

Building a Low Carbon Society

First Draft

Ministry of the Environment, Japan

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About this paper

- In May 2007, Japanese Government has identified building Low-Carbon Society and promoting Innovative Technology Development as two keys to make global emission half in 2050.
http://www.kantei.go.jp/foreign/abespeech/2007/05/24speech_e.html
- Ministry of the Environment, Japan has started to develop ideas on Low-Carbon Society's principles, images and strategies to realize, mainly for Japan. With regard to this work, we don't be based on numerical scenarios, instead, we try to describe broad direction toward Low-Carbon Society.
Please refer to a research program, "Japan Low-Carbon Society Scenarios toward 2050" for numerical scenarios.
<http://2050.nies.go.jp/index.html>
- Images and strategies for Low-Carbon Society should be diverse among countries, depending on their natural environment, developing stages, industrial structures. But we believe elements Japan describes will be useful for other countries and we would like to work together for further development of ideas with international colleagues.
- This paper is not our conclusion but the starting point and material for discussion.
We very much welcome comments from all over the world.

Contact:

kyotomecha@env.go.jp

Office of Market Mechanism

Climate Change Policy Division

Ministry of the Environment, Japan

Building a low carbon society

1. Principles

- 1) **Carbon Minimization in all sectors**
Minimization of carbon-dioxide emissions from all sectors
- 2) **Toward a Simpler life style that realize richer quality of life**
Shifting from mass-consumption society towards QOL oriented society. Revolution led by consumers' choice. "Mottainai" spirit.
- 3) **Coexistence with Nature**
Maintaining and restoring natural environment that is essential for human society

2. Images

- 1) **Mobility**
Public transportation plays a central role. Intelligent transportation system and efficient cars will be used.
- 2) **Living & Working Scene**
Highly insulated houses / buildings and efficient appliances are widespread
- 3) **Industry**
Low carbon energy supply and production technologies are developed and used
- 4) **Consumers' choice**
Carbon minimum choices will become common by widespread "visualization" technologies and changes in consumer consciousness
- 5) **Forests & Agricultures**
Contribute as carbon sink, energy sources & QOL
- 6) **Aspects from Areas(Urban & Rural)**
Compact cities will be formed depending on the scale of the cities

3. Strategies to realize a Low-Carbon Society

Barriers

- Technical
- Economical
- Social
- Informational

Innovations

- Energy technologies
- Social systems
- Lifestyle etc.

Desirable actions for citizens

Desirable actions for companies

Policy instrument of the government

- Development of low carbon infrastructures
- 1) **Institutional infrastructures**
Incentives (Prizes, regulations, economic instruments)
 - 2) **"Soft"-infrastructures**
Human resources (capacity building, education), information (visualization), financial resources
 - 3) **"Hard"-infrastructures**
Urban structure, buildings, transportation network, energy supply, adaptation
 - 4) **Natural capitals**
Sink, biomass resources, adaptation

4. Sharing experiences and ideas among countries & International cooperation

1. Principles for a Low-Carbon Society

All the world's countries need to unite to make supreme efforts to establish a low-carbon society by “reducing global emissions by half from the current level by 2050.” For example, if CO₂ emissions per capita were the same worldwide when the 50% reduction is realized, the developed countries would need to reduce its emissions by 70 to 80 % from the current level, and the developing countries would need to keep approximately the current level while achieving economic growth and improved quality of life. Such a society cannot be realized if the current trends continue. All countries, organizations, and entities have to take action based on the following philosophies.

1) Carbon Minimization in all sectors

“A low carbon society” in the ultimate sense would be a society that emits greenhouse gases only in an amount which can be absorbed by nature (Carbon Neutral Society). To achieve this goal, we have to have a social system that all sectors, such as industries, governments, and citizens, will naturally or automatically give special consideration to their selection and decisions in order to minimize carbon-dioxide emissions (carbon minimization).

2) Toward a Simpler life style that realize richer quality of life

People would need to forgo the mass-consumption society, mainly formed by developed countries, and build a new society in which value is placed on family or community ties, health, interactions with mother nature and “Mottainai” spirit to improve the quality of life. This type of consumer choice would lead to a revolution in the social system, moving toward a low-carbon, rich society.

3) Coexistence with Nature

We recognize human and its society is a part of global ecosystem. In order to secure the CO₂ absorption essential for a low-carbon society and to adapt to the unavoidable global warming, it is important to maintain and restore rich, diverse natural environments, such as forests. To achieve this symbiosis, local communities should place importance on harmony and coexistence with nature, and promote “nature-friendly technologies,” such as utilization of biomass.

Principles for a Low-Carbon Society

Carbon
Minimized

Minimization of carbon-dioxide emissions from all sectors

Simpler & Richer
Quality of life

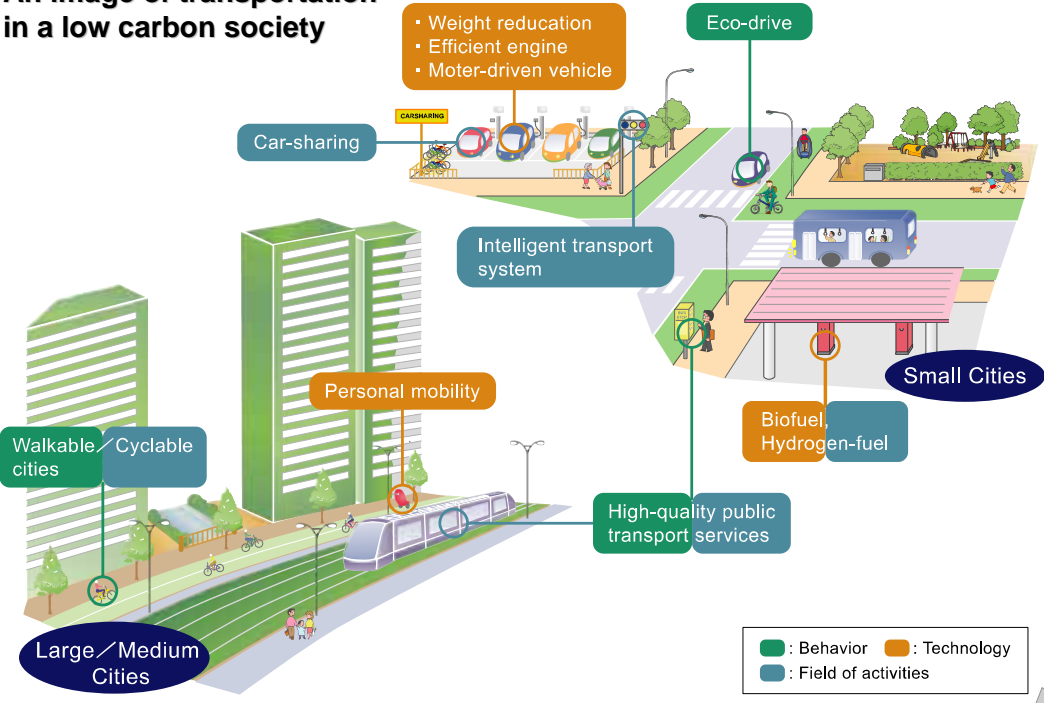
Shifting from mass-consumption society towards QOL oriented society. Revolution led by consumer' choice. “Mottainai” spirit.

Coexistence
with Nature

Maintaining and restoring natural environment that is essential for Low-Carbon Society

01 Mobility

An image of transportation in a low carbon society



Behavior

- Environmentally friendly transportation will be chosen by the people. People's choice would be assisted with information such as CO2 emissions of each transportation means ("visualization" technology) or traffic information on public transportation (intelligent transportation system), as they become readily available.
- Local residents will actively participate in the development of the community.

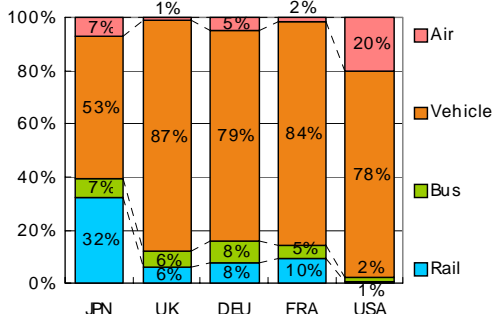
Technology

- The efficiency of individual cars due to lighter bodies and widespread use of motor-driven cars (plug-in hybrid cars, electric cars, fuel-cell cars) will increase substantially. Air pollution caused by cars will have been overcome.
- Many personal (single-seat) vehicles will be introduced. The choice of transportation means will be broadened considerably.
- Autonomous travel will be allowed by an intelligent transportation system. Traffic accidents will be reduced to almost zero.

Field of activities

- Public Transportation services, such as railways, buses, monorails, and LRTs, depending on the scale of the city, will be selected or combined.
- Physical distribution system will be sophisticatedly managed by advanced ICT (Information & Communication Technologies), and appropriate mode of transportation, such as railways, ships, and trucks are selected. With those systems, low carbon distribution systems are formed.
- A compact town convenient for pedestrians and cyclists will be formed (e.g., formation of a transit mall around a public transportation station).
- Car sharing systems will be widely introduced. People rent an appropriate size of vehicle when needed.
- Intelligent transportation systems will not only collect and provide traffic information, but they will also enable an advanced billing method, thereby forming the basis of a low-carbon transportation system.

Pride of Japan High share of public transportation



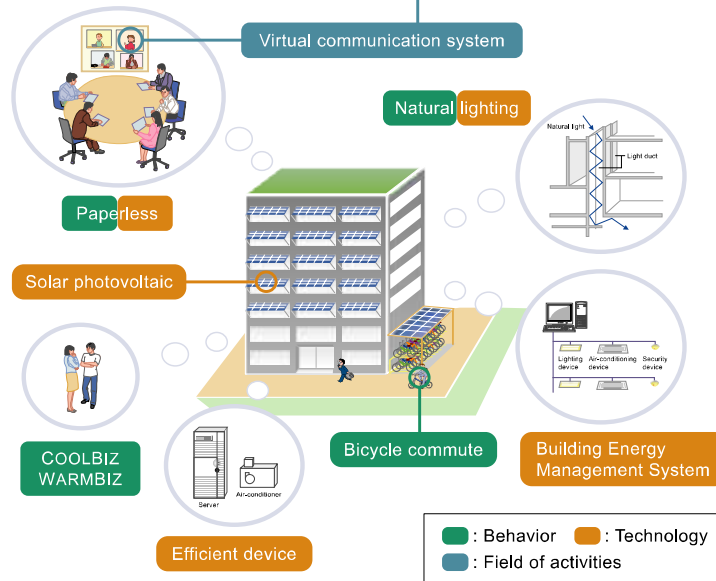
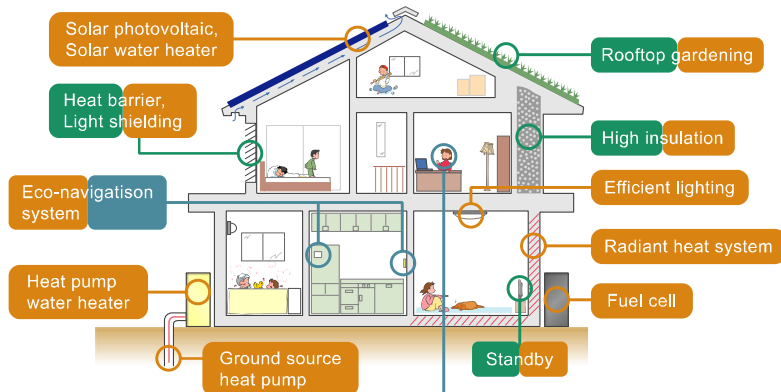
Excellent vehicle technologies



Share of transportation volume by mode in developed countries
JPN:2003,UK,GER,FRA:2002, USA:2001(Ref.MLIT)

02 Living and Working Scene (Houses & Buildings)

An image of living scene in a Low-Carbon Society



An image of working scene in Low-Carbon Society

Note: Fluorocarbons will not be used in air-conditioner, insulations, and heat pumps

Behavior

- It would become a common practice to avoid wasting energy and to efficiently use natural energies at homes and offices.
- Energy will be conserved based on accurate information provided by “visualization” technology.
- Energy will also be conserved by cooperation among members of families, residents of apartments, and employees of companies that possess environmental sensitivity and always consider how to avoid wasting energy.
- With the great support of advanced ICT, people would be able to choose their working style freely no matter where they live since working environment in their house or nearby facilities would be as good as in the office. The technologies also offer great flexibility to the companies, and allow companies to start worldwide business without having office in the big city.

Technology

- Energy-efficient devices and natural energy-based devices will be developed by Japanese “monozukuri (manufacturing)” technologies, and are widespread.
- Control technology using ICT will be widespread. Lighting and air-conditioning will be operated in association with the movement of people.
- Architects and builders who create houses suitable for local weather conditions will be fostered to provide and spread the use of comfortable buildings in which natural materials are used and heating is less required in the wintertime.
- Construction methods & designs and renovation to lengthen the life of housing (200 years houses) will be widespread. The resale housing market will be revitalized.
- Wooden houses and other buildings would become more popular. Use of wood will be introduced to mid-story constructions as well.

Field of activities

- An infrastructure will be developed for “visualization” where CO2 emissions of individual devices can be recognized (display of the environmental load and advice about environment-conscious behavior).

03 Consumers' Choice

An image of consumers' choice and "visualization" in a Low-Carbon Society

Food

¥200.- Food Mileage Orange 28

Emissions are displayed on price display panels and barcodes on items. Preference for seasonal and local ingredients

Houses

Rent	
Rent	¥
Utilities	¥
CO2	kg
Wood	..

GHG emissions during construction or use will be indicated for each house. The value would provide an important reference for choice of a house. People would move into houses with sizes suitable for their life stage.

Home appliances

メーカーまたはブランド	製品名称	省エネ省CO2(ランニングコスト)			
		省エネ性能	省エネ効果率	省CO2率	省CO2率
1	洗濯機	省エネマーク	106	5.80	5.3
2	洗濯機	省エネマーク	108	5.81	5.3
3	洗濯機	省エネマーク	100	5.15	5.0
4	洗濯機	省エネマーク	100	5.41	5.0
5	洗濯機	省エネマーク	96	5.15	5.6
6	洗濯機	省エネマーク	93	4.90	5.4

GHG emissions for each product throughout its lifecycle will be quantified and indicated. This value would provide an important reference for choosing a product

Leisure activities

When a leisure activity having large GHG emissions (overseas trip, etc.) is chosen, a corresponding carbon offset will be purchased.

Behavior

- These behaviors would become common practice when they purchase goods:
 - do not receive unnecessary accessories or wrapping;
 - prefer to purchase reuse products or to purchase services rather than products (rental);
 - prefer goods that have a low environmental load in terms of lifecycle;
 - Feel proud to their hometown and prefer to purchase locally produced goods
 - do not purchase goods from companies that are not sensible of Corporate Responsibility; and
 - pay counter value (price) for use of the Earth's limited resources (greenhouse gas emissions)

Technology Field of activities

- An infrastructure will be developed for "visualization" where CO2 emissions of individual devices can be recognized (display of the environmental load and advice about environment-conscious behavior).
- "Eco-points" system, in which the points are awarded for environmentally friendly behavior or for purchasing environmentally friendly goods and services, will be widely introduced

Cars

A car with an appropriate size will be rented only when needed.

Drive

Fuel consumption and advices on eco-driving will be displayed or guided. People would put the advices on eco-driving into practice

3. Strategy for Building a Low-Carbon Society <1/4>

Citizens and corporations are expected to proactively take action to contribute to the creation of a low-carbon society. The government is responsible for establishing systems and rules, and for providing the social capital to ensure that these citizen and corporate actions can be taken in a smooth and sustainable way.

Desirable actions for Citizens

- “Eco-participation,” “eco-thinking,” and “eco-sharing”
- Practice “eco-learning,” “eco-buying,” “eco-use,” and “eco-disposal.”

Desirable actions for Corporations

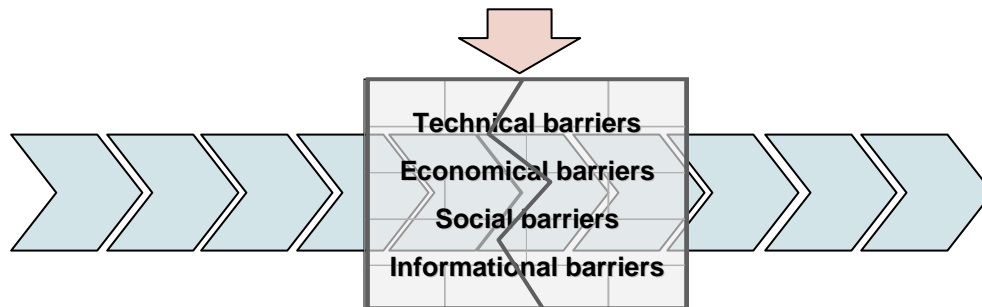
- Development of low-carbon-oriented products and promotion of technological innovations on a global level
- Creation of new business models
- Promotion of disclosure of environmental information
- Development of various environmentally friendly financial products

Policy instruments by the Government

Infrastructure development towards a low carbon society should be started at an early point by considering that time needed for development of institutions, human resources, consumer durable goods, buildings, and urban infrastructures are different

- Institutional infrastructures
- “Soft”- infrastructures
- “Hard”-infrastructures
- Natural capitals

Today



Low-Carbon Society

- Japanese possible contributions, toward broader international cooperations -

1) Sharing the “Japan Model” with developing countries

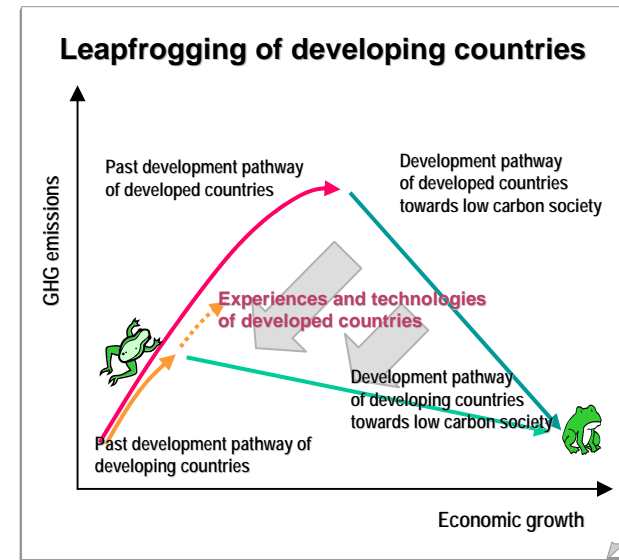
- For developing countries in Asia and other regions, it would be beneficial to share Japan’s experiences in the manner that would be suitable for each countries’ circumstance, as the “Japan Model” for solving pollution and energy problems, as well as creating an efficient society.
- Although Japan has developed high carbon society in the process of economic growth, developing countries can skip the process and create low carbon society directly by using Japanese experiences and technologies.
- There are many countermeasures on climate change that has co-benefit effects such as mitigation of air pollution or improvement of quality of life (QOL) .
 <Japan’s unique traditions and experiences: “mottainai” spirit (too precious to waste), environmental and energy technology, transfer of the experience, systems, and know-how for solving pollution problems (enforcement of laws, capacity building on monitoring, systems to promote the creation of a low-carbon society, national and local government’s action plan/promotion plan toward a low-carbon society), energy-saving products and technology, improvement and wider use of public transportation in the urban areas.

2) Establishment of information center for a Low-Carbon Society and Promotion of international joint research activities and human development

- Japan will establish a center that collects, analyzes and provides updated information (technology, action, systems, people, customs, etc.) for the creation of a low-carbon society and coordinate joint international research activities.
- In making these efforts, it is important to fully cooperate with existing domestic and international research institutes, universities and private organizations for international cooperation located in Japan and to establish a network of these organizations.
- Capitalizing on the opportunity of hosting the Hokkaido Toyako G8 Summit, it would be possible to promote joint international research activities, for example, on measures that people should take as moving toward the creation of a Low-Carbon Society based on the experience of cooperation between Japan and the UK(Japan Low-Carbon Society Scenarios toward 2050” for numerical scenarios.<http://2050.nies.go.jp/index.html>)

3) Proposal to strengthen global-level incentives toward a Low-Carbon Society

- Formulation of rules on carbon pricing system, aiming to make people recognize carbon emissions as costs (provision of incentives and refund to developing countries)
- Promotion of countermeasures on international transportation through international cooperation activities
- Promotion of “green procurement”, “green contracts” and “environmental reports (CSR reports)” across the world, as well as the facilitation of product and service development that contribute to a Low-Carbon Society.
- Promotion of approaches to manage and maintain forests through international cooperation



Co-benefit approach	
Countermeasures on climate change	Economic and social development
• Widespread use of energy independent houses	<ul style="list-style-type: none"> • Increase in electrification ratio • Increase in energy self sufficiency
• Efficient production process	
• Diffusion of motor driven vehicles	<ul style="list-style-type: none"> • Mitigation of air pollution
• Car-free society	
• Development of intelligent transportation system	<ul style="list-style-type: none"> • Traffic accidents reduction
• local production for local consumption	
• Practice of eco lifestyle (Mottainai spirit)	<ul style="list-style-type: none"> • Prevention of rural community disruption • Reduction in water consumption • Reduction in waste