

# Developing Visions for a Low-Carbon Society (LCS) through Sustainable Development

## Executive Summary

June 14th to 16th, 2006  
Mita Kaigisho, Tokyo, Japan



National Institute for Environmental Studies (NIES)

16-2 Onogawa, Tsukuba

Ibaraki 305-8506, Japan

Telephone +81-29-850-2504

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

© NIES, Japan, 2006

This publication (excluding the logo) may be reproduced free of charge in any format or medium provided that it is reproduced accurately and not used in a misleading context. The material must be acknowledged as NIES copyright with the title and source of the publication specified.

This workshop summary and all presentation materials are also available on the Japan LCS website.

---

## The first workshop of Japan-UK Joint Research Project

# “Developing Visions for a Low-Carbon Society (LCS) through Sustainable Development” Executive Summary

## Introduction

A workshop on “Developing Visions for a Low-Carbon Society (LCS) through Sustainable Development” was held from June 14 to 16, 2006 in Tokyo, hosted and organized by The Ministry of the Environment of Japan (MoEJ) and the UK Department for Environment, Food and Rural Affairs (Defra), National Institute for Environmental Studies (NIES), UK Energy Research Centre (UKERC), and Tyndall Centre for Climate Change Research with the advice of the steering committee composed of scientists and governmental officials from Japan, UK, China, Germany, India, Mexico, Russia and USA. Prior to the workshop, a public symposium was held in Tokyo on June 13, 2006.

Dr. Shuzo Nishioka of NIES and Dr. Jim Skea of UKERC co-chaired the Workshop. 54 experts from 19 countries and 6 international organizations, and 65 other participants attended.

The objectives of the workshop were:

- a) identifying and understanding the necessity for deep cuts in greenhouse gas (GHG) emissions toward 2050 based on scientific findings,
- b) reviewing country-level GHG emissions scenario studies in developed and developing countries,
- c) aligning sustainable development and climate objectives,
- d) studying methodologies to achieve LCS,
- e) identifying gaps between our goals to develop country-level LCS scenarios and the current reality and,
- f) identifying opportunities for cooperation and how best to cooperate in estimating country, regional and global-level LCS scenarios.

This summary has been produced by the steering committee. It does not represent the formal views of any of the participants or countries involved in the workshop.

---

## 1. What do we mean by a Low-Carbon Society?

A Low-Carbon Society:

- takes actions that are compatible with the principles of sustainable development, ensuring that the development needs of all groups within society are met;
- makes an equitable contribution towards the global effort to stabilise atmospheric concentrations of carbon dioxide and other greenhouse gases at a level that will avoid dangerous climate change through deep cuts in global emissions;
- demonstrates high levels of energy efficiency and uses low-carbon energy sources and production technologies, and
- adopts patterns of consumption and behaviour that are consistent with low levels of GHG emissions.

For developed countries, achieving a LCS is likely to involve making deep cuts in carbon dioxide emissions by the middle of the 21st century. It will involve the development and deployment of low-carbon technologies and changes to lifestyles and institutions.

For developing countries the achievement of a LCS must go hand in hand with the achievement of development goals. This would be with a view to achieving an advanced state of development with carbon intensity commensurate with those of developed LCSs.

## 2. Why do we need Low-Carbon Societies?

Global emissions of greenhouse gases are projected to reach levels during the next 100 years, which could have serious negative effects on the climate system, natural environment and human society. Deep cuts in global greenhouse gas emissions are required to prevent the worst effects of climate change and thus achieve the ultimate objective of the UNFCCC to stabilise greenhouse gas

---

concentrations in the atmosphere at levels which avoid dangerous climate change. Although there is some debate over the precise magnitude of emission reductions required at the global level, in part due to uncertainty in climate sensitivity and the nature of the impacts expected, it is clear that developed country emissions need to be reduced by at least about half of current levels by 2050. In addition, developing country emissions need to be limited in a way which enables the achievement of their development goals. Many of our choices today and in the near future will determine our emissions pathways for decades to come. Urgent action is therefore required to keep options available to achieve the magnitude of cuts required. Delay in acting now would increase the burden of climate change impacts and emissions reductions for future generations.

### **3. How can we achieve Low-Carbon Societies?**

Long term goals can help us define the pathway to a LCS. Developing shorter-term targets can inform and energise the policy-making and implementation processes. Targets should be flexible enough to allow freedom to act in response to an uncertain future.

There is a need to identify priority options that can be implemented in the short term which help to make early progress towards low carbon goals. These priorities would vary from country to country and will depend on economic circumstances and resource endowment. Policies for low carbon options should be durable and consistent with long-term strategies. Carbon markets and appropriate financial instruments provide effective incentives.

There exist numerous potential pathways towards a sustainable LCS. The options should be evaluated from a variety of economic and societal perspectives including regional, national and global. A combination of technological innovation, policy implementation, institutional and behavioural change will be necessary. These elements should not be treated in isolation from each other. They should be integrated with existing policies that address other social goals such as energy security, access, competitiveness and land-use.

---

There is no single option for achieving a LCS. The approach to some measures will be common to all countries. Other issues, for example energy poverty and household energy efficiency, need careful assessment in their local context. LCSs are likely to require substantial changes in areas such as the built environment, transport, and industrial and service sectors. There will also be a need to implement these changes in harmony with other development goals. Therefore, a portfolio of sustainable emission reduction measures is required, which will take into account regional specificities. Key options include;

- Demand reduction through energy efficiency and lifestyle change. It is important to accelerate the historical rate of energy efficiency improvement through incentives, institutional and behaviour change.
- Biomass along with other renewables. These play important roles in many national energy systems, and also have the potential to achieve substantial carbon emissions reductions. The development of this set of options needs to take into account prudent use of land and forestry.
- Carbon capture and storage. This was identified as a likely bridging technology that could reconcile continuing fossil fuel use with lower carbon emissions. The scale of carbon capture and storage required by many LCS scenarios is substantial. It is not yet clear to what extent this can be realised in practice.

## **4. How to align Low-Carbon Societies with Sustainable Development**

The sustainable development perspective is important, especially from the viewpoint of developing countries, because they have development choices open to them that could allow the achievement of a LCS more cost effectively. They could reach their national sustainable development goals along with a LCS, if suitable policies are coupled with international collaboration at the regional and global levels. LCSs could bring additional benefits such as energy security, land use and conservation, reduced pollution, and environmentally sustainable cities and transportation.

---

The successful development of LCSs must involve a wider range of domestic and international actors than those involved with purely energy and high GHG intensive sectors.

Necessary actors include:

- governments (which set the overall framework and can provide long-term predictable signals),
- businesses (who bring forward innovations),
- the financial sector (private, public and multilateral) and
- civil society (whose awareness can help align diverse stakeholders).

Their incentives and risks have to be jointly addressed.

Countries' deployment of policies and the regulatory environment they set can help create conditions required to support large scale infrastructure and capital flows.

A wide range of policies is needed. Critical to these are government support, reflected in public procurement, product standards, the setting of suitable incentives for investors and the fostering of public awareness and lifestyle change.

Realising win-win options also requires international collaboration. Trade regimes could encourage technologies and products that will enhance sustainable development while lowering carbon emissions. Knowledge transfer related specifically to the LCS can play a key role in supporting sustainable development in a wider sense. Knowledge transfer can cover research, policies and practices as well as technology.

The most effective technology transfer often comes through the private sector, which is supported by clear market signals, especially the establishment of a long-term price for carbon in international market.

The availability of efficient technologies is crucial in realising win-win opportunities, especially from the long-term perspective. Public and private investment in technology R&D can play an important role in developing win-win opportunities. Increasing the overall volume of energy R&D in all countries is

---

critical to a sustainable, low carbon future. While recent decreases in the volume of energy R&D in developed countries is a move in the wrong direction, there are encouraging signs of increases in energy R&D in key developing countries. Coordinating public and private R&D activity would help to focus investments.

Effective policies to encourage the deployment of technologies are also critical.

A key priority is to avoid lock-in to unsustainable technologies. Some investments, for example in power plants, may have a lifetime of decades. Taking early action with long-term perspectives will help to reconcile the LCS with sustainable development.

## 5. International cooperation

The formal international climate framework of the UNFCCC is essential to the development of LCSs. Informal processes such as the Gleneagles Dialogue complement the formal process. We hope that the insights gained at this workshop will provide a useful input to existing international processes.

There is a need for stronger political signals at domestic and international levels. The role of the Clean Energy Investment Framework, currently being developed by the multilateral financial institutions, in particular will be crucial. International Financial Institutions (World Bank, Regional Development Banks, IMF) could usefully assess present instruments and reshape them where needed in consultations with regions and countries to enhance policy credibility and diminish investment risks. Regional institutions can play a central role in advancing country dialogues and examining conditions that facilitate the required capital replacement.

A resource mechanism such as a special global fund for technology innovations and transfer would enlarge the set of options for transitions to LCSs. Likewise international trade can be potentially tapped to foster transitions to LCSs.



---

## 6. Further Work and Research

A variety of tools and methods are required to explore pathways including policy scenarios and backcasting methodologies. The latter, for example, first set goals of desirable LCS and, by working backwards explore optimal paths for their achievement. However further research is needed. Among the ideas discussed at the workshop were:

### Modeling

- How can we coordinate the development of baselines and policy scenarios?

### Technology

- What risks and potentials are associated with individual technological responses?
- What impact will technological learning have on speed and cost of implementation?

### Socio-Economics

- What are the costs of action and of inaction with respect to climate change at the regional and global level?
- What is the most cost effective way to achieve a LCS individually and internationally?
- What influence do social infrastructure, lifestyle/behaviour, and governance have on the ability to achieve a LCS?

### Policy option assessment

- What short term policy implications follow from the long-term goals?
- How to integrate issues other than climate change, like poverty reduction and energy security, in the LCS methodology?

---

## Next Steps

A further workshop will be held in 2007 in UK. Participants provided concrete suggestions regarding focus, content and participation in the 2007 workshop:

- the next workshop should be outcome oriented;
- a wider range of LCS scenarios should be presented, with more opportunity to go into detail and focus on similarities and differences between scenarios; and
- the workshop should engage a wider range of stakeholders including business leaders.

Participants also considered opportunities to disseminate information on LCS activities:

- a semi-popular compilation of LCS results and scenarios could be compiled; and
- the 2007 workshop could generate a map of LCS activities.

International Steering  
Committee  
Tokyo, Japan  
June, 2006

---

## **International Steering Committee**

Co-chairs: Shuzo Nishioka (NIES, Japan)

Jim Skea (UKERC, UK)

Igor Bashmakov (Center for Energy efficiency, Russia)

Andrew Bolitho (Defra, UK)

Stephen Cornelius (Defra, UK)

Junichi Fujino (NIES, Japan)

Jose Alberto Garibaldi (Energeia, Mexico)

Kejun Jiang (Energy Research Institute, China)

Mikiko Kainuma (NIES, Japan)

Jonathan Pershing (World Resource Institute, USA)

P.R. Shukla (Indian Institute of Management, India)

Naoya Tsukamoto (MoEJ, Japan)

David Warrilow (Defra, UK)

Jim Watson (SPRU and Tyndall Centre for Climate Change Research, UK)

Martin Weiss (Federal Environmental Agency, Germany)

## “Japan–UK Joint Research Project Developing Visions for a Low-Carbon Society (LCS) through Sustainable Development”

The Ministry of the Environment of Japan (MoEJ) and the Department for Environment, Food and Rural Affairs in the UK (Defra) are jointly promoting a scientific research project toward achieving a Low-Carbon Society by 2050.

The objectives of the joint research project are:

- Identifying and understanding the necessity for deep cuts in greenhouse gas (GHG) emissions toward 2050 based on scientific findings (e.g. 50% global GHG emissions reductions in 2050 to 2100 compared to 1990 levels).
- Reviewing country-level GHG emissions scenario studies in some developed and developing countries such as Japan, UK, Australia, Brazil, Canada, China, France, Germany, India, Mexico, Russia, South Africa, Thailand, and USA. Looking at possible options such as for supply-side, demand-side, policy, institution, financial, lifestyle based on national circumstance.
- Aligning sustainable development and climate objectives: win-win strategies. Investigating possible co-benefits of LCS such as tackling poverty; other environmental concerns (air pollution, water, land use, etc); and energy security.
- Studying methodologies to achieve LCS, such as depicting visions and pathways (i.e. back-casting); qualitative modeling of the future society; possible combination of options (technological, institutional, behavioral); financial mechanisms; LCS scenarios harmonization at national, regional and global levels.
- Identifying gaps between our goals to develop country-level LCS scenarios and the current reality.
- Sharing best practice and information; identifying opportunities for cooperation and how best to cooperate in estimating country, regional and global-level LCS scenarios.



## “Japan Low-Carbon Society Scenarios toward 2050”

This research project, initiated in 2004, is sponsored by Global Environment Research Fund of MoEJ. The objective of the project is to propose concrete countermeasures to achieve LCSs in Japan by 2050, including institutional change, technology development and lifestyle change. More than 50 research experts have studied together to develop visions and roadmaps.

This project supports the “Japan–UK Joint Research Project.”

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

National Institute for Environmental Studies (NIES)  
16-2 Onogawa, Tsukuba, Ibaraki 305-8506, Japan.

Contact person: Junichi Fujino (NIES), [fuji@nies.go.jp](mailto:fuji@nies.go.jp)

