhabited.

# Projected Japan population and households in scenario A




| year | 2000 | 2050 | |
|---|---|---|---|
| | | A | B |
| Population (million) | 126.9 | 94.5 | 100.3 |
| Aged population ratio (%) | 17.4 | 38.0 | 35.8 |
| Average number of household | 2.71 | 2.19 | 2.38 |
| Single-person households (%) | 27.6 | 42.6 | 35.1 |

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

Utilizing solar power

Photovoltaic

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

Eco-life education

10-20% energy demand reduction

rooftop gardening

High efficiency lighting
【eg LED lighting】

Reduce 1/2 energy demand
Share 100%

Solar heating

Diffusion rate: 20-60%
（currently 8%）

Monitoring system
equipped with appliances

High-insulation

Reduce 60% warming energy demand, share 100%

Super high efficiency air conditioner

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

Heat-pump heating

COP＝5
share 30-70%

Fuel cell

share 0-20%

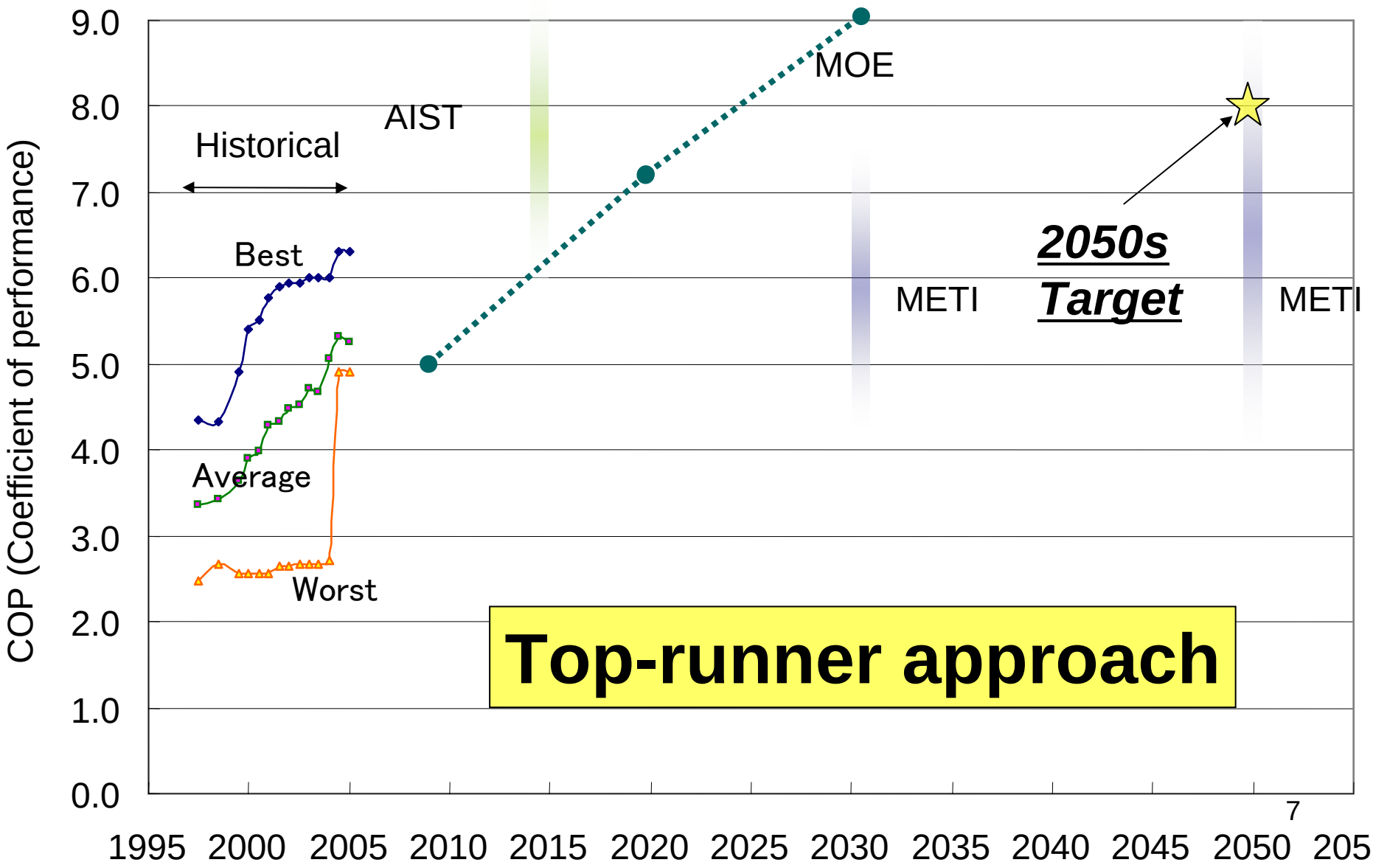
Stand-by energy reduction

Reduce 1/3 energy demand, share 100%

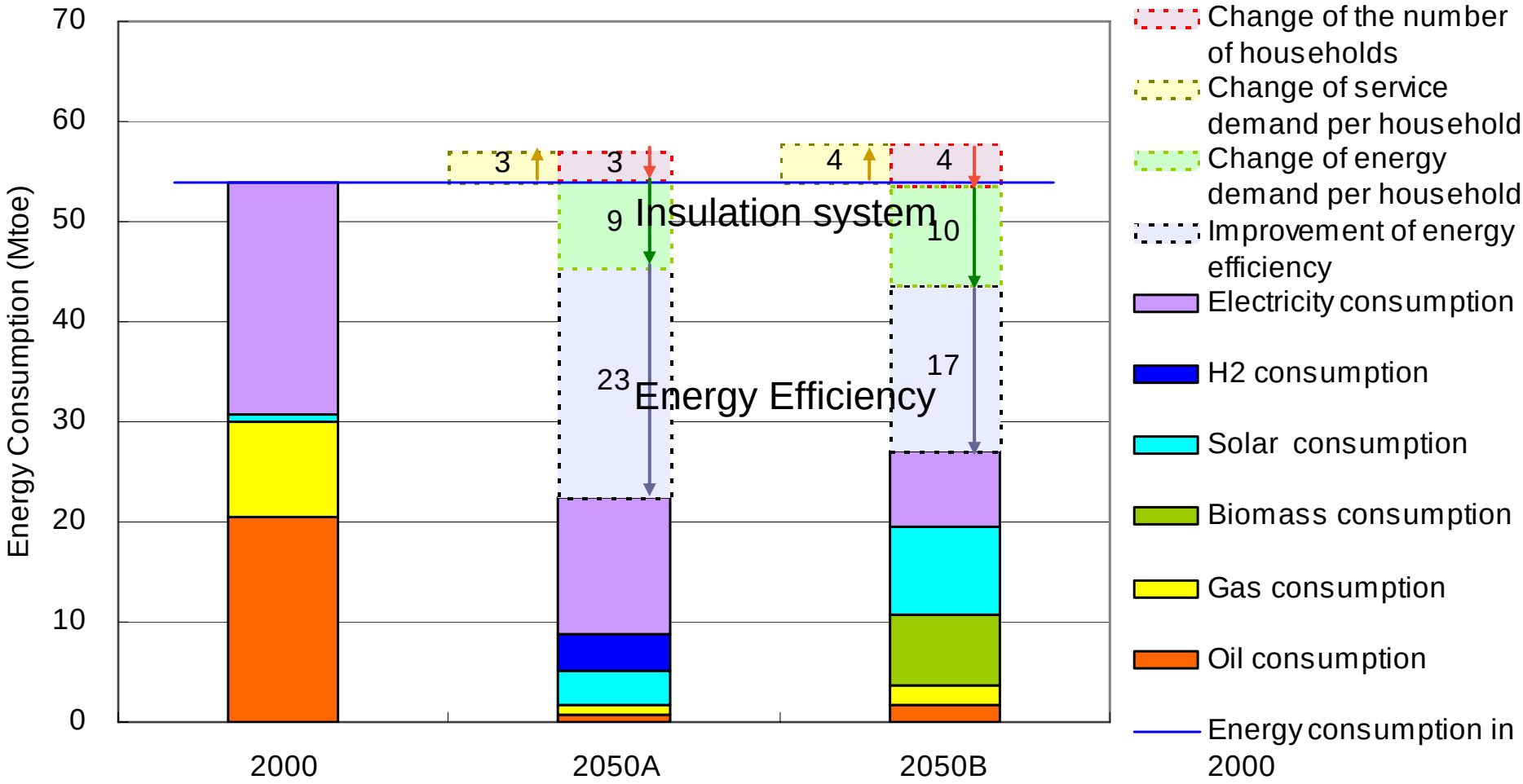
Good information for economy and environment makes people's behavior low-carbon

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

# Projected energy efficiency improvement: Air-conditioners for cooling and heating



# Residential sector
# Energy demand reduction potential: 50%




Change in the number of households: the number of households decrease both in scenario A and B
Change in service demand per household: convenient lifestyle increases service demand per household
Change in 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

# How to reduce CO2 emissions from passenger transportation sector

Demand management
e.g. by information-communication technology
[transport-service per capita]

**(1-0.2)x(1-0.2)x(1-0.2)x(1-0.2)x(1-0.2)x(1-0.2)=0.26**

Modal shift to reduce $CO_2$ EF per passenger-km or ton-km

Improve fuel economy
[Fuel consumption per vehicle-km]

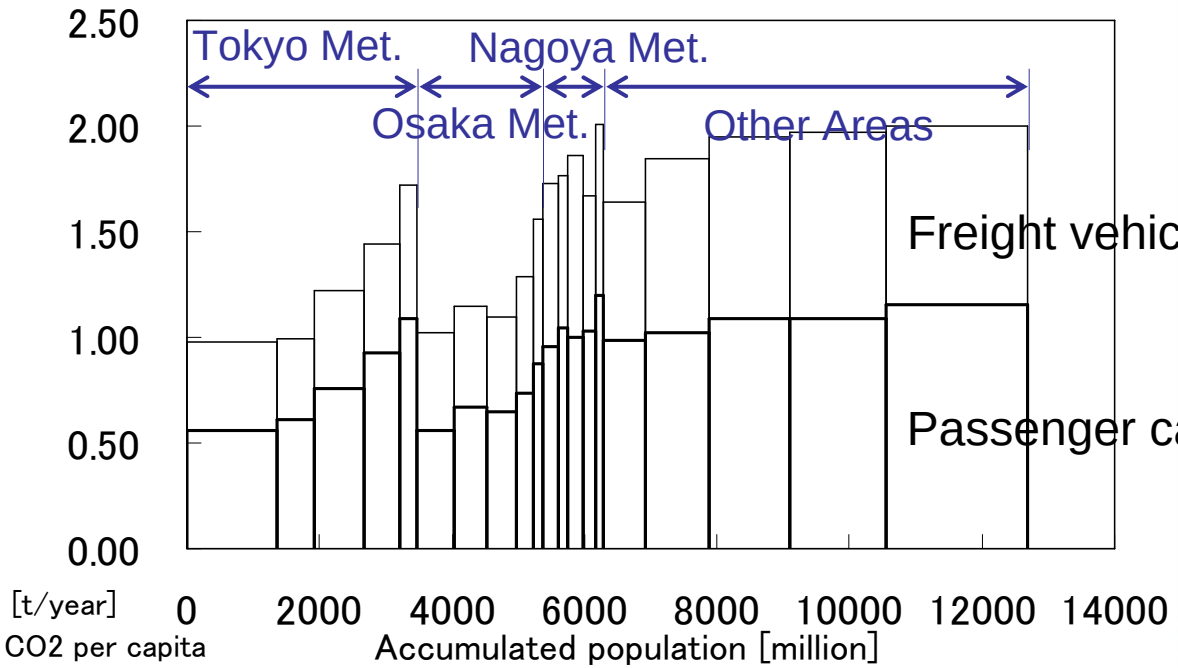
$$\frac{CO_2}{capita} = \frac{TransServ}{capita} \times \frac{Pkm(Tkm)}{TransServ} \times \sum_{Mode} \left( \frac{Vkm}{Pkm(Tkm)} \times \frac{Fuel}{Vkm} \times \frac{CO_2 EF}{Fuel} \right)$$

Improve load factor
[vehicle-km per Pkm(Tkm)]

Improve accessibility
[passenger-km or ton-km per transport-service]

Introduce low carbon energy
[$CO_2$ emission factor per fuel consumption]

# Estimated regional automotive $CO_2$ emissions




Each Area is categorized in
1. Major cities
2. Cities with a pop of 0.5 million and above
3. Cities with a pop of 0.3 and above
4. Cities with a pop of 0.1 and above
5. Cities with a pop less than 0.1 million
6. Counties




**Yuichi Moriguchi, 2nd Japan-UK joint research project workshop (2007.6)**

# TOD (Transit Oriented Development) in local city


Toyama Light Rail(2006.4.26-)

- Lack of public transport for cities of less population than one millions.
- It has been difficult to manage LRT because “self-supporting accounting system” was required.
- Upgrading from traditional tram has started.

**Yuichi Moriguchi, 2nd Japan-UK joint research project workshop (2007.6)**

# New concepts for personal mobility

$$\frac{Vkm}{Pkm(Tkm)} \quad \frac{Fuel}{Vkm} \quad \frac{CO_2EF}{Fuel}$$

the Segway Human Transporter

Yamaha EC-02

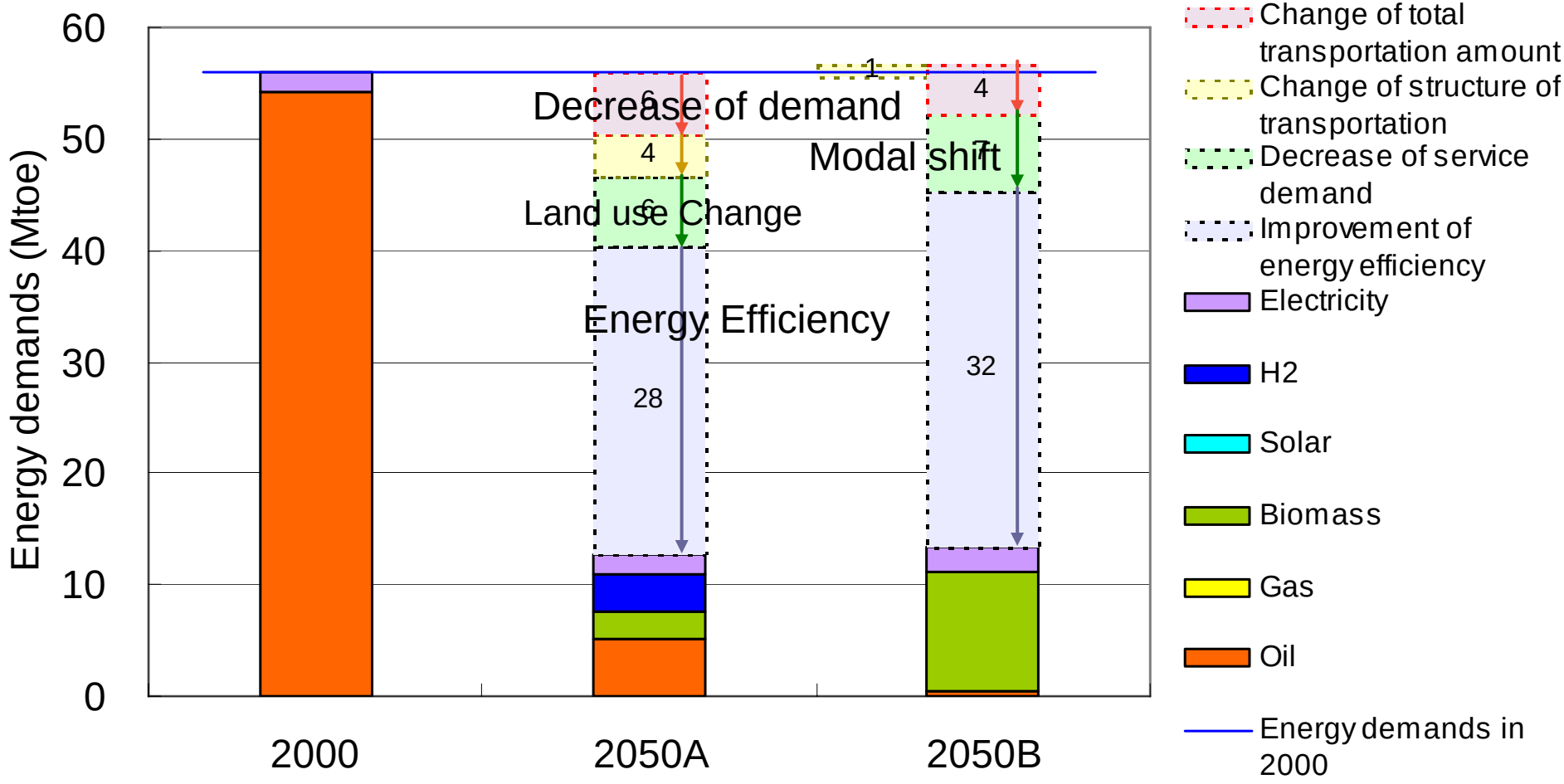
Kawamura cycle KE

Toyota i-Swing

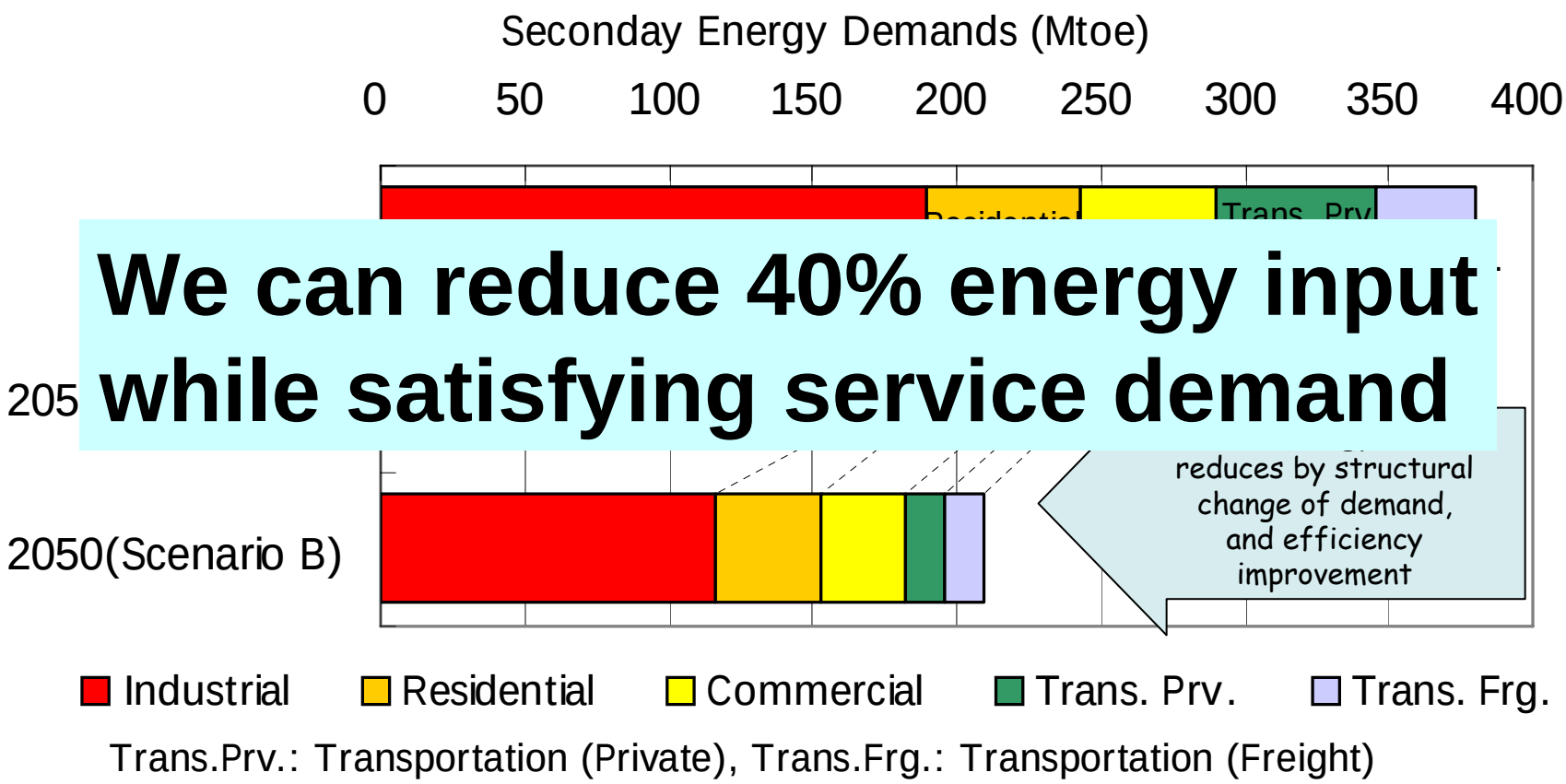
**Yuichi Moriguchi, 2nd Japan-UK joint research project workshop (2007.6)**

(catalog information)

# Passenger transportation
# Energy demand reduction potential: 80%



# Energy demands for achieving 70% reduction of $CO_2$ emissions



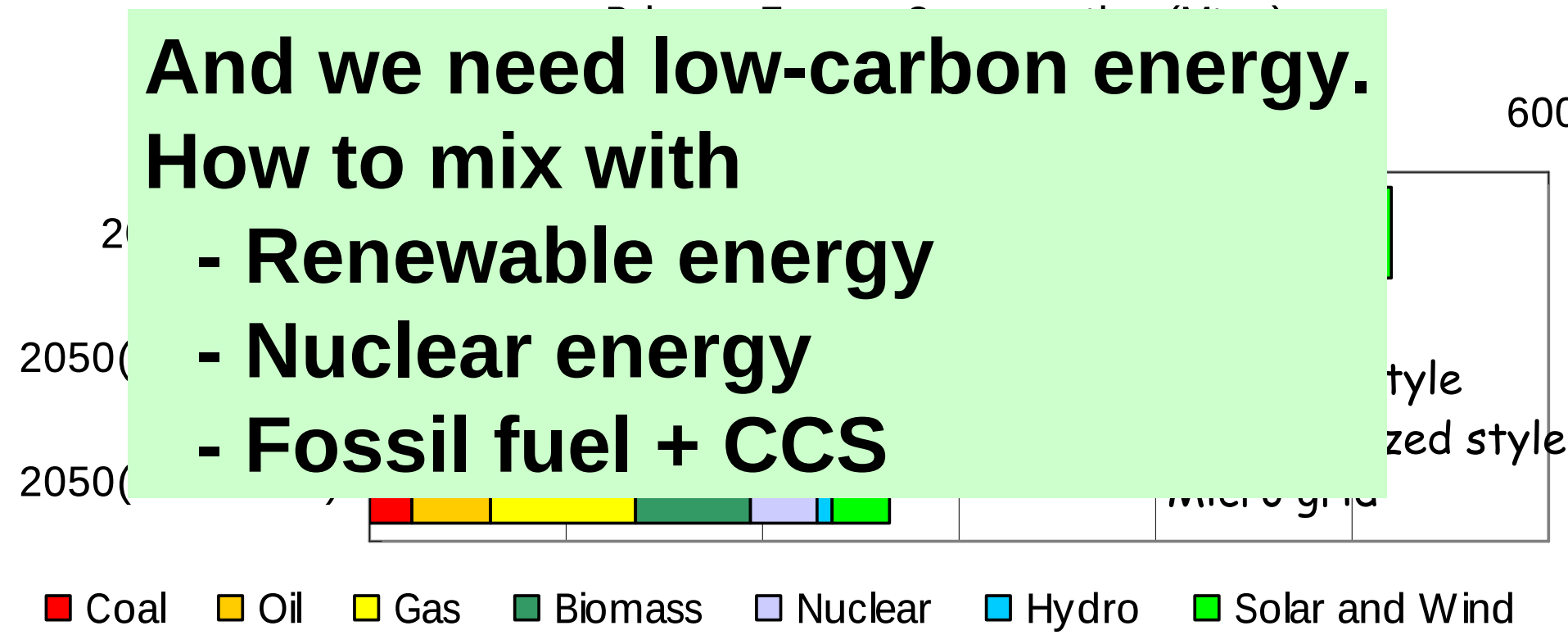

**We can reduce 40% energy input while satisfying service demand**

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

**Possible energy demands reductions for each sector:**
**Industry：structural change and introduction of saving energy tech. 20~40%**
**Passenger Transport :land use, saving energy, carbon-intensity change 80%**
**Freight Transport :efficient transportation system, energy efficient 60~70%**
**Residential: high-insulated and energy-saving houses 50%**
**Commercial: high-insulated building and energy saving devices 40%**

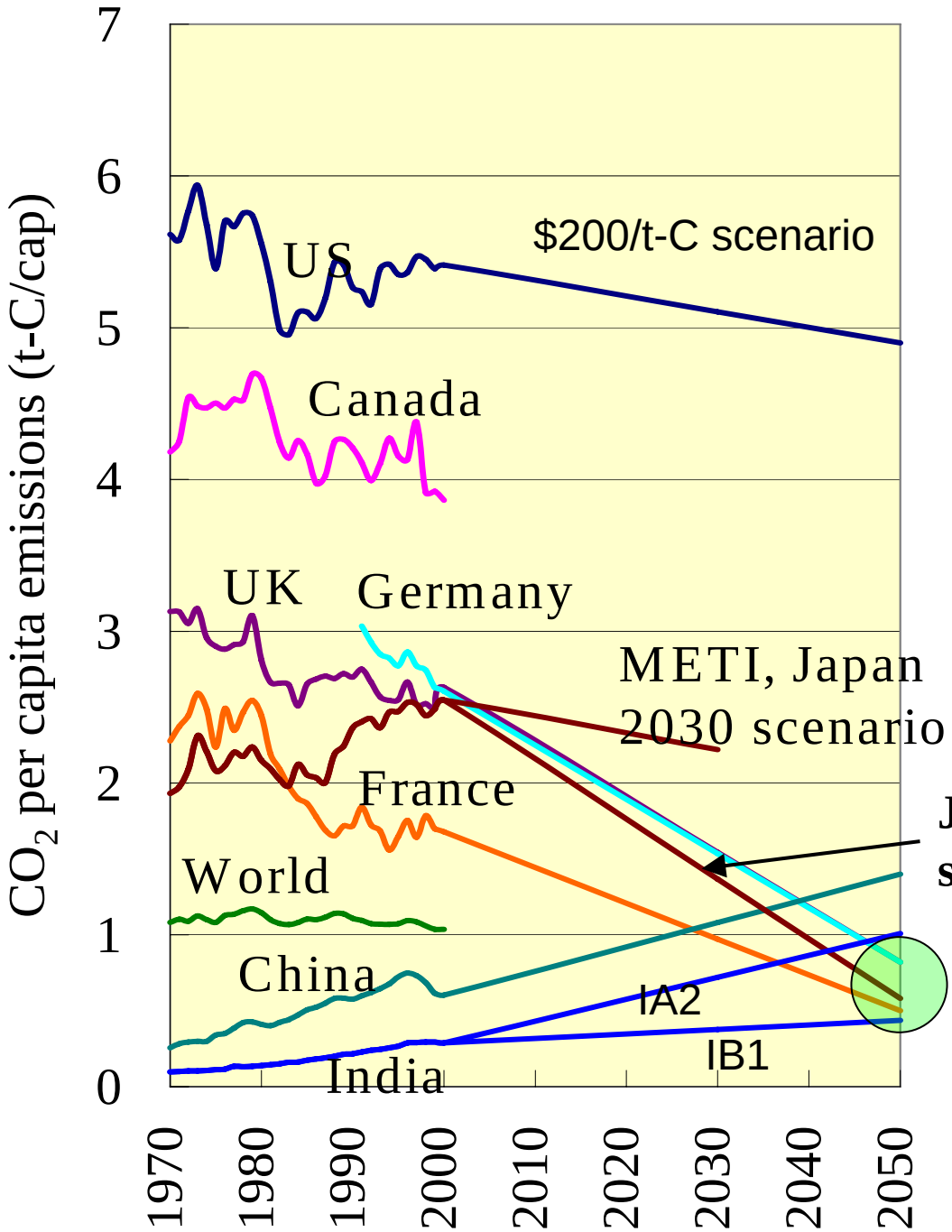
# Energy supply for achieving 70% reduction of $CO_2$ emissions

**And we need low-carbon energy.**
**How to mix with**
- **Renewable energy**
- **Nuclear energy**
- **Fossil fuel + CCS**




**1% of GDP is necessary to diffuse LCS technologies for Scenario A and B**

# Current per capita $CO_2$ emissions and Target




US: delay for tech development, global warming business

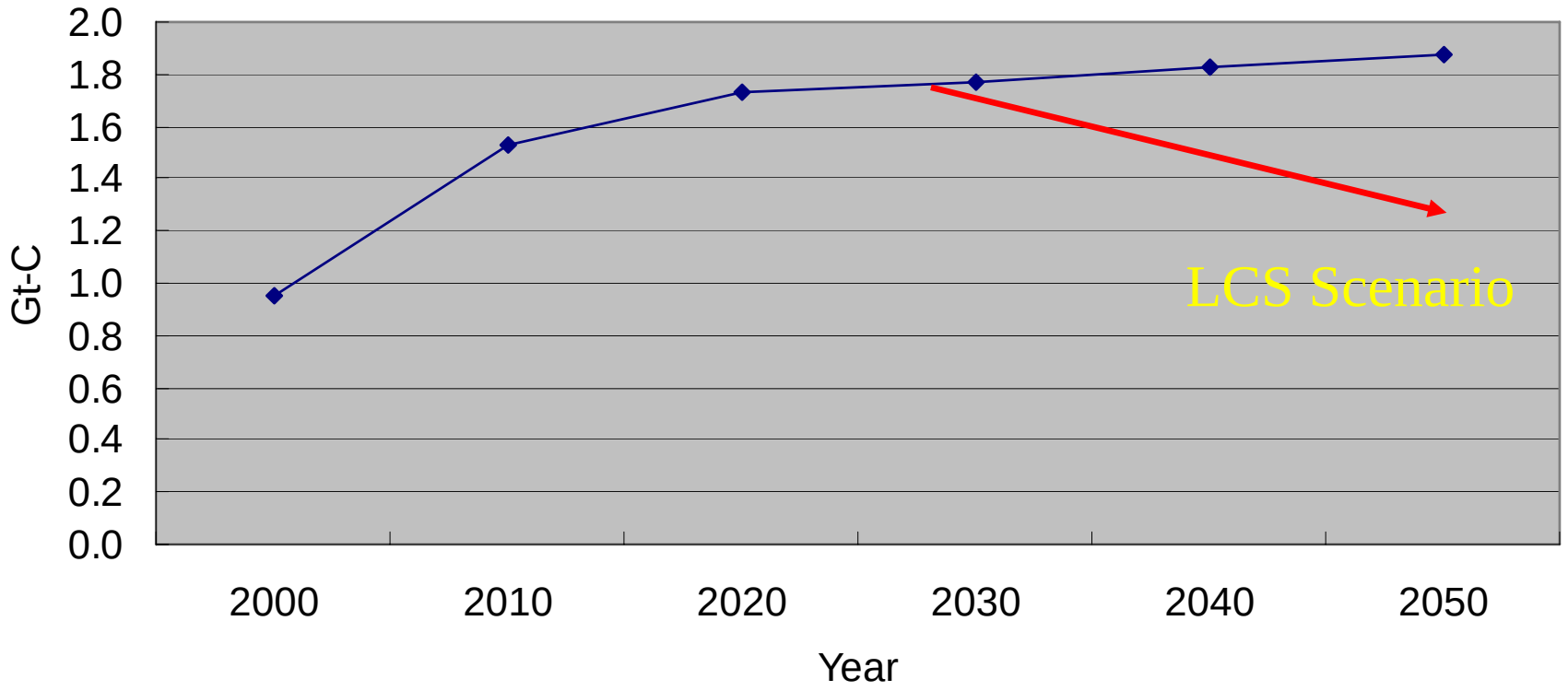
EU: Initiatives toward LCS
Japan: Need long-term vision

Developing countries: early guidance toward LCS is key

## Target for Low Carbon Society

Shuzo Nishioka, Junichi Fujino;
NIES COP11 and COP/MOP1 side event
Global Challenges Toward
Low-Carbon Economy (LCE), Dec.3, 2005

# CO2 Emission from Energy Activities in China



# VOICES FROM COMMUNITIES AFFECTED BY CLIMATE CHANGE
## Friends of the Earth International, November 22, 2007

3°n, 101°e

# malaysia

## rising to the challenge

**authors** Sangeetha Amarthalingam & Meenakshi Raman,
Sahabat Alam Malaysia/Friends of the Earth Malaysia

**slow path to forest conservation:** Forests have an important role in reducing climate change impacts.[7] For example, mangrove forests provide a crucial shield for vulnerable coastal development and agriculture, by buffering the effects of strong winds and heavy wave action. Forests' important role as carbon sinks was recognised by both the Forest Research Institute of Malaysia[8] and the Stern Review, which advocate incentives to halt deforestation in developing countries as a way to reduce emissions. However, such measures are not provided for under the Kyoto Protocol.

"What scientists are saying about climate change and deforestation is nothing new to us. We just wish the government would take our plight into consideration, as the people who are directly affected by their inaction in enforcing the law; particularly since climate change is becoming an important agenda for them now."

**Juk Eng Jau, community development programme manager,**
**Uma Bawang/Sungai Keluan communities, Baram River region, Sarawak state.**



http://www.foei.org/

# We support country-wise LCS modeling through SD for Asia-Pacific and the world

## - We have continued AIM Training Workshops since 1997 -

**Oct 16-20, 2006 at NIES**
**Oct 22-26, 2007 at NIES**

India China Thailand Korea Malaysia Indonesia Brazil Russia South Africa Taiwan, China USA Japan

# Japan-UK Joint Research Project
# LCS through Sustainable Development for Global Participation

**The First workshop was held in Tokyo, June14-16, 2006.**

Participants from 19 countries;
Asia: Japan, China, India, Thailand, Taiwan (China)
Africa: South Africa, Nigeria
Europe: UK, France, Germany, Denmark, Spain, Netherlands, Russia
Latin America: Brazil, Mexico, Chile
North America: US, Canada

**G8 Gleneagles 2005**

**G20 March 13-15, Chiba**
**G8 Env. May 25-27, Kobe**
**G8 Japan**
**July 2008**

**The Second workshop was held in London, June13-15, 2007.**

**The Third workshop will be held in Japan, Feb13-15, 2008.**

**Developing and Diffusing Innovations for our good life and LCS through SD**

# LCS is not only to avoid dangerous climate change, but to…

- **Avoid energy resource battles by using resources in efficient ways**
- **Develop many innovations to support global sustainable development**
- **Build safe and sound society considering appropriate land-use and city planning**

**<u>We need good systems to pledge people's activity for LCS</u>**

# What do you want to do now for our future?

Christmas Concert of Yoko Fujino's Piano Class on Dec 23, 2005