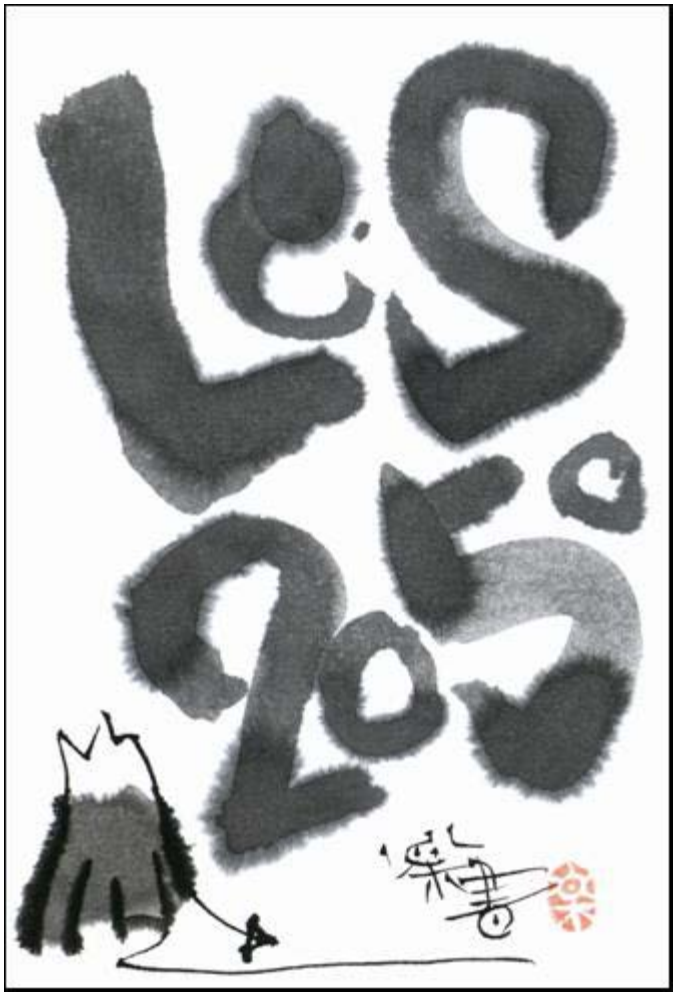
Japan and Asian Low-Carbon Society Scenarios and Actions

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

AIM ASIA-PACIFIC INTEGRATED MODEL

NIES JAPAN

Junichi FUJINO (fuji@nies.go.jp)

NIES (National Institute for Environmental Studies), Japan

Hari Perancangan Bandar Sedunia 2010

Hotel Royale Chulan, Kuala Lumpur, Nov 8, 2010

Japan LCS research project

- Japanese target: 25% cut by 2020 and 80% cut by 2050
- Local LCS roadmap development for Shiga, Kyoto and Tsukuba
- International LCS research network Japan-UK -> LCS-RNet

Japan LCS research project

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, Natural-oriented
Urban/Personal	Decentralized/Community
Technology breakthrough Centralized production /recycle	Self-sufficient Produce locally, consume locally
Comfortable and Convenient	Social and Cultural Values
2%/yr GDP per capita growth	1%/yr GDP per capita growth
	

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.

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

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%

Fuel cell

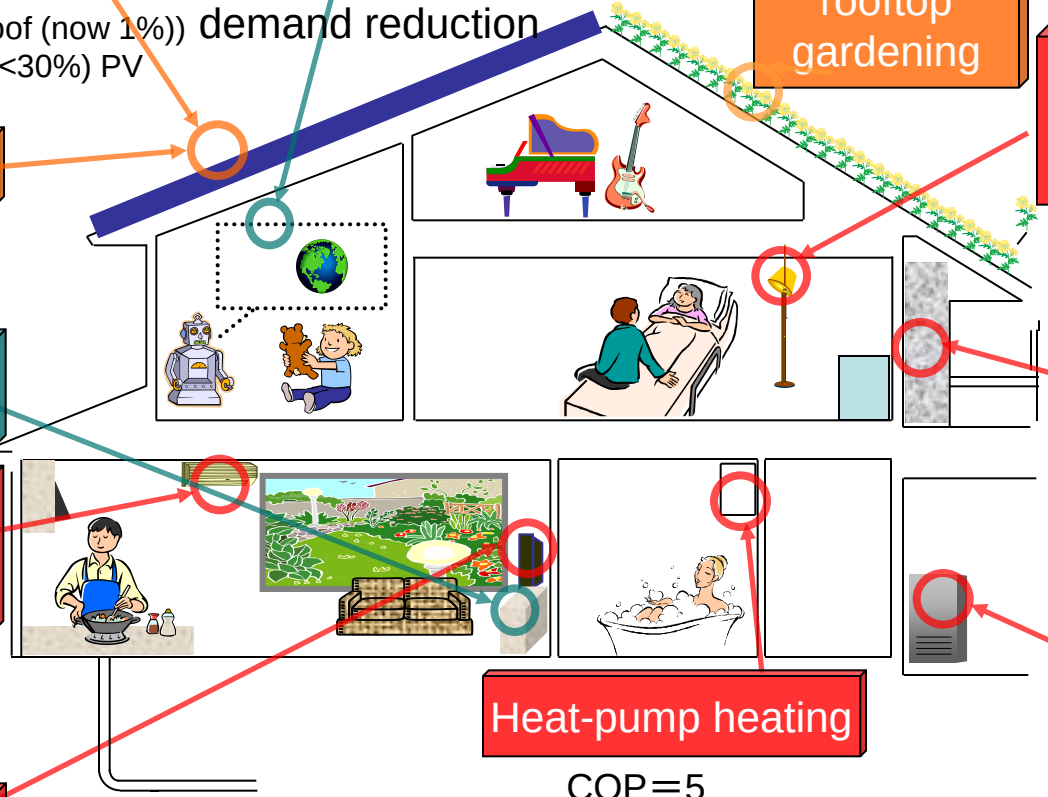
share 0-20%

Heat-pump heating

COP＝5
share 30-70%

Stand-by energy reduction

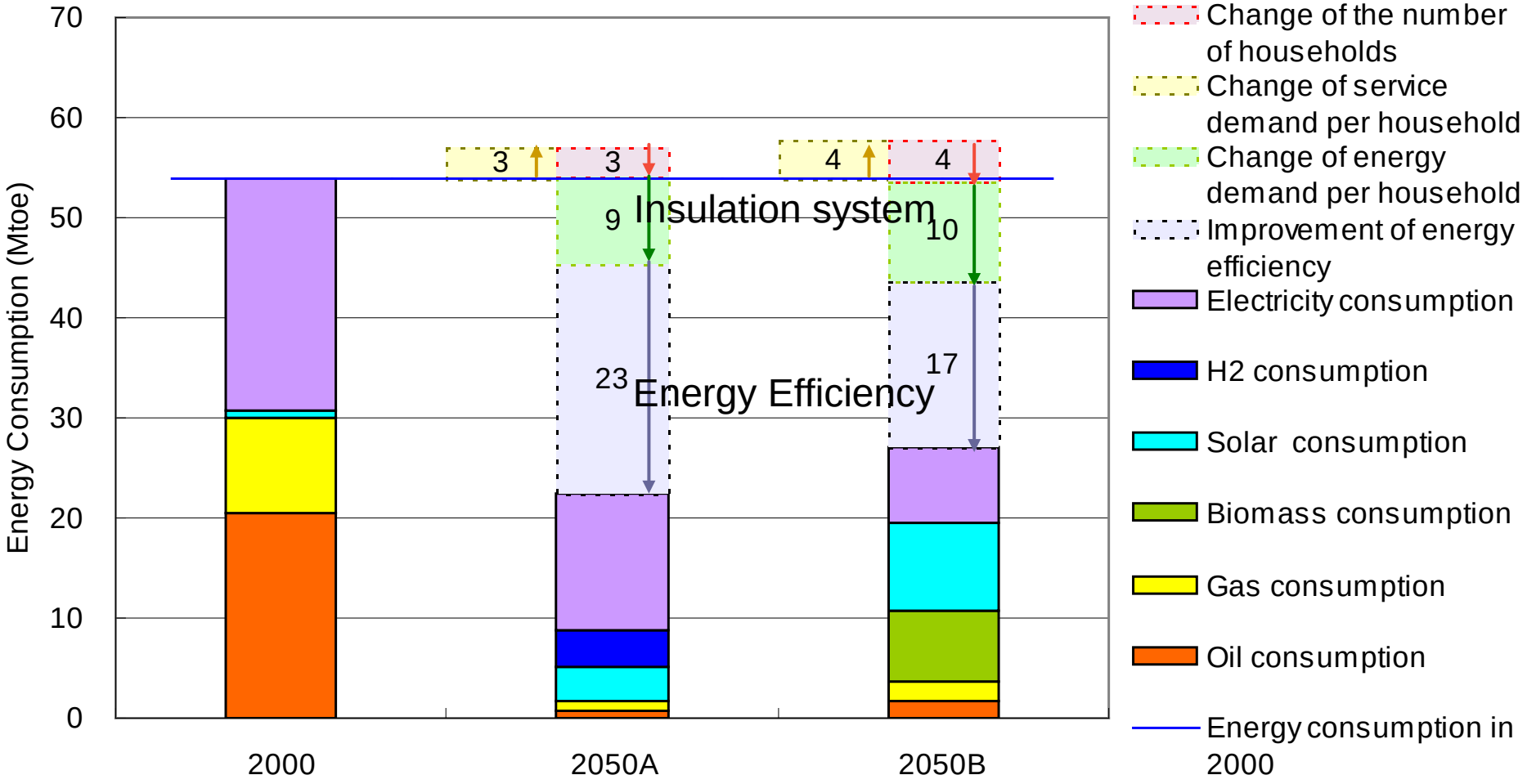
Reduce 1/3 energy demand,
share 100%



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

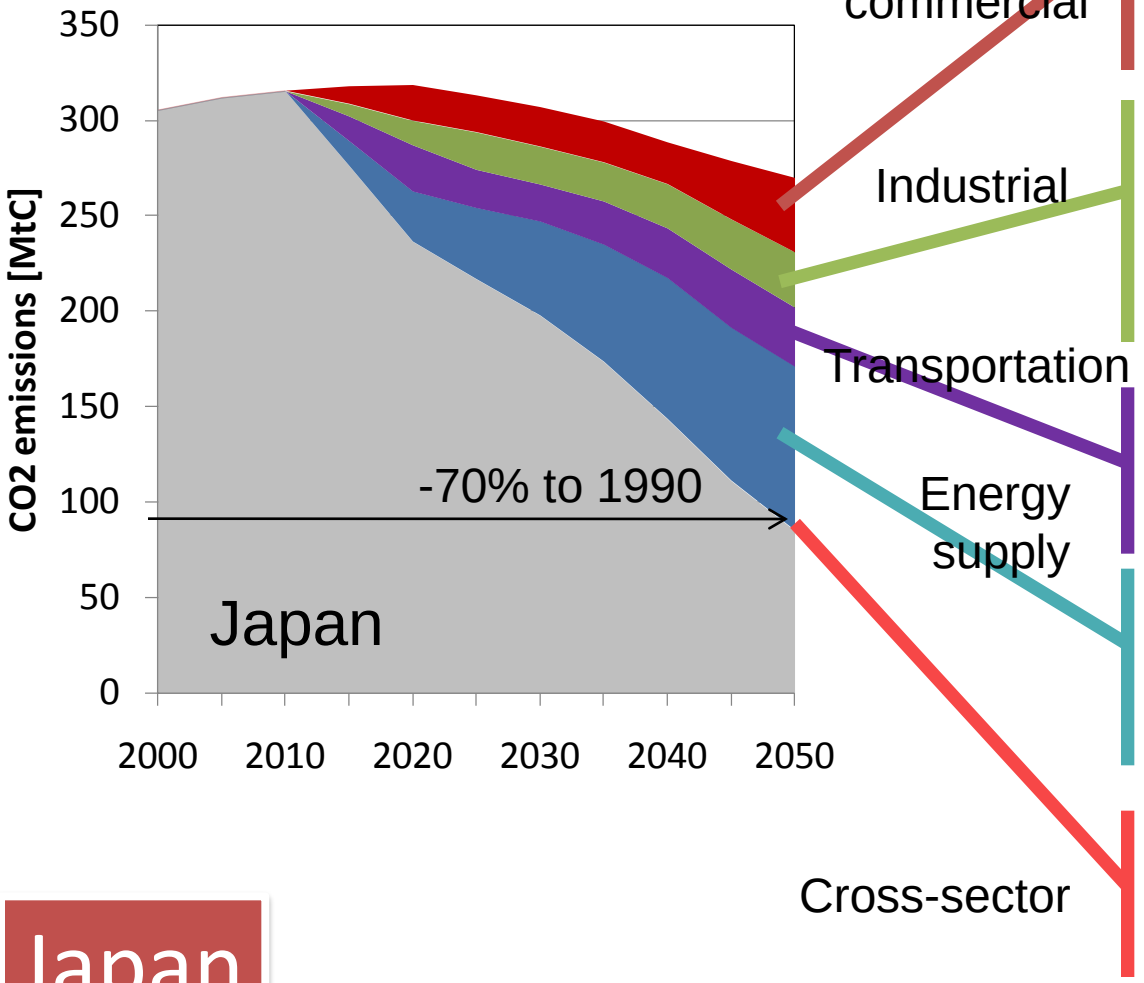
High efficiency appliances reduce energy demand and support comfortable and safe lifestyle

Residential sector
Energy demand reduction potential: 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

A dozen actions make it possible to reduce 70% CO2 emissions by 2050

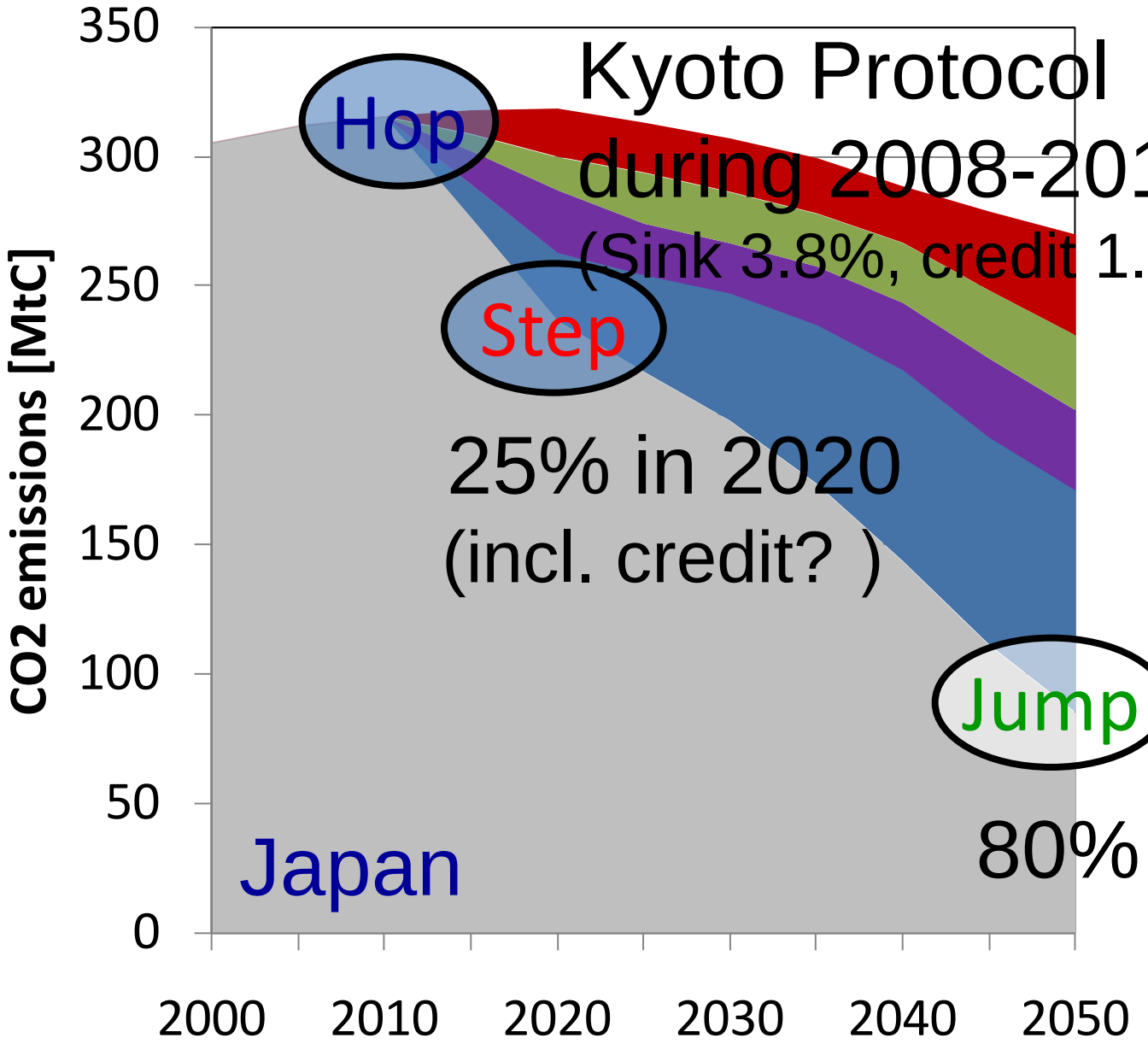


Japan

A Dozen Actions

1. Comfortable and Green Built Environment
2. Anytime, Anywhere Appropriate Appliances
3. Promoting Seasonal Local Food
4. Sustainable Building Materials
5. Environmentally Enlightened Business and Industry
6. Swift and Smooth Logistics
7. Pedestrian Friendly City Design
8. Low-Carbon Electricity
9. Local Renewable Resources for Local Demand
10. Next Generation Fuels
11. Labeling to Encourage Smart and Rational Choices
12. Low-Carbon Society Leadership

Japanese Targets towards 2050



Former Prime Minister Hatoyama 鳩山由紀夫

Japan

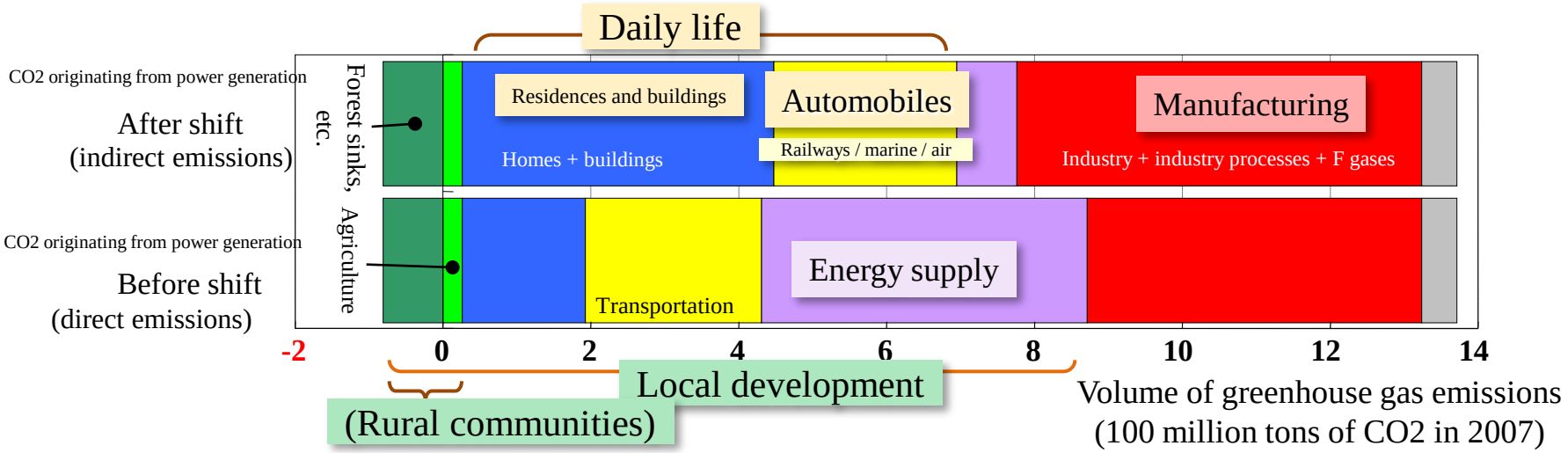
Structure of Mid- and Long-Term Roadmap Review Panel since Dec 2009

- 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



KEY CONCEPT FOR RESIDENTIAL AND COMMERCIAL SECTOR

- Diffusion of ZEB and ZEH
- Collaboration among central and local governments
- Labeling to encourage smart and rational choice

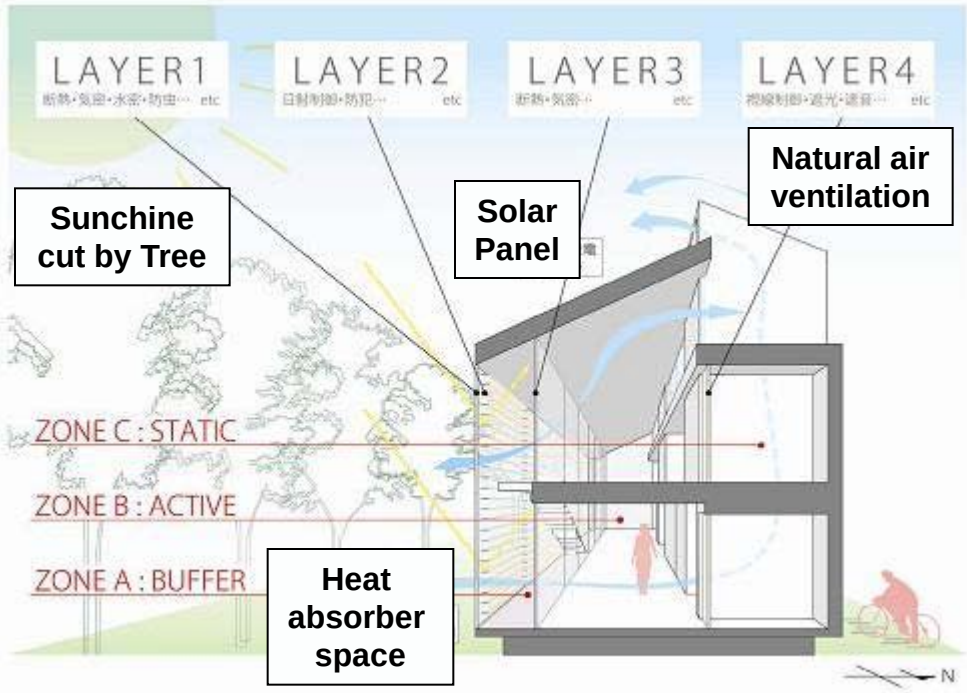
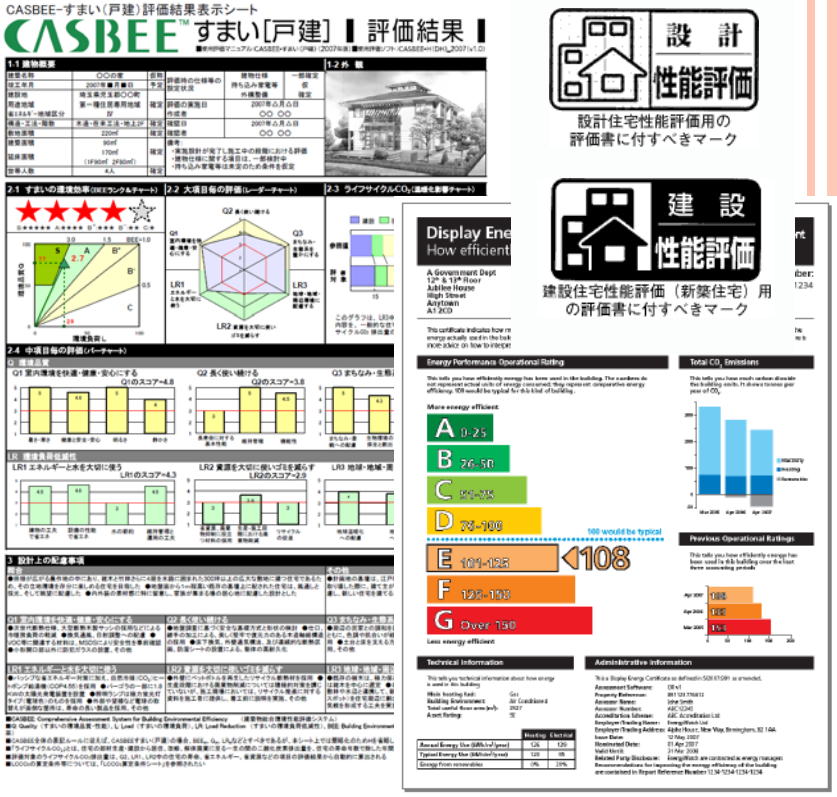


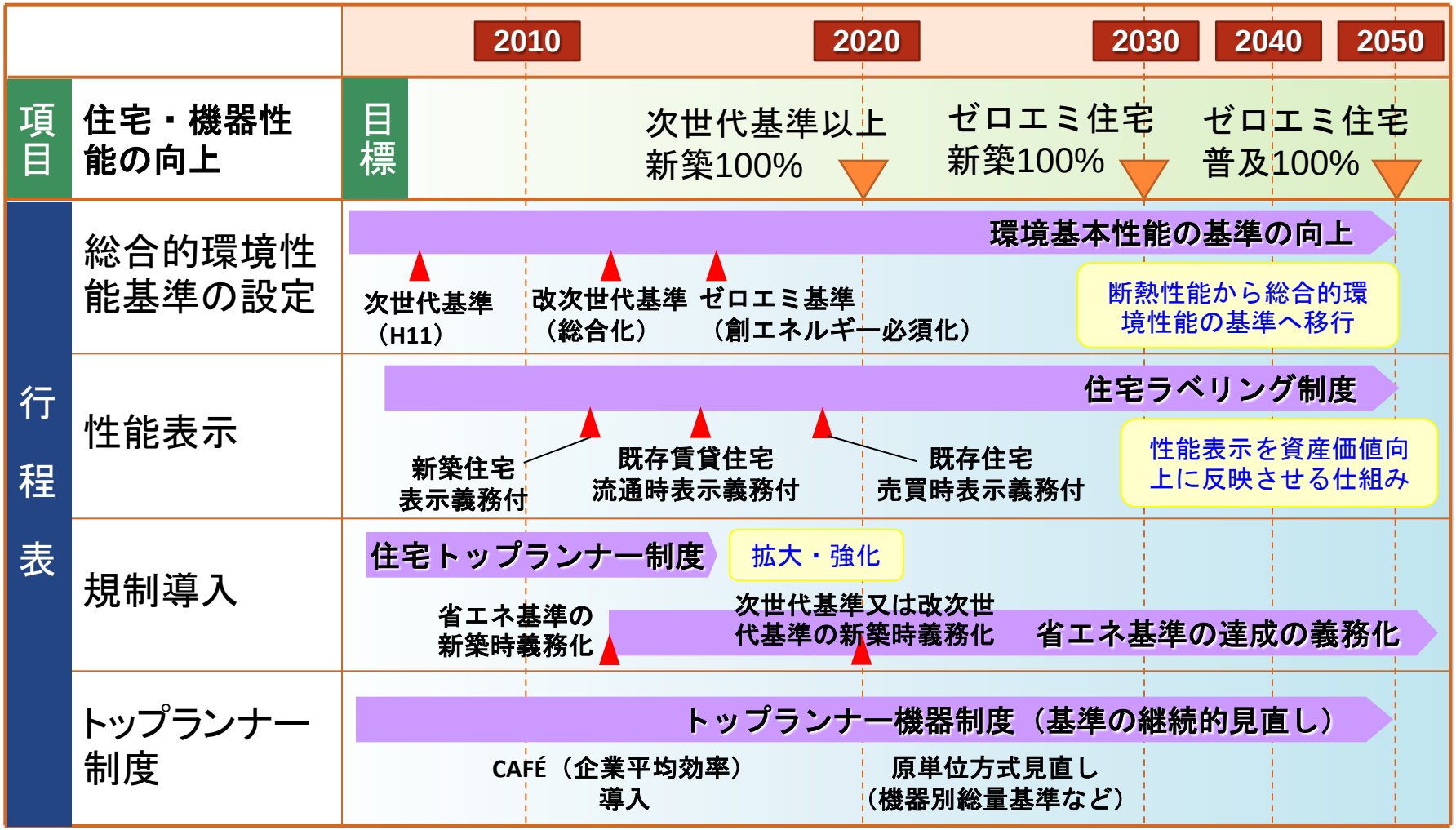
Image of Zero Emission House
（「LCCO2配慮建築物小委員会」資料、国交省）



“CASBEE”
building labeling system in Japan

Roadmap for residential and commercial sector

- 性能基準⇒性能表示⇒規制導入の流れで、住宅の環境基本性能の向上を図る仕組みを構築。

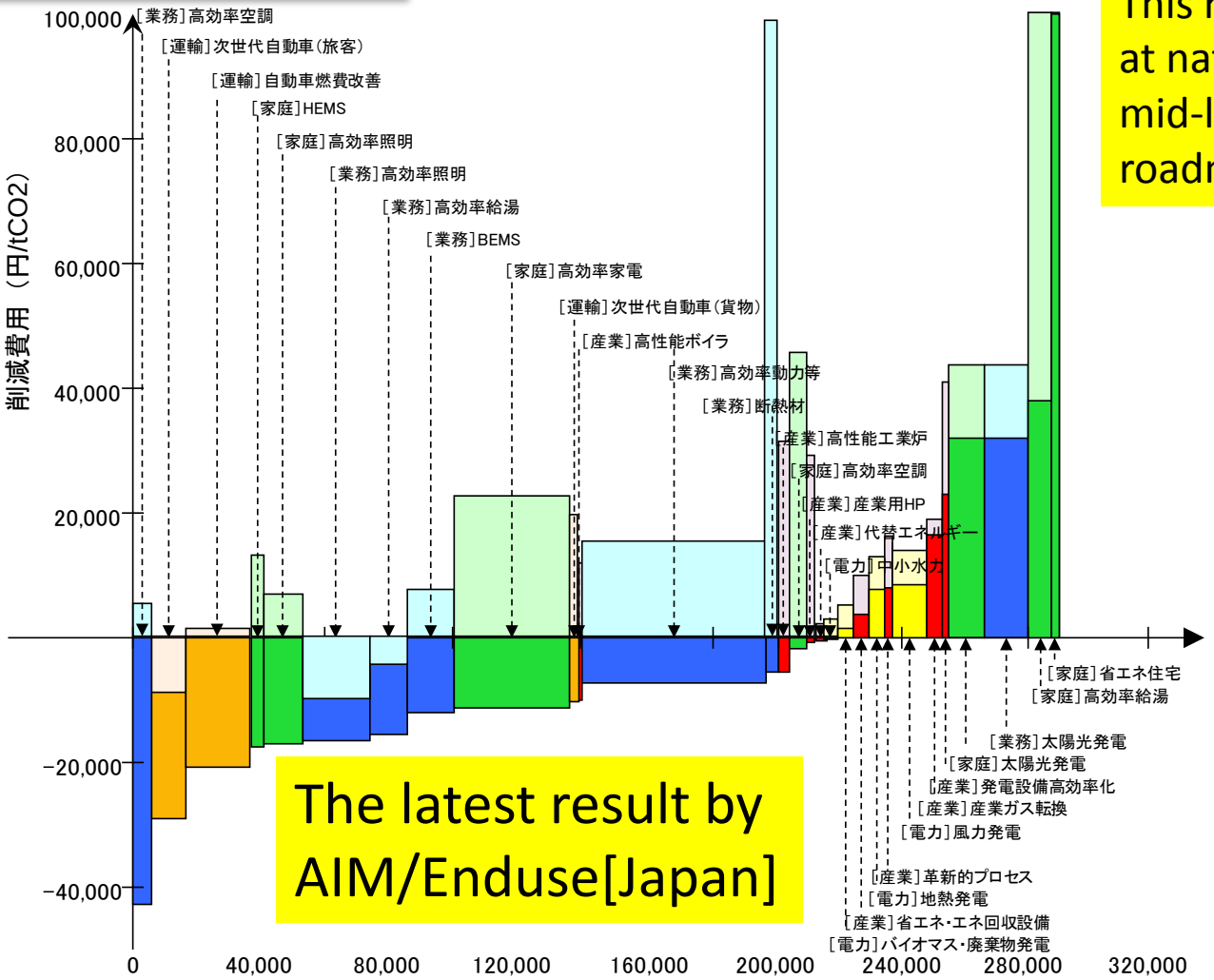


Mitigation cost curve in Japan to achieve 25% GHG emissions reductions by 2020 compared with 1990 level

各主体に任せ
加味して変容

社会費用も

削減費用と削減量の関係



This result was reported at national committee on mid-long term GHG mitigation roadmap on 15th Oct, 2010

家庭部門・投資回収年数 3年
業務部門・投資回収年数 3年
運輸部門・投資回収年数 5年
再エネ発電・投資回収年数 9年

社会的観点

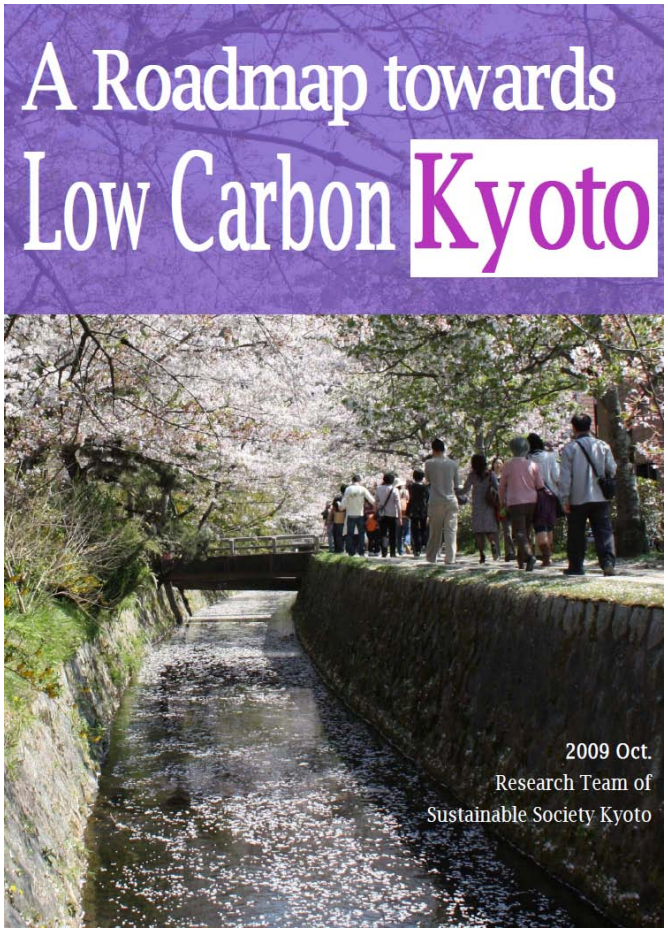
産業部門・投資回収年数 12～15年
家庭部門・投資回収年数 8年（*1）
業務部門・投資回収年数 8年（*2）
運輸部門・投資回収年数 8年
再エネ発電・投資回収年数 12年

*1 住宅は17年，*2 建築物は15年

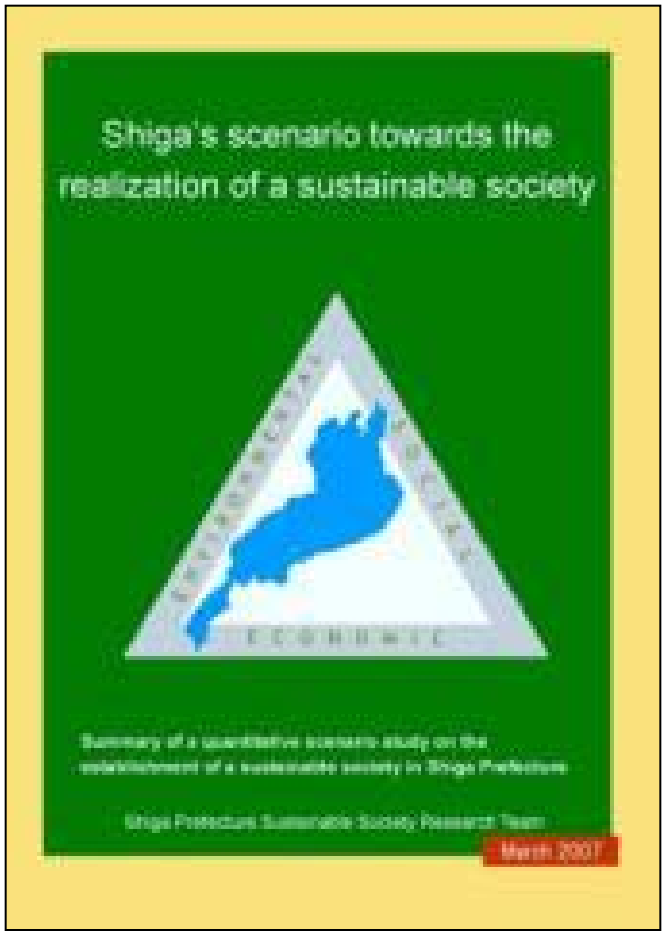
参考
- 事務所用建物 22～50年
- 鉄鋼業用設備 5～14年
- 家庭用冷暖房機器 6年
- 建物附属 冷房・暖房設備 13～15年
- 自動車　3～5年
- 汽力発電設備 15年
- その他発電設備17年

The latest result by AIM/Enduse[Japan]

Local initiatives in Japan

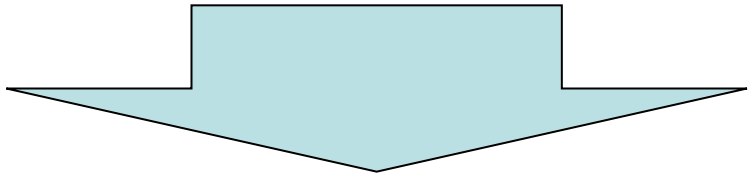


GHG reduction ordinance (25% cut by 2020 and 40% by 2030) is proposed on 7th July 2010 and adopted on 30th Sep 2010



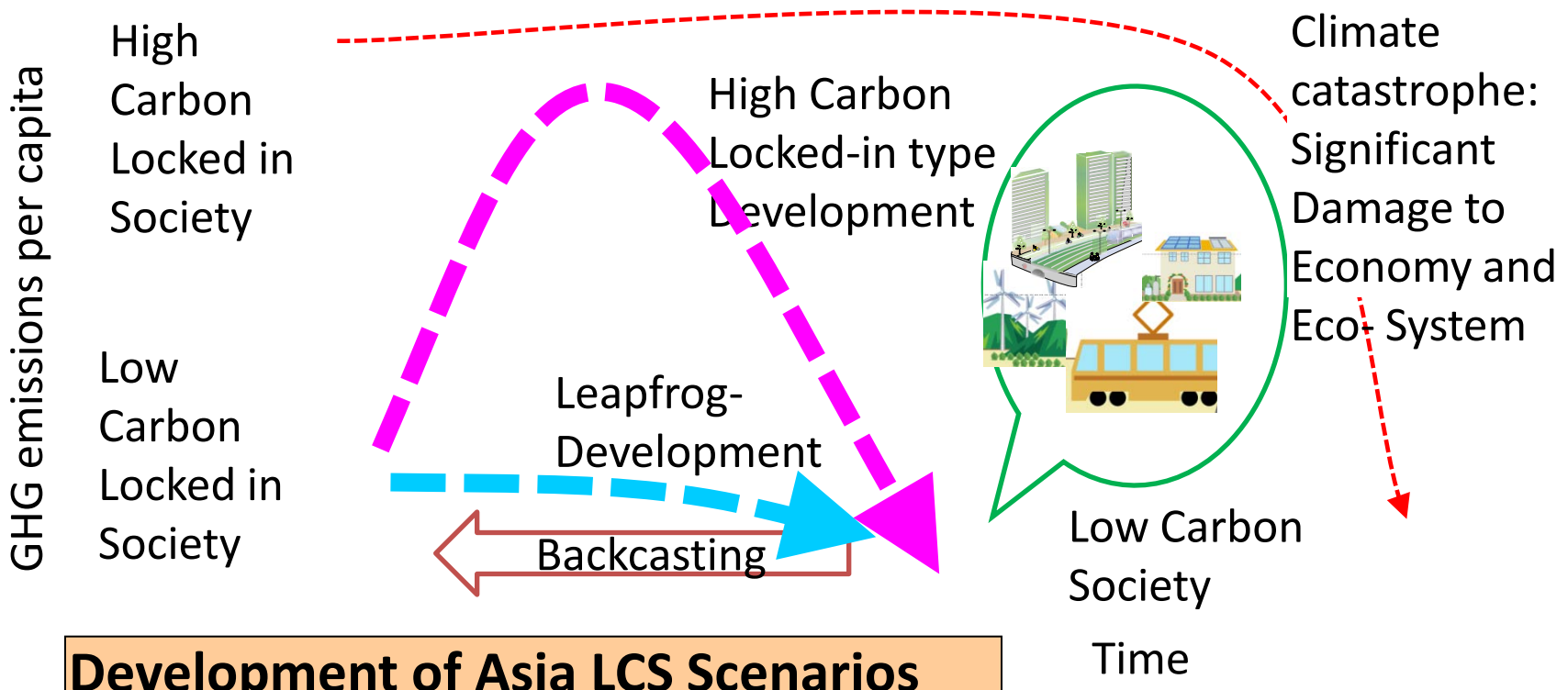
Mitigation roadmap is discussed at local congress and stakeholders dialogue

Japan LCS



Low-Carbon Asia

How to reach to Low Carbon Society in Asia ?



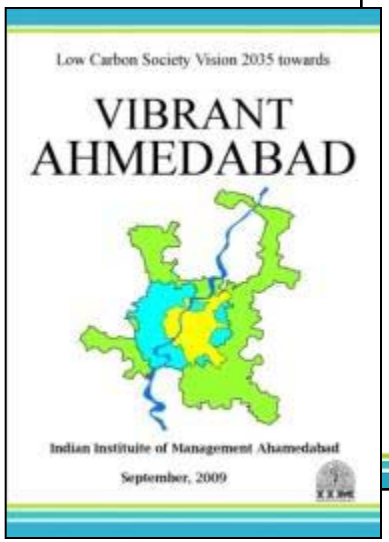
Development of Asia LCS Scenarios

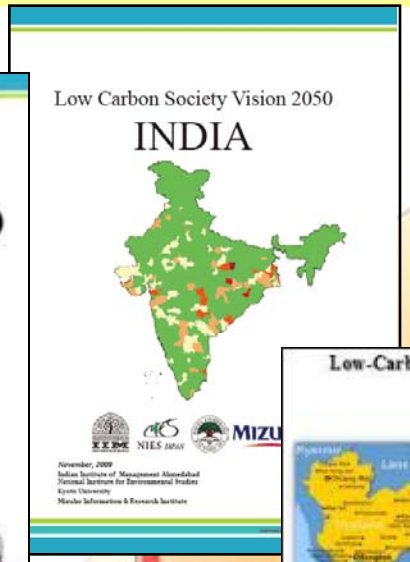
(1) Depicting narrative scenarios for LCS
(2) Quantifying future LCS visions
(3) Developing robust roadmaps by backcasting

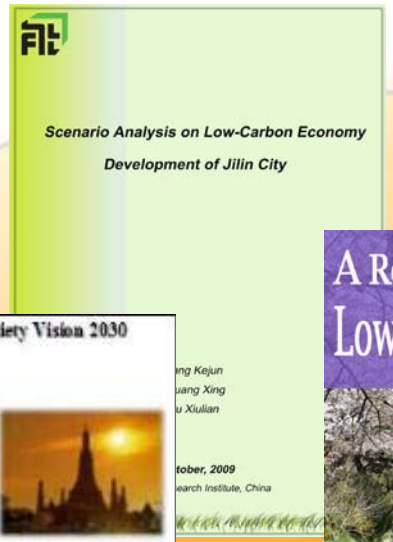
Policy Packages for Asia LCS

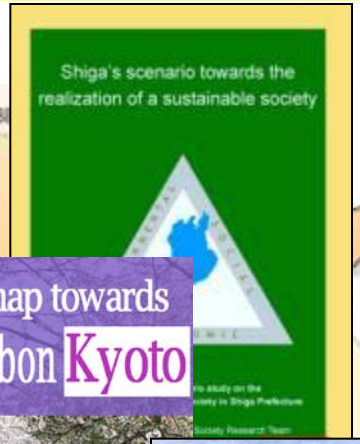
Funded by Ministry of Environment, Japan (GERF, S-6) and NIES

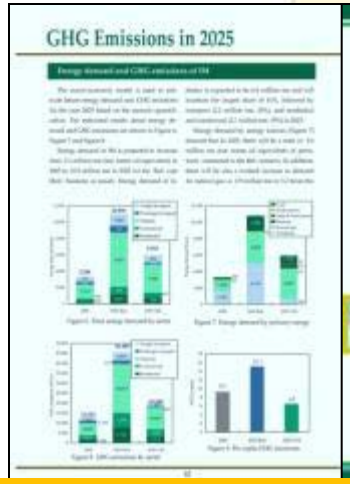
Low-Carbon Scenarios for countries and sub-countries in Asian

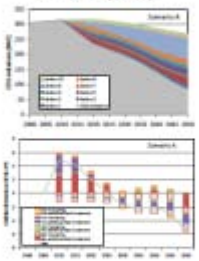










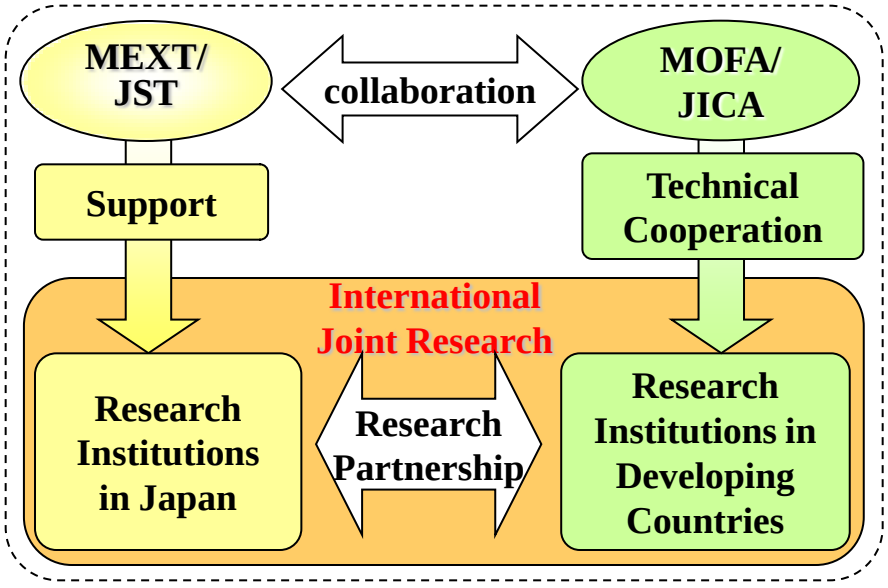


We will hold COP16 side-event with IGES and ADB

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

Science and Technology Research Partnership for Sustainable Development (SATREPS)

- JST supports international joint research cooperation between Japan and developing countries for resolving global issues such as: environment/energy, natural disaster prevention and infectious diseases control.
- Such research cooperation is conducted in collaboration with JICA, an organization that implements ODA technical cooperation.
- Objectives of the program are
 to strengthen the international science and technology (S&T) cooperation between Japan and developing countries to advance scientific knowledge and technology for resolving the global issues we face, and
 to build capacities of counterpart researchers and research institutes.



MEXT: Ministry of Education, Culture, Sports, Science and Technology
MOFA: Ministry of Foreign Affairs
JST: Japan Science and Technology Agency JICA: Japan International Cooperation Agency

<No. of projects adopted in FY2008 ~ FY2010>

Research Areas	Region			FY		
	Asia	Africa	Others	2008	2009	2010
Research contributing to adaptation to or mitigation of climate change	25	13	11	4	4	0
Research contributing to energy systems for low carbon society				—	—	4
Research contributing to the resolution of global-scale environmental issues				3	2	4
Research contributing to sustainable utilization of bio-resources				—	6	5
Research on natural disaster prevention measures attuned to the needs of developing countries				3	4	2
Research on measures to address infectious diseases control attuned to the needs of developing countries				2	4	2
Total				12	20	17
				49		

Outline of the proposal

Title: Development of Low Carbon Society Scenarios for Asian Regions

Target country: Malaysia

Institutes expected to be involved:

- Universiti Teknologi Malaysia (UTM)
- Federal Department of Town and Country Planning Malaysia (JPBD)
- Iskandar Regional Development Authority (IRDA)
- Pusat Tenaga Malaysia (PTM)
- Kyoto University (KU)
- National Institute for Environment Studies (NIES)
- Okayama University (OU)

Project period: 2010-2014

Expected Total budget: 190 Million JPY to Japan's group and less than 300 Million JPY as ODA "technical cooperation"

LCS study by AIM team

- 1990 start AIM (Asia-Pacific Integrated Model) project
- 2000 provide IPCC/SREN A1B maker scenario

  2003 UK released “Low-Carbon Economy” Paper
- 2004.4-2009.3 “Japan LCS research project” coordinated by AIM/NIES funded by MOEJ and provide 70% CO2 cut scenario by 2050
- 2006.2-2008.3 “Japan-UK joint LCS research project” submitted “call for action” to G8 Japan summit
- 2009.4-2014.3 “Low-Carbon Asia research project” coordinated by AIM/NIES funded by MOEJ
- 2010.4-2015.3 SATREPS “Development of Low Carbon Society Scenarios for Asian Region” especially focused on Iskandar and Malaysia funded by JST/JICA

LCS is not only to avoid dangerous climate change, but also 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
- And our happy life!

We need good systems to pledge people's activity for LCS

What do you want to do now for our future?

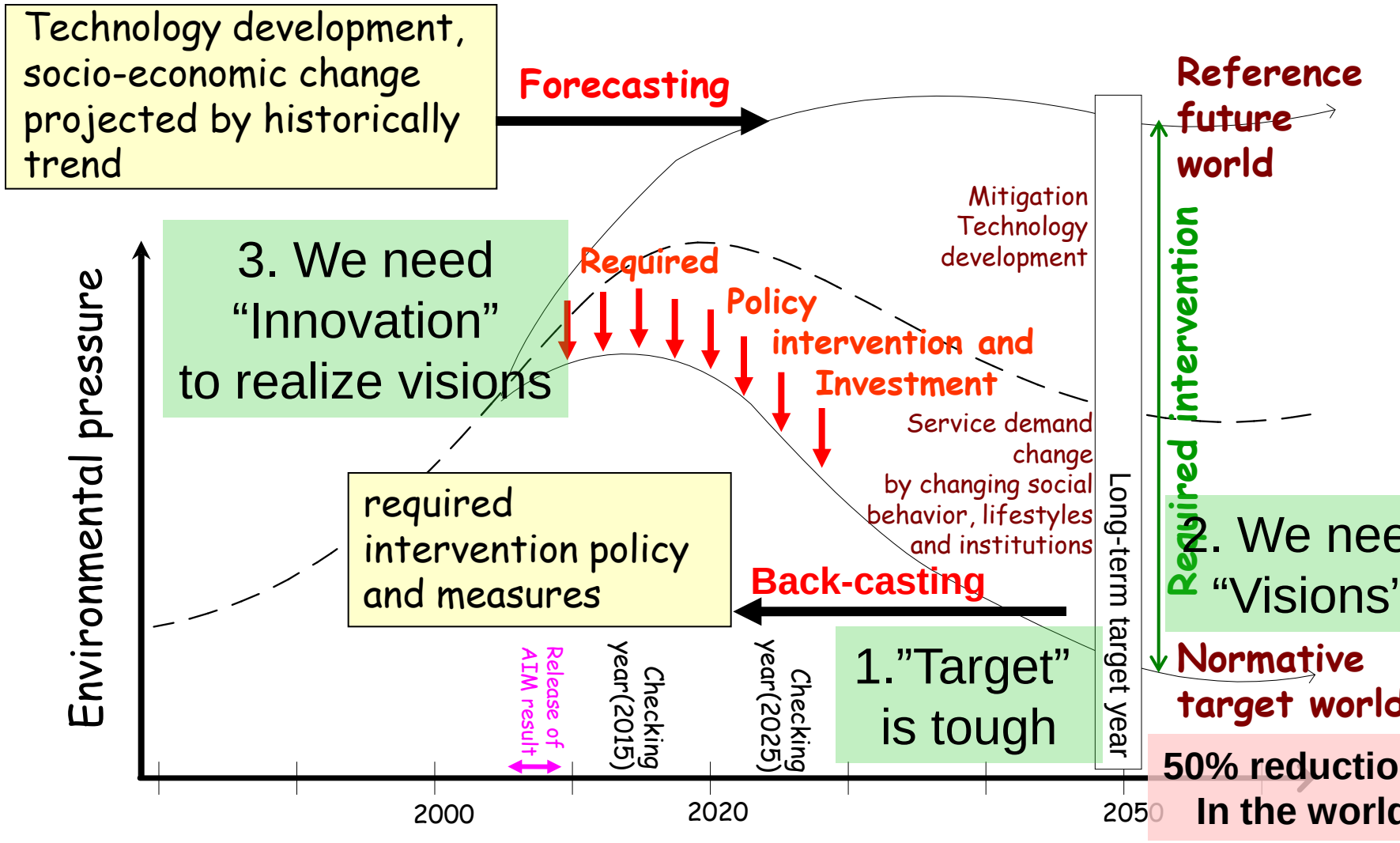
Christmas Concert of Yoko Fujino's Piano Class on Dec 23, 2005

Concept comes true
by planning and actions.
Let's realize happy LCS
by imagination,
creativity,
and our actions.

Junichi Fujino

fuji@nies.go.jp

Forecasting from now and Backcasting from future prescribed/normative world



Japan Low Carbon Society Scenarios toward 2050

Japan Low Carbon Society 2050

Study environmental options toward low carbon society in Japan

Advisory board : advice to project

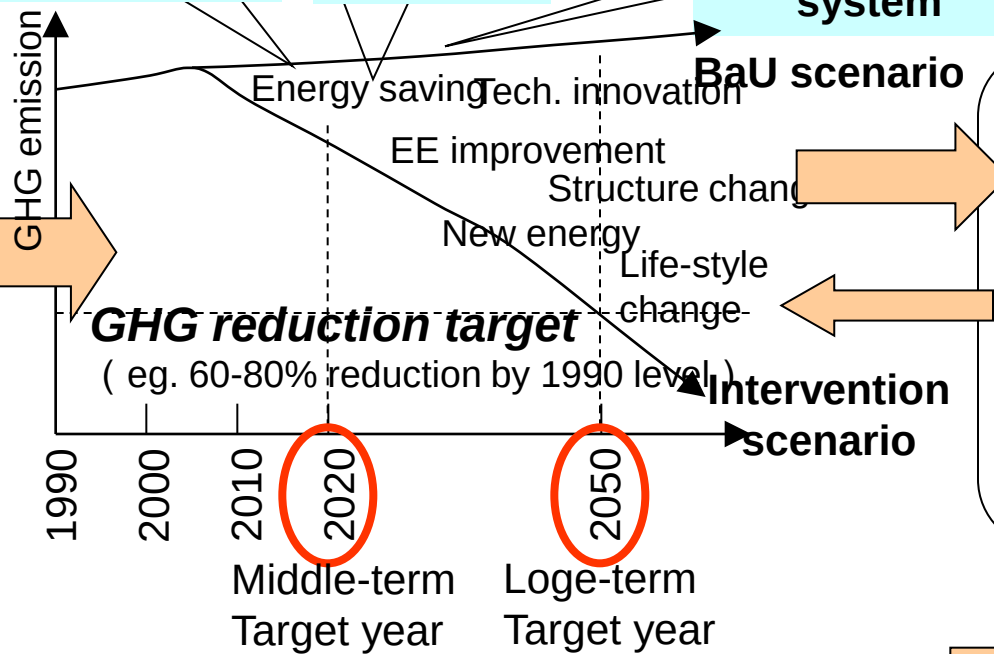
Techno-Socio Innovation Study

Green buildings Self-sustained city Decentralized services	Eco awareness Effective communication Dematerialization	Next generation vehicles Efficient transportation system Advanced logistics

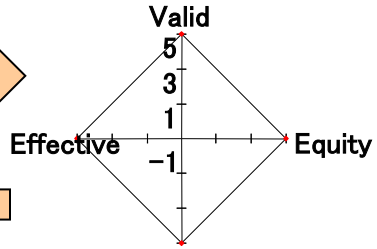
Urban structure | **IT-society** | **Transportation system**

Long-term Scenario Development Study

Develop socio-economic scenario, evaluate counter-measures using econ-techno models



Reduction Target study



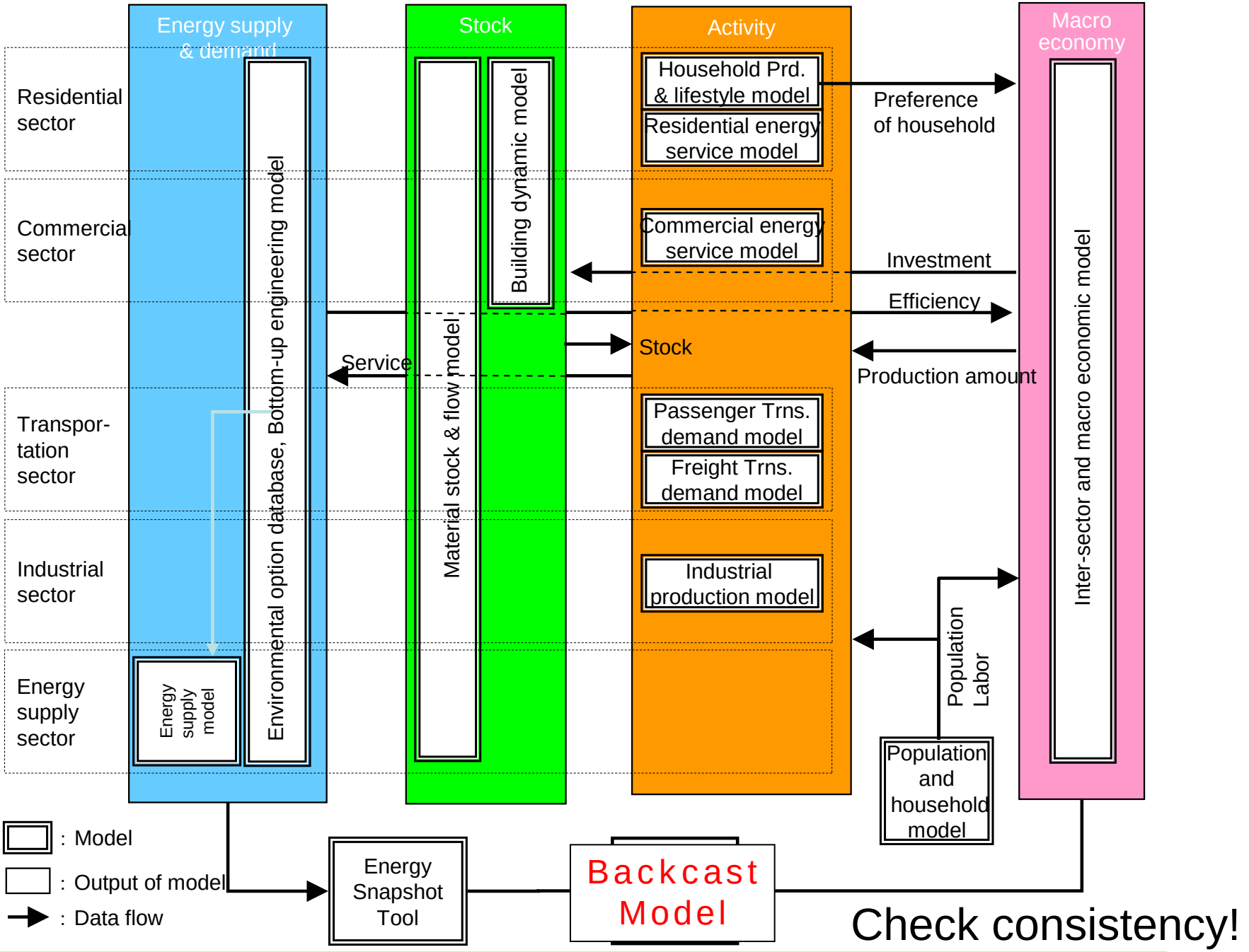
Evaluate feasibility of GHG reduction target

60 Researchers

Propose the direction of long-term global warming policy

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

http://2050.nies.go.jp



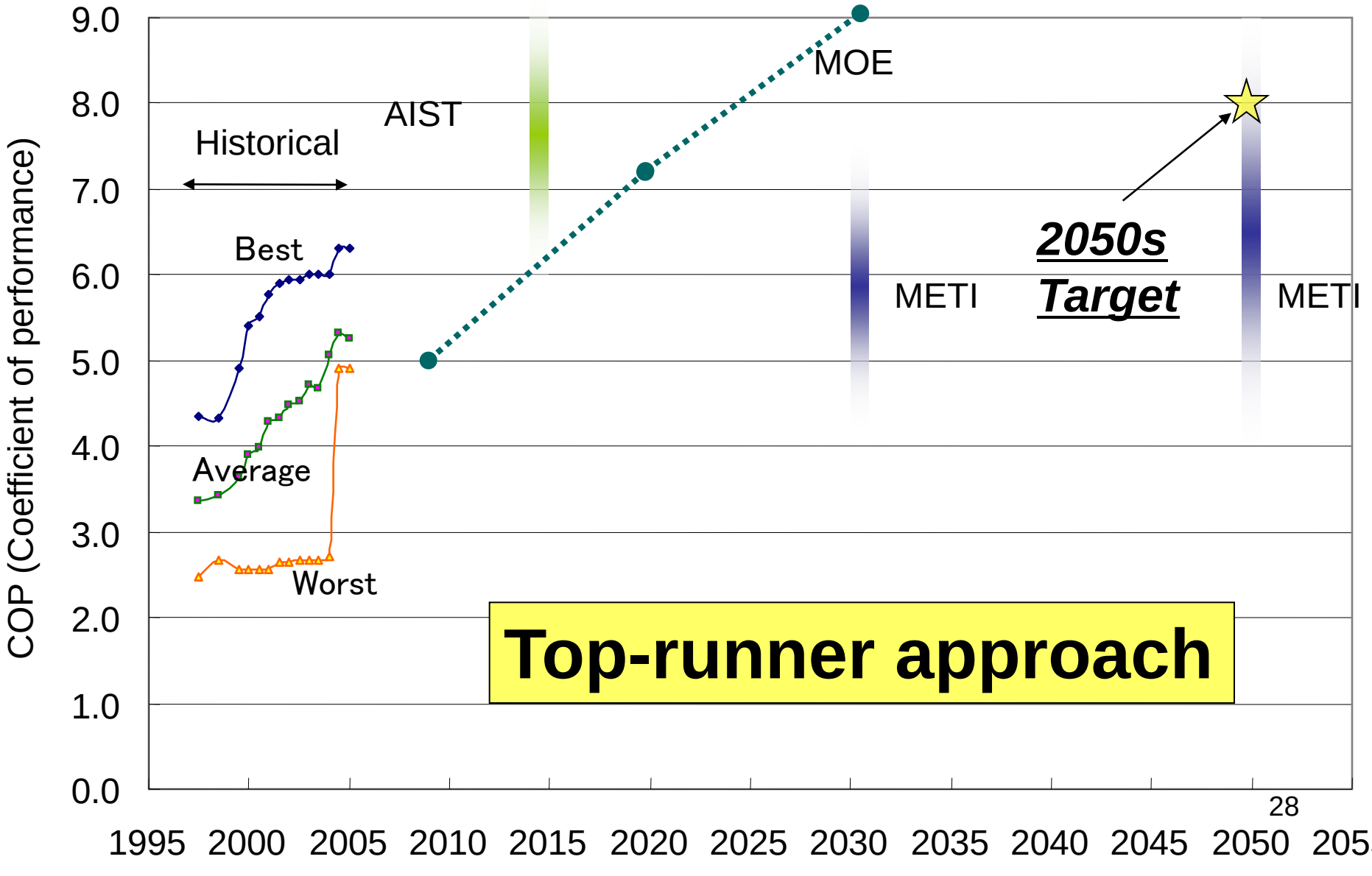
AIM (Asia-Pacific Integrated Modeling) for Japan LCS scenarios

Socio-Economic Scenarios in Japan, 2050

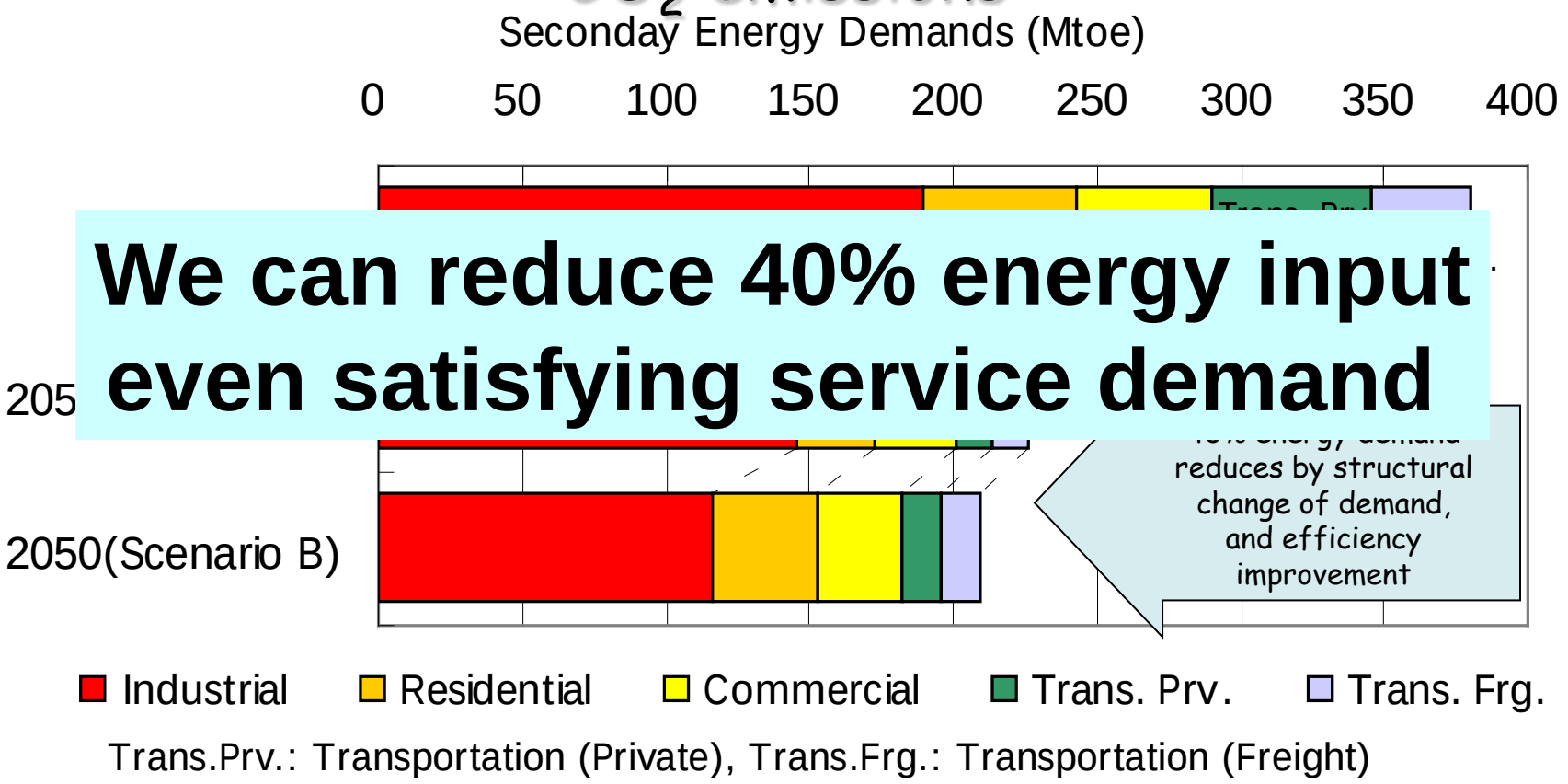
year	unit	2000	2050 A		2050 B		model
Population	Mil.	127	94	(74%)	100	(79%)	Population and Household model
Household	Mil.	47	43	(92%)	42	(90%)	
Average number of person per household		2.7	2.2		2.4		
GDP	Tril.JPY	519	1,080	(208%)	701	(135%)	Inter-sector and Macro Economic Model
Share of production							
primary	%	2%	1%		2%		
secondary	%	28%	18%		20%		
tertiary	%	71%	80%		79%		
Office floor space	Mil.m^2	1654	1,934	(117%)	1,718	(104%)	Building dynamics Model & Inter-sector and Macro Economic Model
Travel Passenger volume	bill. p·km	1,297	1045	(81%)	963	(74%)	Transportation demand model & Inter-sector and Macro Economic Model
Private car	%	53%	32%		51%		
Public transport	%	34%	52%		38%		
Walk/bycycle	%	7%	7%		8%		
Freight transport volume	bill. t·km	570	608	(107%)	490	(86%)	
Industrial production index		100	126	(126%)	90	(90%)	Inter-sector and Macro Economic Model
Steel production	Mil.t	107	67	(63%)	58	(54%)	
Etylen production	Mil.t	8	5	(60%)	3	(40%)	
Cement production	Mil.t	82	51	(62%)	47	(57%)	
Paper production	Mil.t	32	18	(57%)	26	(81%)	

(%) is a percentage compared with year 2000

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



Energy demands for achieving 70% reduction of CO_2 emissions

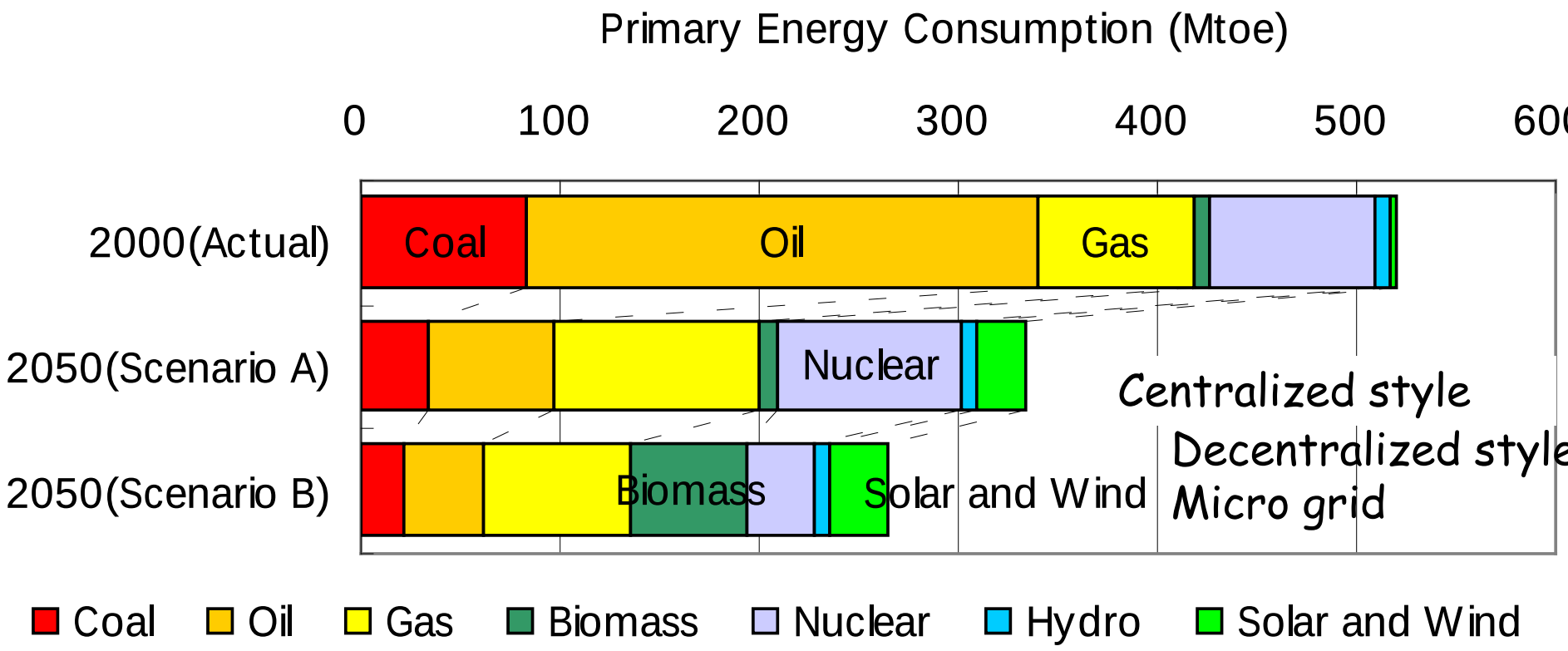


We can reduce 40% energy input even satisfying service demand

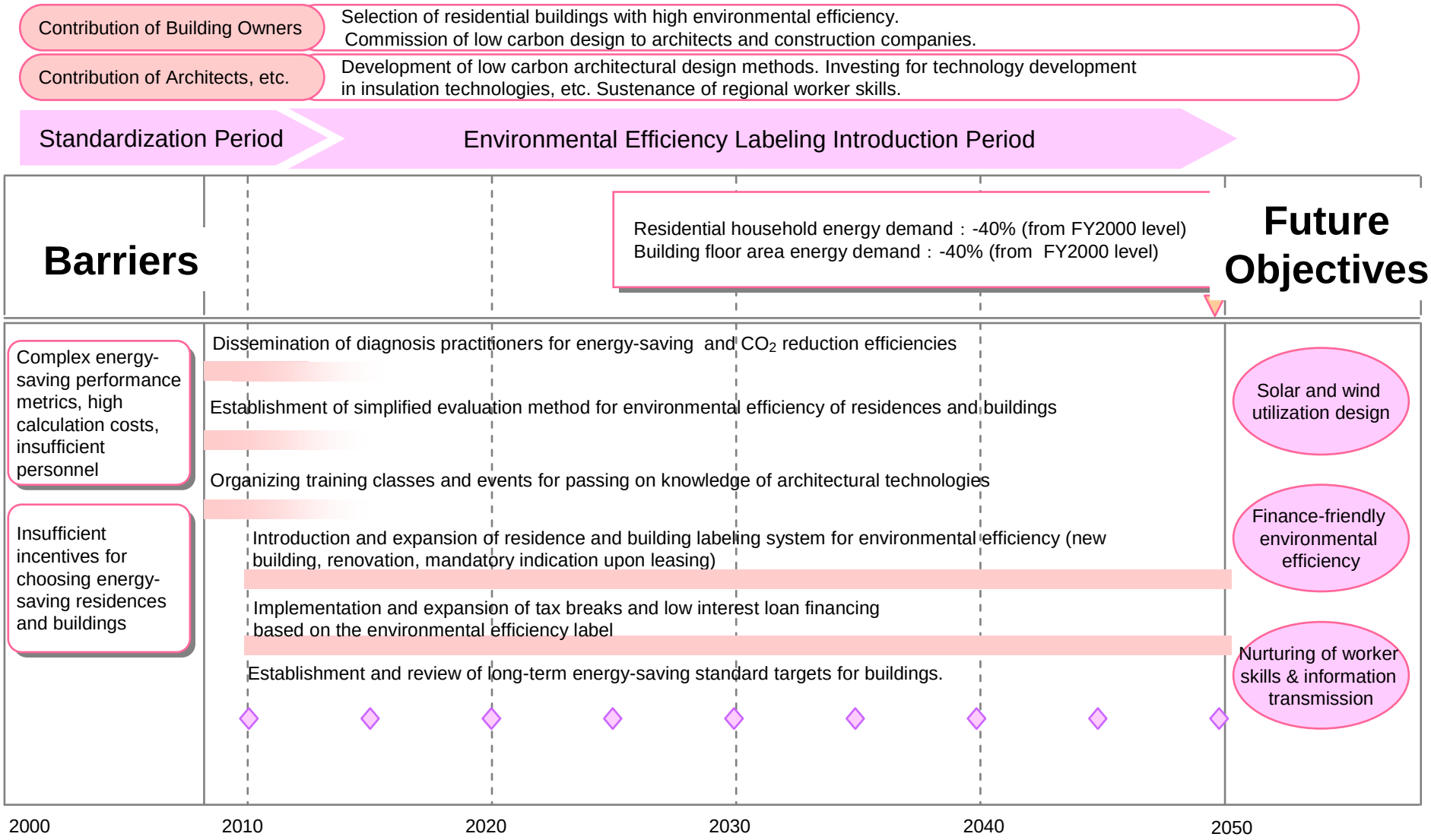
Trans.Prv.: Transportation (Private), Trans.Frg.: Transportation (Freight)

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%

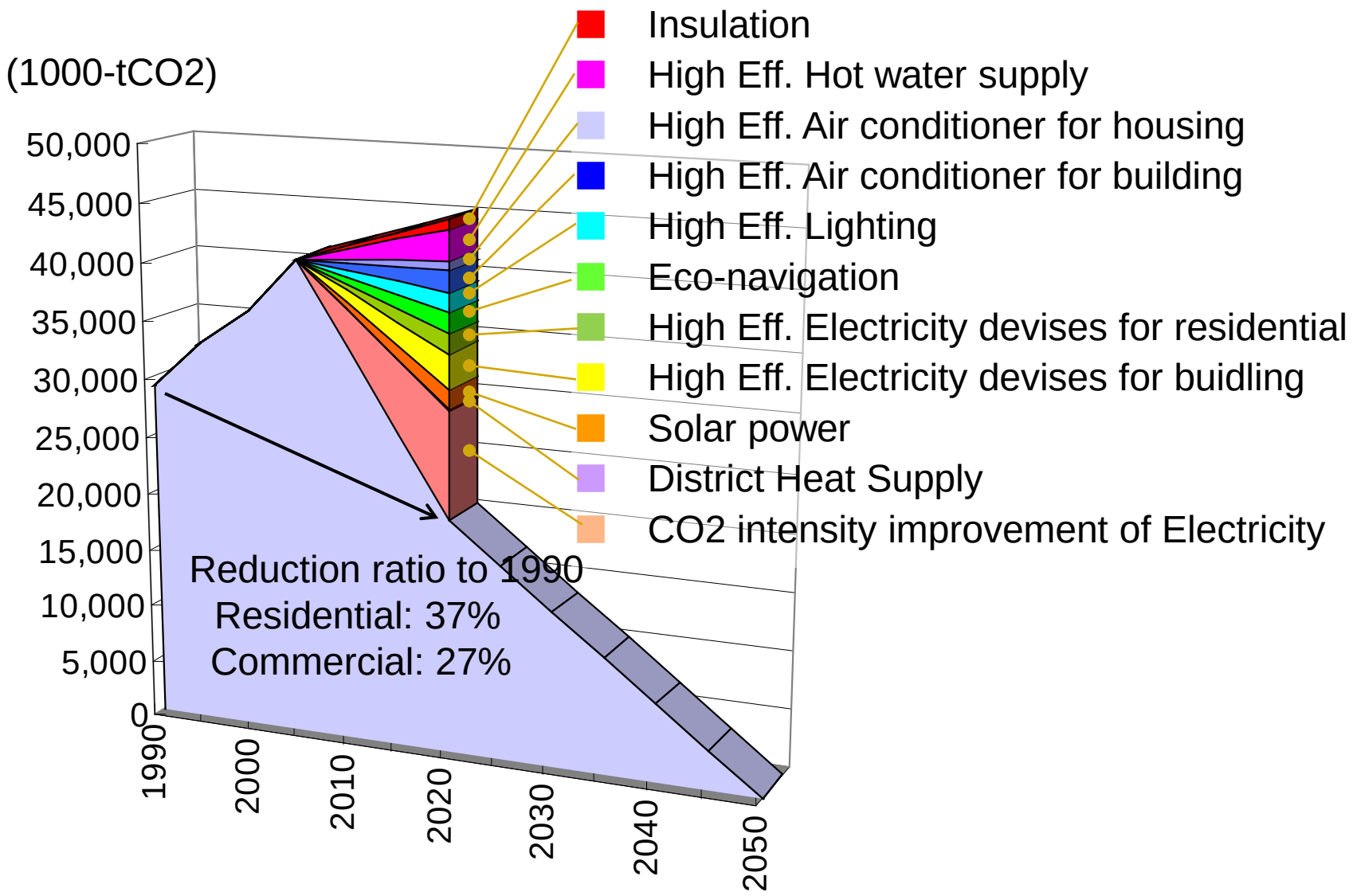
Energy supply for achieving 70% reduction of CO_2 emissions



1. Comfortable and Green Built Environment



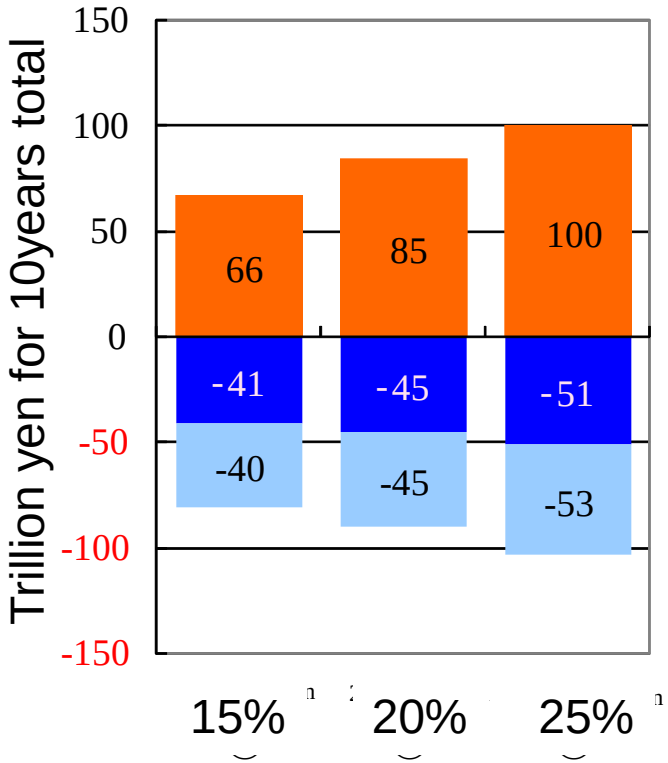
Low-Carbon Pathway and Mitigation Options for Residential and Commercial Sector



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.

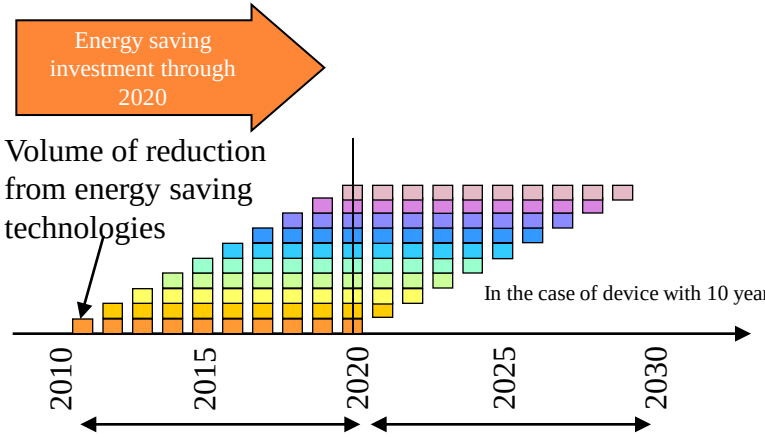
<Low-carbon investment amount and energy reduction expense>



Additional investment ('11 – '20 total)

Energy reduction expense ('11 – '20 total)

Energy reduction expense ('21 – '30 total)



Energy 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))

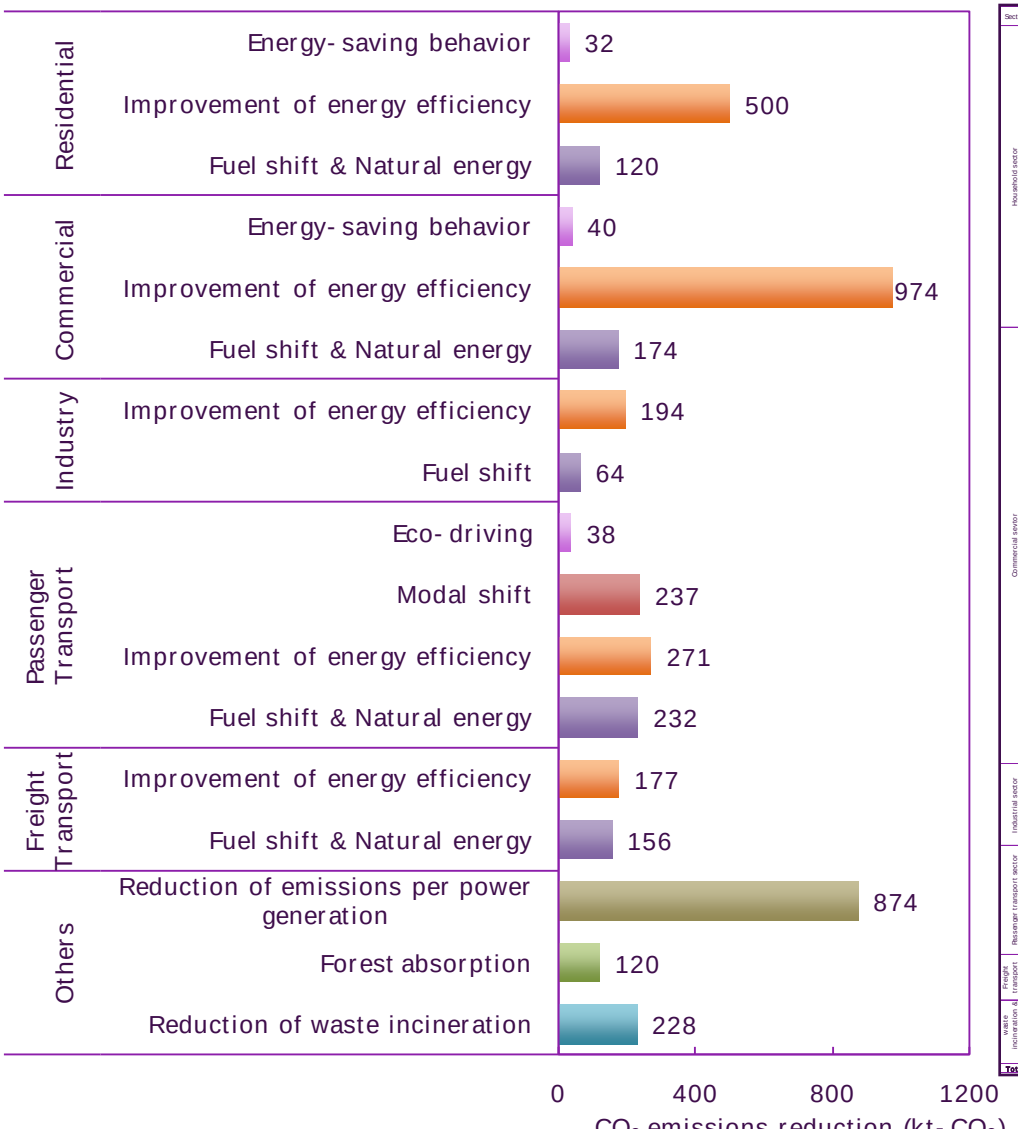
Progress in *Climate change*

- "Basic Act on Global Warming Countermeasures" , approved by cabinet on March 2010
- Progress toward a Cap and Trade domestic emission trading scheme
  - ✓ Japan's Voluntary Emissions Trading Scheme (MOE) (2005～)
- Promotion of green taxation systems
  - ✓ Eg. Reduction of tax on low-emission-vehicles and energy efficient houses
  - ✓ Progress in the discussion towards the introduction of carbon taxes
- 3 Revisions of the "Act on Promotion of Global Warming Countermeasures"
  - ✓ Creation of the system for the calculation, reporting and publication of data on greenhouse gas emissions
  - ✓ Strengthening of regional action plans
  - ✓ Else

But basic act has been rejected on July 2010…

LOW-CARBON DIRECT MEASURES

Contribution to CO2 emissions reduction (compared to Frozen)

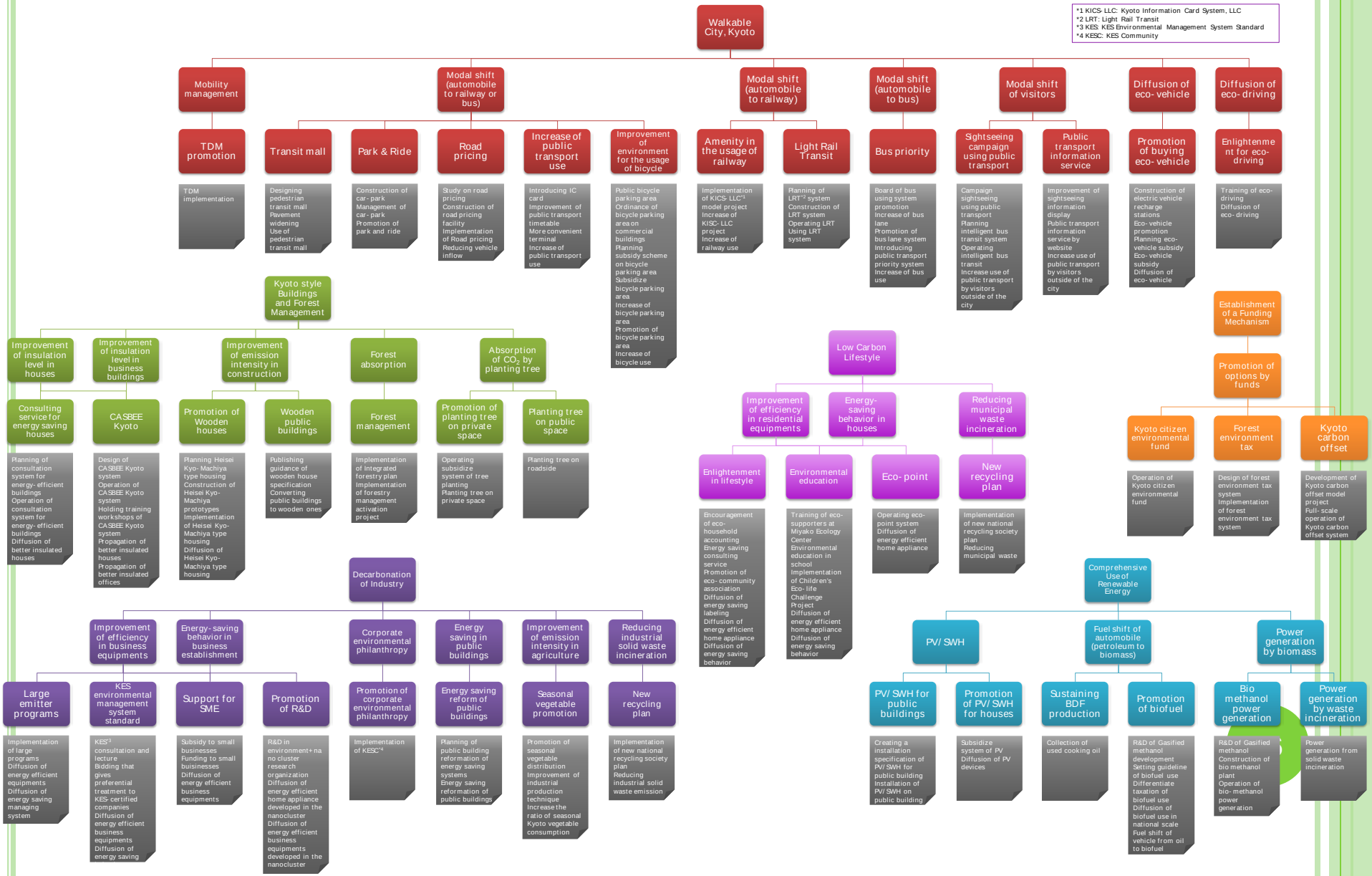


Direct measures

Sector	Low- carbon countermeasure	Data		Source	Category (*)	Identified implementation intencity		Emissions reduction (kt- CO_2)	Action (**)
Household sector	Air conditioner							50.1	3(***)
	Highest energy efficiency air conditioner	COP	6.60	2	E	Diffusion ratio (cooling and heating)	50%		
	High energy efficiency air conditioner	COP	2.54	1	E	Diffusion ratio (cooling and heating)	50%		
	High energy efficiency kerosene heating	COP	0.88	1	E	Diffusion ratio (heating: kerosene)	80%	12.9	3
	High energy efficiency gas heating	COP	0.88	1	E	Diffusion ratio (heating: gas)	80%	25.8	3
	High energy efficiency oil water heater	COP	0.83	1	E	Diffusion ratio (hot water: oil)	70%	6.1	3
	Gas water heater							55.0	3
	Latent heat recovery- type water heater	COP	0.83	1	E	Diffusion ratio (hot water: gas)	50%		
	High energy efficiency gas water heater	COP	0.83	1	E	Diffusion ratio (hot water: gas)	50%		
	Heat pump water heater	COP	4.50	3	E	Diffusion ratio (hot water: electricity)	70%	48.9	3
	High energy efficiency gas cooker	Thermal efficiency (base year=1)	0.55	1	E	Diffusion ratio (cooking: gas)	70%	12.3	3
	High energy efficiency IH cooker	Thermal efficiency (base year=1)	0.86	1	E	Diffusion ratio (cooking: electricity)	70%	8.0	3
	Fluorescent light								
	LED (substitute fluorescent light)	Electricity consumption (conventional type=1)	2.67	1	E	Diffusion ratio	50%	24.1	3
	Hf inverter fluorescent light	Electricity consumption (conventional type=1)	1.33	1	E	Diffusion ratio	50%		
	Incandescent light							51.5	3
	LED (substitute incandescent light)	Electricity consumption (conventional type=1)	8.70	1	E	Diffusion ratio	50%		
	Bulb- type fluorescent light	Electricity consumption (conventional type=1)	4.35	1	E	Diffusion ratio	50%		
	Refrigerator							72.1	3
	Super high energy efficiency refrigerator	Electricity consumption (conventional type=1)	2.92	1	E	Diffusion ratio	50%		
	Highest energy efficiency refrigerator	Electricity consumption (conventional type=1)	2.33	1	E	Diffusion ratio	50%		
	TV							31.9	3
	LCD TV	Electricity consumption (conventional type=1)	2.27	1	E	Diffusion ratio	50%		
	Highest energy efficiency TV	Electricity consumption (conventional type=1)	1.54	1	E	Diffusion ratio	50%		
	House insulation							100.7	2
	Next generation level	Thermal loss (base year=1)	0.36	4	E	Diffusion ratio	40%		
	New standard	Thermal loss (base year=1)	0.43	4	E	Diffusion ratio	40%		
	Energy- saving behavior	Energy service demand reduction ratio	10%	5	B	Diffusion ratio	25%	32.4	3
	Photovoltaic generation	Potential(ktoe)	295	6	S	Diffusion ratio	10%	26.9	5
	Solar water heating	Potential(ktoe)	1037	6	S	Diffusion ratio (hot water: all)	10%	38.8	5
	Other energy efficiency improvement				E			0.2	3
	Other fuel shifting				S			27.3	3
	Total							**626.1**	
Commercial sector	Air conditioner (cooling only)							41.3	4
	Super high energy efficiency air conditioner (cooling only)	COP	5.00	2	E	Diffusion ratio (cooling electricity)	50%		
	Highest energy efficiency air conditioner (cooling only)	COP	4.07	1	E	Diffusion ratio (cooling electricity)	50%		
	Cooling (gas)							19.1	4
	High energy efficiency gas heat pump	COP	1.60	8	E	Diffusion ratio (cooling gas)	40%		
	High energy efficiency absorption tiller (gas)	COP	1.35	7	E	Diffusion ratio (cooling gas)	40%		
	High energy efficiency absorption tiller(oil)	COP	1.35	9	E	Diffusion ratio (cooling oil)	70%	3.2	4
	High energy efficiency boiler (oil)	COP	0.88	1	E	Diffusion ratio (heating oil)	70%	25.1	4
	High energy efficiency boiler (gas)	COP	0.88	1	E	Diffusion ratio (heating gas)	70%	75.4	4
	Air conditioner (heating only)							67.0	4
	Super high energy efficiency air conditioner (heating only)	COP	7.40	2	E	Diffusion ratio (heating electricity)	90%		
	Highest energy efficiency air conditioner (heating only)	COP	4.44	1	E	Diffusion ratio (heating electricity)	10%		
	High energy efficiency oil water heater	COP	0.87	1	E	Diffusion ratio (hot water: oil)	70%	16.0	4
	Gas water heater							64.2	4
	High energy efficiency gas waterheater	COP	0.87	1	E	Diffusion ratio (hot water: gas)	50%		
	Latent heat recovery- type water heater	COP	0.85	1	E	Diffusion ratio (hot water: gas)	50%		
	CO_2 cooling medium water heater	COP	3.00	1	E	Diffusion ratio (hot water: electricity)	100%	64.2	4
	High energy efficiency gas cooker	Thermal efficiency (base year=1)	0.55	1	E	Diffusion ratio (cooking: gas)	70%	27.0	4
	IH cooking heater	Thermal efficiency (base year=1)	0.86	1	E	Diffusion ratio (cooking electricity)	70%	11.6	4
	Incandescent light							131.6	4
	Timer controlled LED (substitute fluorescent light)	Electricity consumption (conventional type=1)	3.95	1	E	Diffusion ratio	50%		
	Illumination controlled LED (substitute fluorescent light)	Electricity consumption (conventional type=1)	3.36	1	E	Diffusion ratio	50%		
	Incandescent light							20.6	4
	LED (substitute incandescent light)	Electricity consumption (conventional type=1)	4.55	1	E	Diffusion ratio	50%		
	Bulb- type fluorescent light	Electricity consumption (conventional type=1)	4.55	1	E	Diffusion ratio	50%		
	High- intensity evacuation light	Electricity consumption (conventional type=1)	4.18	1	E	Diffusion ratio	70%	0.5	4
	Large scale cooler (energy- saving type)	Electricity consumption (conventional type=1)	1.18	1	E	Diffusion ratio	70%	3.1	4
	Personal computer (energy- saving type)	Electricity consumption (conventional type=1)	2.47	1	E	Diffusion ratio	70%	3.3	4
	Copier (energy- saving type)	Electricity consumption (conventional type=1)	1.45	1	E	Diffusion ratio	70%	0.9	4
	Fax machine (energy- saving type)	Electricity consumption (conventional type=1)	1.45	1	E	Diffusion ratio	70%	0.6	4
	Printer (energy- saving type)	Electricity consumption (conventional type=1)	1.45	1	E	Diffusion ratio	70%	1.2	4
	Elevator (energy- saving type)	Electricity consumption (conventional type=1)	4.01	1	E	Diffusion ratio	70%	5.4	4
	Ventilation							50.1	4
	with energy- saving fan	Electricity consumption (conventional type=1)	2.00	1	E	Diffusion ratio	50%		
	with low- pressure duct	Electricity consumption (conventional type=1)	1.82	1	E	Diffusion ratio	50%		
	Vending machine (energy- saving type)	Electricity consumption (conventional type=1)	2.17	1	E	Diffusion ratio	70%	11.5	4
	Traffic light (LED type)	Electricity consumption (conventional type=1)	3.75	1	E	Diffusion ratio	70%	1.4	4
	High energy efficiency transformer	Electricity consumption (conventional type=1)	2.53	1	E	Diffusion ratio	70%	13.3	4
	Other electric appliances							61.2	4
	30%energy- saving type	Electricity consumption (conventional type=1)	1.43	1	E	Diffusion ratio	50%		
	10%energy- saving type	Electricity consumption (conventional type=1)	1.11	1	E	Diffusion ratio	50%		
	Building insulation	Thermal loss (base year=1)	0.50	1	E	Diffusion ratio	100%	231.1	2
	BEMS	Energy demand reduction ratio	10%	10	E	Diffusion ratio	25%	24.4	4
	Energy- saving behavior	Energy service demand reduction ratio	10%	5	B	Diffusion ratio	25%	40.3	4
	Photovoltaic generation	Potential(ktoe)	295	6	S	Diffusion ratio	10%	26.9	5
	Solar water heating	Potential(ktoe)	1037	6	S	Diffusion ratio (hot water: all)	5%	49.6	5
	Other fuel shifting				S			70.8	4
	Total							**1161.8**	
Industrial sector	Energy efficient equipments				E			184.7	4
	High energy efficiency boiler	Thermal efficiency(base year=1)	1.09	11		Diffusion ratio	80%		
	High energy efficiency furnace	Thermal efficiency(base year=1)	1.67	12		Diffusion ratio	80%		
	High energy efficiency morter	Electricity consumption(base year=1)	1.25	11		Diffusion ratio	80%		
	Inverter control	Electricity consumption(base year=1)	1.05	11		Diffusion ratio	80%		
	Fuel shifting	From oil to gas			S	Shifting ratio	60%	63.9	4
	Increase in the ratio of seasonal vegetable production	Ratio of CO2 emissions against non- seasonal vegitable produc	0.7	17	E	Ratio of selling seasonal vegitables	36.2%	0.3	4
	Increase in the ratio of wooden buildings	Ratio of CO2 emissions against non- wooden buildings	0.6	17	E	Diffusion ratio	30%	9.0	4
	Total							**257.9**	
Passenger transport sector	Vehicle							270.7	1
	Hybrid vehicle	Fuel cost (conventional type=1)	0.6	1	E	Diffusion ratio	50%		
	High energy efficiency vehicle	Fuel cost (conventional type=1)	0.8	1	E	Diffusion ratio	50%		
	Modal shift	From vehicle to;			B			236.7	1
	Intra area trip	walking and bicycle				Shifting ratio	15%		
		train and bas				Shifting ratio	30%		
	Inter area trip	bicycle				Shifting ratio	10%		
		train and bas				Shifting ratio	30%		
	Trip to outside of the city	train				Shifting ratio	30%		
	Bio fuel	From oil to bio fuel			S	Diffusion ratio	20%	231.7	5
	Eco- driving	Fuel efficiency improvement ratio	24%	13	B	Diffusion ratio	20%	37.8	1
	Total							**776.9**	
Freight transport sector	Vehicle							178.9	1
	Hybrid vehicle	Fuel cost (conventional type=1)	0.6	1	E	Diffusion ratio	50%		
	High energy efficiency vehicle	Fuel cost (conventional type=1)	0.8	1	E	Diffusion ratio	50%		
	Bio fuel	From oil to bio fuel			S	Diffusion ratio	20%	156.2	5
	Total							**335.1**	
waste incineration sector	Bio- methanol power generation			17		production of electricity (ktoe)	18.8	53.8	5
	Reducing the amount of waste incineration			17		Rate of CO_2 emissions reduction	40%	228.1	3.4
	Improvement of CO2 intensity of power generation					CO_2 emission per generation (tC/ toe)	0.78	873.9	(****)
	Fuel shifting			14					
	Generation efficiency improvement								
	Coal	Generation efficiency	48%	15					
	Gas	Generation efficiency	55%	16					
Total								**4810.7**	

Kyoto city

LOW-CARBON MEASURES

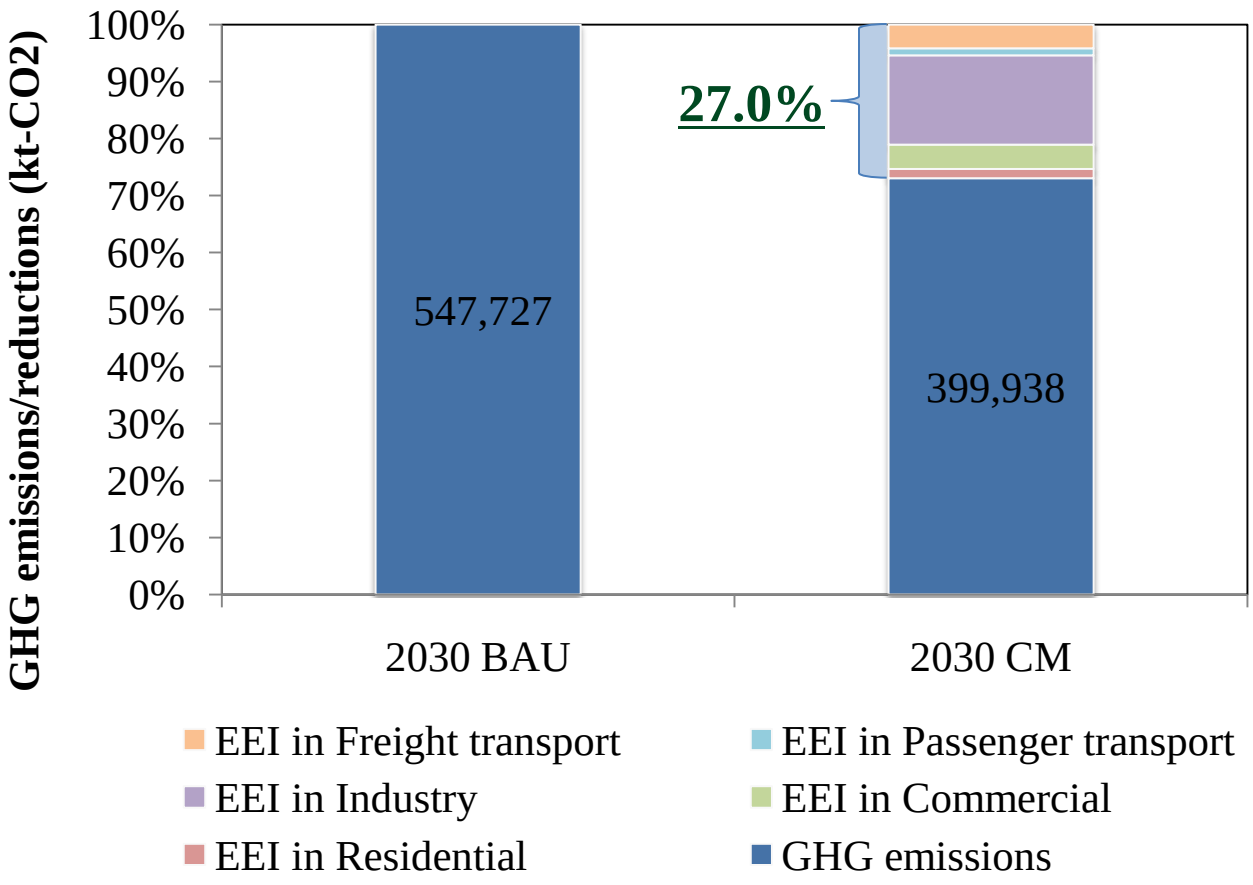


Thailand
Low-Carbon Society Vision 2030

- Sirindhorn International Institute of Technology, Thammasat University
- Asian Institute of Technology
- National Institute for Environmental Studies
- Kyoto University
- Mizuho Information & Research Institute
- Asia-Pacific Integrated Model

Contents

GHG emissions by sector



Selected Projects for FY2010

FY 2010

[Afghanistan]
☆Project for the Development of Wheat Breeding System for Sustainable Food Production

[Cameroon]
☆ Sustainable Livelihood and Natural Resources Management in Tropical Rain Forest and its Surrounding Areas of Cameroon: Integrating the Global Environmental Concerns with Local Livelihood Needs
☆Magmatic Fluid Supply into Lakes Nyos and Monoun, and Mitigation of National Disaster in Cameroon

[India]
☆UASB-DHS Integrated System-A Sustainable Sewage Treatment Technology

[Bangladesh]
☆Improved Diagnosis of Tuberculosis in Bangladesh

[Panama]
☆Comparative Studies of the Early Life History for Purposes of Pacific Bluefin Tuna and Yellowfin Tuna Resource Management and Yellowfin Tuna Aquaculture Development

[Thailand]
☆New Biodiesel Production and Utilization from Vegetable Oil

[Viet Nam]
☆Establishment of Carbon-Cycle-System with Nature Rubber
☆Project for the Promotion of Improved Crop Production in the Mountainous Areas of North Vietnam

[Sri Lanka]
☆Pollution Control and Site-Specific Remediation Technique at waste Dumping Site in Sri Lanka

[Philippines]
☆Comprehensive Etiological and Epidemiological Study on Acute Respiratory Infections in Children

[Algeria]
☆Sahara Solar Energy Research Center (SSERC)

[Malaysia]
☆Development of Low Carbon Society Scenarios for Asian Regions
☆Geo-Hazard Remote Analysis and Monitoring Stations (GRAMS)

[Mexico]
☆Study of O3, VOC and PM2.5 Air Pollution between Japan and Mexico

[Mozambique]
☆Sustainable Production of Biodiesel from Jatropha in Mozambique

[Indonesia]
☆Development of Internationally Standardized Microbial Resources Centers as a Core of Biological Resources Center to Promote Life Science Research and Biotechnology