

Stakeholder Dialogue on Low Carbon Societies

LCS-RNet

International Research Network
for Low Carbon Societies



Expert workshop
ISAP June 26-27, 2009



LCS•R Net

IGES

Institute for
Global Environmental
Strategies

Stakeholder Dialogue
on
Low Carbon Societies

- LCS-RNet -

**International Research Network
for Low Carbon Societies**

26 June 2009

Institute for Global Environmental Strategies

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This report was finalised on the basis of the information provided, discussions, and outputs of Stakeholder Dialogue on Low Carbon Societies at ISAP Expert workshop and Opening Session held in Hayama, Japan in June 2009. LCS-RNet Secretariat would like to thank all the participants for their contributions.

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Contents

Overview.....	v
Expert Workshop Session	
Stakeholder Dialogue on Low Carbon Societies	1
Appendix	
ISAP Opening Session Report	23

Overview

With a background of growing global concern on climate change, the International Forum for Sustainable Asia and the Pacific (ISAP) was held in Hayama, Japan on 26 and 27 June 2009. The main theme was “Low-carbon development in Asia and the Pacific.” Taking this opportunity, the Secretariat of the LCS-RNet (*International Research Network for Low Carbon Societies*)¹ organised a stakeholder dialogue, planned as a part of International symposium on LCS-RNet in the Expert workshop sessions that were held in parallel with ISAP in Hayama.

At their 2008 meeting in Kobe, G8 Environment Ministers recognised the need for countries to make the transition to low-carbon societies. This would contribute to the goal, discussed at the 2007 G8 Heiligendamm Summit, of halving global emissions of greenhouse gases by 2050. To make the transition, each country needs a clear vision of what a low-carbon society would look like and how the transition might be achieved. Considering the above, the G8 Environment Ministers in Kobe strongly supported the establishment of the LCS-RNet to help with developing these visions and pathways. LCS-RNet has been established under the auspices of G8 governments but is operated by a group of leading research institutions. The Institute of Global Environmental Studies (IGES) based in Hayama Japan hosts the LCS-RNet Secretariat.

After a brief history and the objectives of LCS-RNet were introduced, there was a keynote speech by

Prof. Nay Htun (*State University of New York, Stony Brook, USA*), who recently launched the research network named International Consortium for Low-Carbon Society (ICLCS).

Prior to the stakeholder dialogue, the Open Session of ISAP² was held at which front-line experts from various research institutes, governments and businesses held discussions on Low Carbon Societies (LCS). The opening and guest remarks, and the keynote speeches of researchers from the USA and UK were followed by two sets of panel presentation sessions, which were held to introduce efforts to shift towards low-carbon societies in selected countries including China, India, Japan, Republic of Korea, UK and USA (Panel Session1), as well as domestically in Japan (Panel Session 2). The issues discussed covered the LCS’s role for successful climate change policy, commitments of the prefectural office of Kanagawa, where IGES is located, to reduce GHG emissions, energy and technology transformation accompanying LCS development, as well as efforts by the private sector. The speeches and presentations introduced in the ISAP Open Session are included in this Report as an appendix.

ISAP Open session and the Expert Workshop provided a great opportunity for all the researchers of LCS-RNet and related fields to exchange ideas and confirm that a further collaborative framework is the key to a successful low-carbon society.

² For more information:

<http://www.iges.or.jp/jp/news/event/isap2009/expert.html>

¹ For more information: <http://lcs-rnet.org/>

Expert Workshop Session

Stakeholders Dialogue on Low Carbon Societies

26 June 2009

■ Background

■ Opening Remarks:

Mr. Hiroshi Ono

Director, Global Environment Research Office, Global Environment Bureau, Ministry of the Environment, Japan ... 2

■ Keynote Speech 1:

International Research Network for Low-Carbon Societies LCS-RNet

Dr. Shuzo Nishioka

Senior Research Advisor, IGES; Senior Visiting Researcher, National Institute for Environmental Studies (NIES) ... 3

■ Keynote Speech 2:

International Consortium for Low-Carbon Society (ICLCS), Established July 2008

Prof. Nay Htun

State University of New York, Stony Brook 8

■ Roundtable Discussion 1: Visions, Concepts, Principles of LCS

Lessons from the Japan-UK Low-Carbon Societies Research Project

Dr. Junichi Fujino

Senior Researcher, National Institute for Environmental Studies (NIES) 11

■ Roundtable Discussion 2: How to Make the Developing Path towards a LCS?

Low-Carbon Development in Asia: Diverse Pathways toward a Common Goal

Dr. Kentaro Tamura

Sub-Manager, Climate Policy Project, IGES 17

Stakeholder Dialogue on Low Carbon Societies

Bridging Efforts in Japan with International Initiatives

Background

Solving the climate change problem will require not only technology deployment, but behavioural changes in the context of socioeconomic, political, and cultural values. In contrast to prevailing approaches that are target driven and largely focused on mitigation, the notion of a low carbon society (LCS), which integrates the various aspects of technology, finance and capacity, is gaining traction among policymakers around the world. However, as yet no clear vision of what makes a LCS has been developed and shared amongst policy-makers and other stakeholders. Researchers and policy-makers realise there is a critical need to develop the LCS concept and collaborate around the world. Starting in 2006, the first workshop of the Japan-UK Low-Carbon Society project took place. Since then several more workshops have taken place and participating researchers to this project from various places in the world have studied this subject,

and developed roadmaps and visions of what LCS would look like in their own economies. Motivated by the success of this joint project, the International Research Network for Low Carbon Societies (LCS-RNet) was initiated by the Environmental Ministers Meeting of the G8 (May 2008). Earlier this year in Trieste, Italy, researchers of the LCS-RNet gathered for the first time and identified the research areas and themes. They also discussed the strategic planning of the network activities for the next five years. At the ISAP meeting in Japan this year, IGES provided an opportunity of a stakeholders' dialogue for the LCS-RNet, where Japanese researchers participating in the LCS-RNet and Prof. Nay Htun who are leading International Consortium for Low-Carbon Society, (ICLCS) furthered discussions with an emphasis on Asia and on promoting a collaborative framework to exchanges ideas among researchers.

Opening Remarks:

Mr. Hiroshi Ono,

Director, Global Environment Research Office, Global Environment Bureau, Ministry of the Environment, Japan

Mr. Ono began his presentation by expressing his belief that while policymakers are beginning to develop an awareness of the significance to realise Low Carbon Society (LCS), the fact of the matter is that many policymakers today do not have firm vision of what a LCS looks like and do not know what changes are needed to make a successful transition to LCS in both developed and developing countries.

As such there is a current need for the scientific community to provide policy makers with clear and visible means to move towards a LCS. In this respect research is needed among different fields to provide scientific views/information and a basis for developing the LCS future. Thus, LCS-RNet was launched in 2009 with the primary objective to promote research

information exchange, as well as to facilitate achieving LCS over the world through interaction amongst policy-makers, civil society and business. Because researchers on their own cannot create a LCS, we must develop a worldwide structure for this interaction. In this context, initiatives like LCS-Rnet need support from policy-makers. The output of such research and interaction is expected to be policy relevant rather than policy prescriptive. As such, stakeholder dialogues at the initial phase of the LCS-RNet are important.

Although the launch of the LCS-RNet is based on the agreement at the last G8 Environmental Ministers Meeting (May 2008), we do not want to limit the network to the G8 countries. It is important for LCS-Rnet to be open to developing countries, particularly emerging economies.

Keynote Speech 1:**International Research Network for Low-Carbon Societies LCS-RNet****Dr. Shuzo Nishioka,**

Senior Research Advisor, IGES; Senior Visiting Researcher, National Institute for Environmental Studies (NIES)

Dr. Nishioka opened his presentation with a brief history of Low Carbon Society-related policies in Japan since 2007, highlighting the roots of Japanese LCS developing through the concepts and visions of past Japanese Prime Ministers such as Abe and Cool Earth 50. Prime Minister Fukuda spoke of a Low Carbon Society in his speech to Diet in May 2008, the G8 Environmental Ministers Meeting (G8 EMM) held in Kobe in May 2008.

At that G8 EMM, the establishment of the LCS-RNet was proposed and accepted as an international network for the world research communities for the sake of the recognised necessities of transition of current socio-economic structures towards low carbon societies (LCS) to solve the issues around the climate change. Dr. Nishioka recounted the Kobe G8 meeting chair's summary by stating the objectives of contributing value-added to research, promoting understanding of LCS dialogues between researchers and other shareholders, and contributing to the international policy process. With those objectives, the LCS-RNet is expected to assist efforts in all involved countries to grasp the clear vision of their own LCS, as it is a new concept and many countries do not yet have guidance for transitioning towards LCS. Although the LCS-RNet was initiated by the G8 EMM, the network should be independent as its concept is that of a non-binding innovative network.

The LCS, in particular at these early stages, is

Discussion

In the response to a question on how the expansion of the LCS-RNet can be achieved, a planned annual meeting of the LCS-RNet was introduced. The LCS-RNet is currently asking people to join the network

academic-driven and multidisciplinary. With this understanding of the newness and comprehensiveness of the research on LCS, new kinds of scientific methodologies need to be established to integrate various disciplines to help science-based policy-making, as well as to support technological innovations. In this light there is a critical need to promote better understanding among stakeholders, as LCS is not only a matter for people working in the energy sector, but also city planners, land-use planners, and behaviour scientists among others. Of utmost importance throughout the development of a LCS is the involvement with other stakeholders than just researchers.

So far as the key research elements and next steps for the LCS, attention must be paid to building awareness outside of the scientific community. In addition, a LCS in the context of sustainable development could be achieved by leapfrogging to low carbon development in developing countries by utilising the low carbon technologies transferred from developed countries, but the most important is how these technology can be integrated into the existing social system and economic structure.

While France, Germany, Italy, UK, Republic of Korea and Japan have made a commitment to LCS-RNet, we are still missing three major countries, i.e. the United States, Canada and are awaiting a response on participation from Russia.

and to participate in the annual meeting. Information of the meeting will be circulated widely (e.g. through the website).

LCS-RNet

International Research Network for Low Carbon Societies

LCS-RNet

Stakeholders Dialogue on Low Carbon Societies
at ISAP 2009
26 June
Shuzo Nishioka

LCS-RNet

Background

At G8 Environment Ministers Meeting, May 2008, Kobe, Japan Strong support to set-up a Low Carbon Society International Research Network (LCS-RNet) was expressed.

[To realize such long-term goals towards LCS], it is **necessary to change the current socio-economic structures** and transition to low-carbon societies. In so doing, there was general recognition of the importance of **all the countries to have a clear vision of their own low-carbon societies.** *[Kobe EMM Chair's Summary]*

LCS-RNet

Objectives of LCS-RNet

- Promote information exchange and research cooperation that covers various issues relating to low carbon societies (LCS).
- Promote understanding of LCS dialogues between researchers and various stakeholders including policy-makers, businesses, citizens, and others to share national and sub-national visions on low carbon societies.
- Contribute to international policy-making processes on climate change such as G8 and other high level policy processes by providing research outcomes and recommendations.

LCS-RNet

LCS Research is:

- relatively new research field -
- a number of issues require research collaboration among researchers with different disciplines.

That require;

- Integration of science and technology, society, and policy,
- Have the overview of the state of LCS research
- Better understanding of LCS among various stakeholders, and
- Linkage between LCS research and policy-making processes to provide science based information

Nature of LCS-RNet

- Platform for research on low carbon society.
- Non-binding network

Why Networking?

- Lessons to be learned from each other for common approaches.
- Various definitions, different pathways to achieve LCS

LCS-RNet

2009 – under Italian G8 presidency

Researchers Meeting in Trieste, 1-2 April

- Hosted by the Government of Italy
- 23 participants from 8 countries
- Research areas/themes identified
- Discussed the strategic planning of its activities for the next 5 years.

The G8 Ministers and senior officials supported the innovative nature of the LCS-RNet, and requested to report back its outcomes periodically.

G8 EMM in Siracusa, 22-24 April

- Bologna, Italy
- 12-13 October 2009
- Hosted by Italy with the support of Ministry of Environment, Land and Sea

LCS Session at G8 High Level Forum In Trieste, 5 April

- Officially announce the launch of the LCS-RNet

1st Annual Meeting in Bologna, 12-13 October & 1st Steering Group Meeting

Stakeholder Dialogue on LCS at ISAP organised by IGES

Workshops in Asia by IGES, etc

2010 – under Canadian G8 presidency

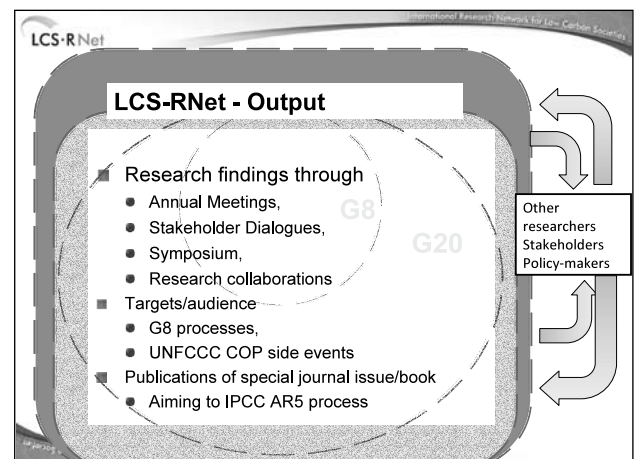
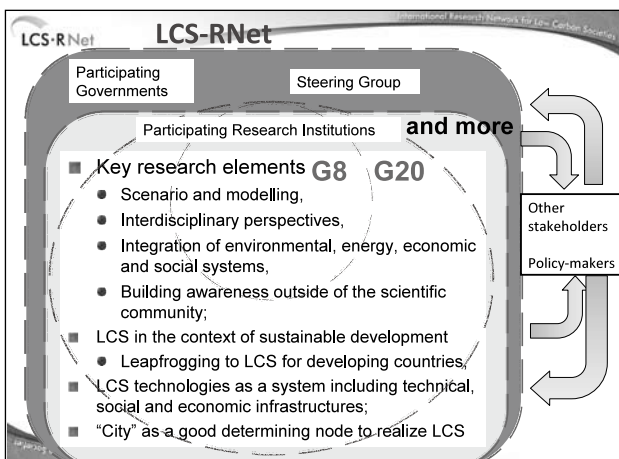
Meeting on LCS in Germany - TBD

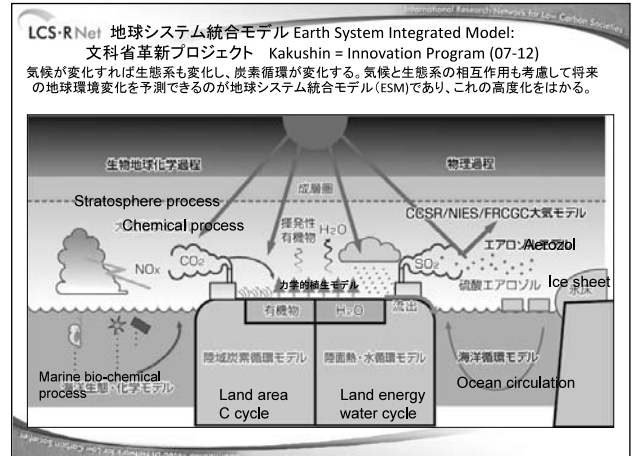
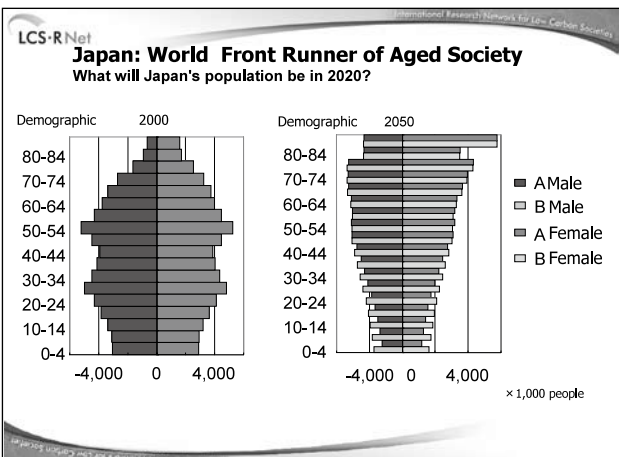
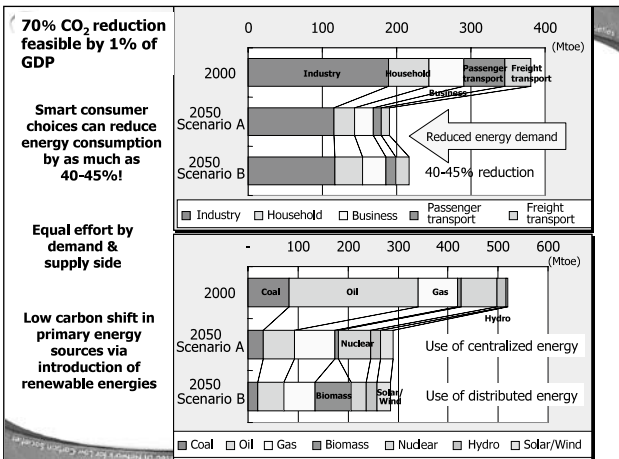
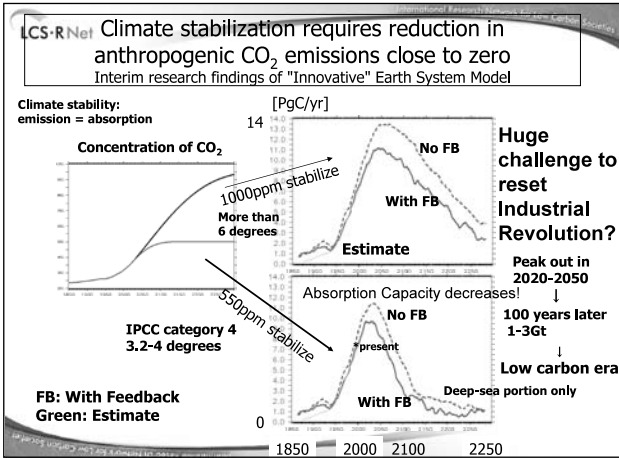
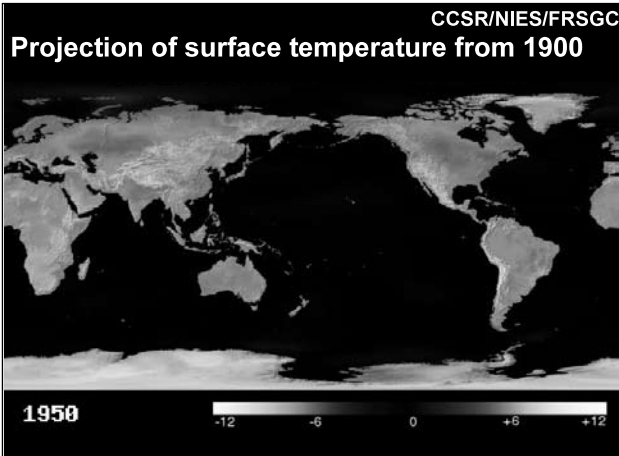
LCS-RNet

Participating Institutions with Government Contact Points

(as of A May 2009)

Academy of Technology		France
French Environment and Energy Management Agency	ADEME	France
Institute for Sustainable Development and International Relations	IDDR	
Wuppertal Institute for Climate, Environment and Energy		Germany
Euro-Mediterranean Center on Climate Change	CMCC	Italy
Italian National Agency for New Technologies, Energy and the Environment	ENEA	Japan
Institute for Global Environmental Strategies	IGES	
National Institute for Environmental Studies	NIES	Japan
National Institute of Environmental Research	NIER	Korea
UK Energy Research Centre	UKERC	UK





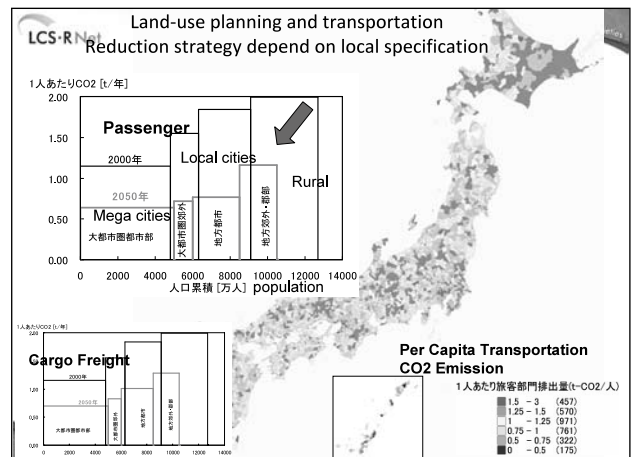
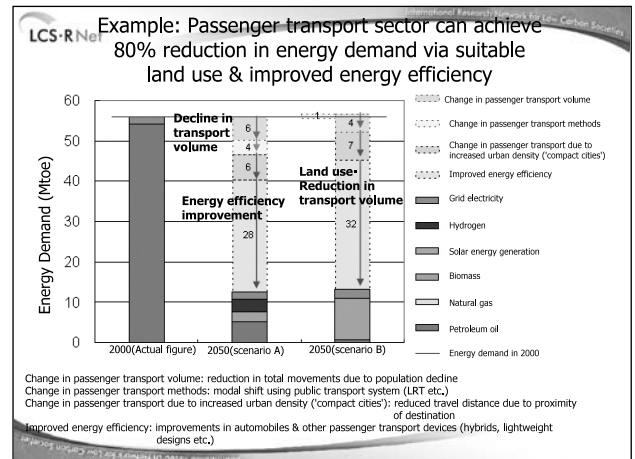
02050 Low Carbon Society, Japan

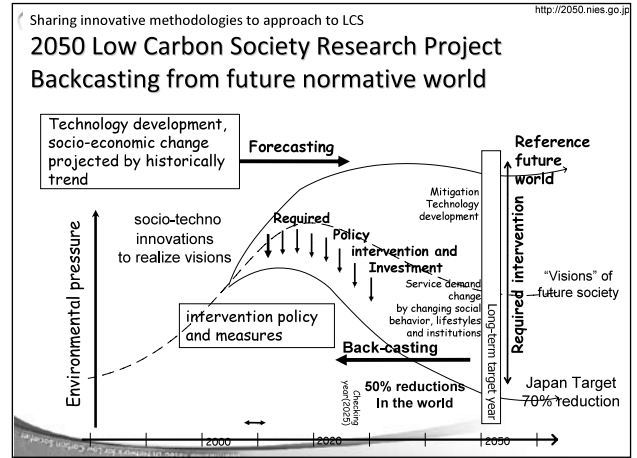
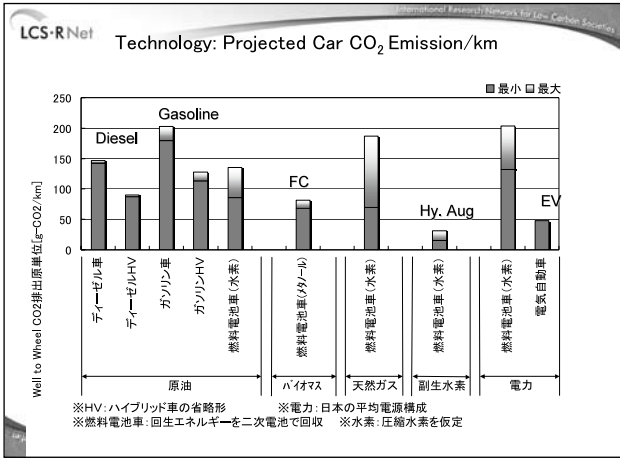
A research result to endorse Japanese policy of 60-80% reduction in 2050

Key conclusion:
Japan has the technological potential to reduce its CO₂ emission by 70% compared to the 1990 level, while satisfying the expected demand for energy services in 2050.

Innovation necessary in technological/industrial/social infrastructure policy

Prime Minister Fukuda in Congress (Jan. 2008) "...maximize Japanese environmental power, lead world transition towards Low Carbon Society..."
(May 18) Japanese long-term target 60-80% reduction until 2050.





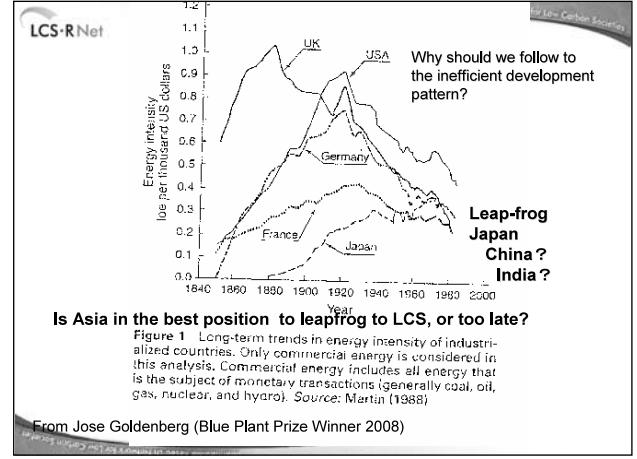
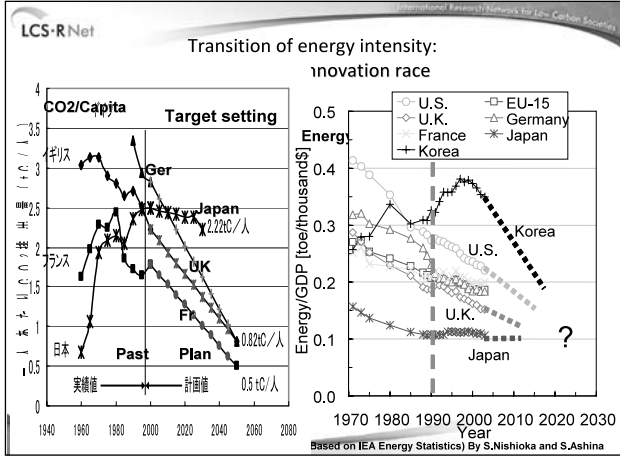
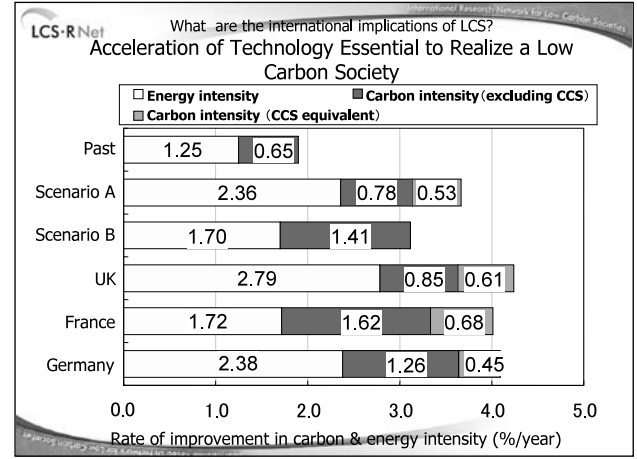
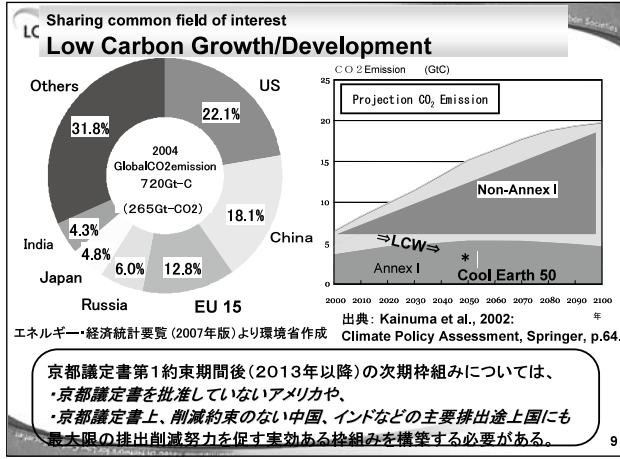
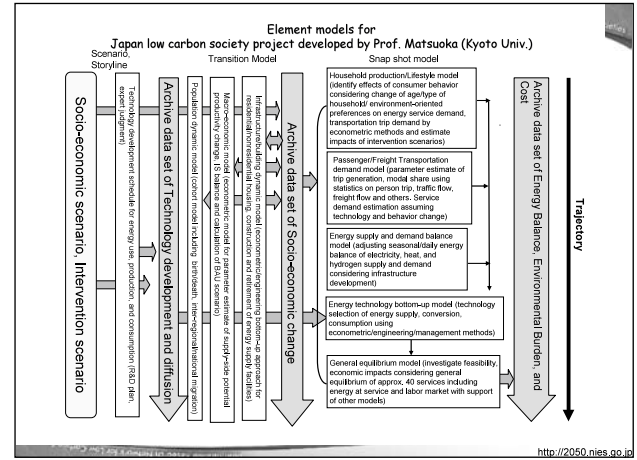
LCS-RNet LCS VISIONS, two different but likely future societies

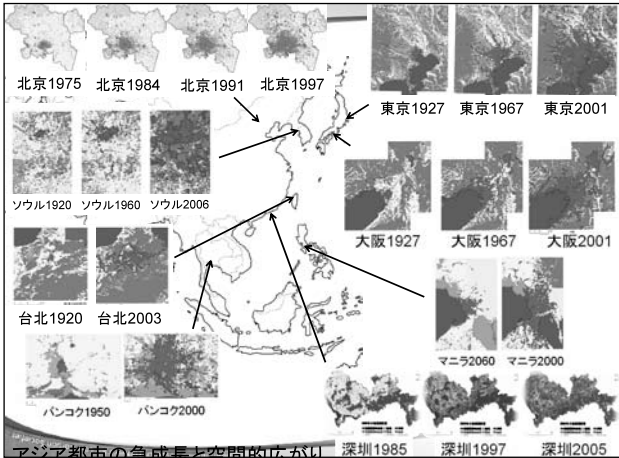
Vision A "Doraemon"	Vision B "Satsuki and Mei"
Vivid, Technology-driven	Slow, Natural-oriented
Urban/Personal	Decentralized/Community
Technology breakthrough Centralized production /recycle	Self-sufficient Produce locally, consume locally
Comfortable and Convenient	Social and Cultural Values
2%/Cap/year GDP growth	1%/Cap/year GDP growth

出典: 2005年発行の漫画『ドラえもん』の主人公の孫である野比大助が、22世紀から来たロボット猫のドラえもんを助けて、21世紀に帰る。ドラえもんは、22世紀の未来社会を生き抜くために、21世紀の社会にさまざまな未来道具をもたらす。この漫画は、未来社会のありかたを想像する上で、非常に重要な役割を果たしている。

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

http://2050.nies.go.jp





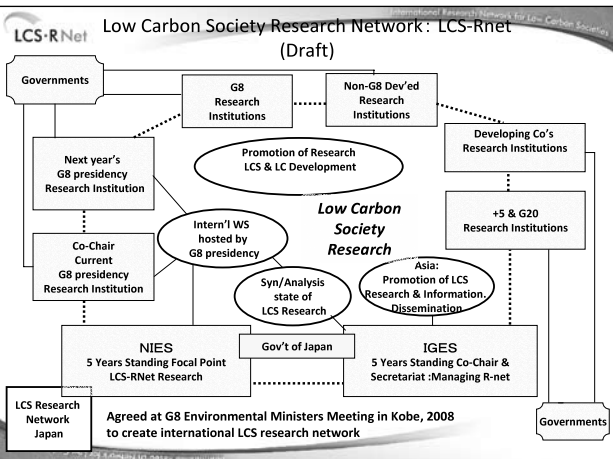
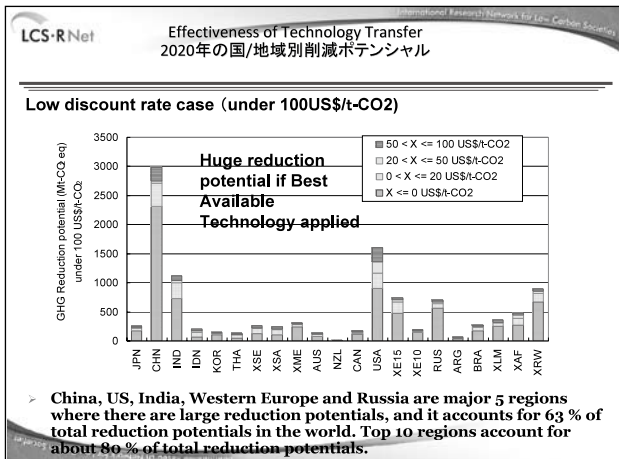
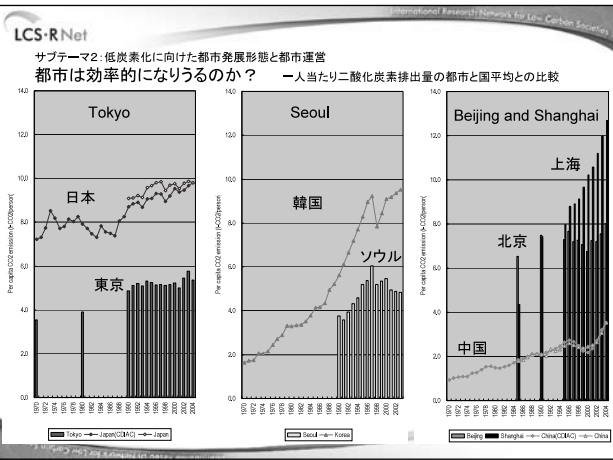
LCS-RNet
 Are many of the Asian Countries in a good position to leapfrog to LCS, or too late?

- Rapid growing stage
- Plenty of human resources/ infrastructure/ technology
- Current pressure: energy, climate, globalization to LCS
- Cooperative opportunity for T.T

Not all the country, but many have possibility to leapfrog



Can you see and feel the blessings of nature?



Keynote Speech 2:**International Consortium for Low-Carbon Society (ICLCS), Established July 2008****Prof. Nay Htun,**

State University of New York, Stony Brook

In terms of the role of energy and carbon, we need to look at some major negative impacts for the global society such as global warming, damage to the ecosystem, and socio-economic development issues such as food security, human health, as well as increasing disasters. Of particular concern are the impacts of climate change on all these issues. At this time, energy and climate change are at the heart of everything, with carbon as a central figure in all this.

Focusing on carbon provides us with something to be measured, which is very important because if it can be measured, it can be managed. Measuring our carbon footprint can make climate change and carbon issues real in everyday life, which in turn can lead us to manage our impact through seeing the outcomes of our actions. It is important that we can see the changes, for example, in an electricity bill. This can lead to greater openness as we have a clearer understanding of our actions and impacts. We need to look at the carbon mitigation issues from a broader perspective, much broader than just technology or economics. Hence, the construct of Low-Carbon Society (LCS) was born.

The parameters of the concept of LCS and the speed at which recognition and perception of LCS is evolving in recent years is something worth noting. In the earlier stage, technologies achieving low carbon emissions were the centre of the focus. The concept was broadened to cover the economy as a whole, the so-called low carbon economy. Then people started to speak a concept of low carbon societies to cover society as a whole.

The G8 invited the research community to create a network, an invitation which was an important indication to countries to draw pathways for LCS, not only for the research community itself, but also for civil society. Now is our chance to address the

challenge of creating a common understanding of where we want to go, and this opportunity can influence the current policy process while political leaders are asking for it. With such varied input, all parties are moving towards the same goal of a low-carbon society. In addition LCS could be a part of the bridge between G8 and non-G8 countries, together with civil society.

Of course, clarification of the LCS should not only be in international discussions. There is a need to articulate LCS within countries which will require coordinating mechanisms to work with seven pathways including technology, finance, economics, partnerships, social changes, education/capacity, and policy. These pathways can be taken by sharing knowledge and experiences, disseminating policy and technical briefs, joint research, developing education and training programmes and mobilising resources.

These mechanisms will allow the network members to address other challenges such as the atmospheric brown cloud (ABC) which is a critical climate issue. In addition this coordination and dialogue will contribute to the reduction of disasters and destruction from natural occurrences such as displaced persons and environmental damage; this is the purpose of a LCS.

We must support this transformational change, and not continue with business as usual. For practical reasons we must consider the economics of these changes. Governments need to make decisions on an informed basis. To really change, the costs are extremely high so we must consider where the money going to come from.

A major question is how to bring together as many stakeholders as possible. This requires a network with

the ability to coordinate and organise with finesse.

Finally, Prof. Htun introduced the new initiative of ICLCS as a collaborative mechanism assisted by

E-TKF (E-Transformational Knowledge Facility). He closed his presentation describing the need to tackle the most pressing issue of global climate change with the “fiercest urgency of now”.

Discussion

A participant asked about new fuels, stating that even if we switch to new fuels there will still be particles, so how to respond to this? Prof. Htun responded that while technology progresses to account for particles and other pollutants additional problems that have not originally been considered as issues for technology may arise. For example wider highways connecting

suburbs and cities allow for faster vehicles which can lead to rubber particulates from the tires causing health problems regardless of the type of fuel used in the car. These situations can be greatly resolved through social and political processes such as better city planning and technological developments.

**THE INTERNATIONAL CONSORTIUM FOR
LOW-CARBON SOCIETY, (ICLCS)**
Established July 2008

STAKEHOLDERS DIALOGUE ON LOW-CARBON
SOCIETIES.

Convened as part of Japan Symposium on
International Research Network for Low-Carbon
Societies (LCS-Rnet)

26 June 2009
IGES, Hyaama Japan

THE CENTRAL ROLE OF ENERGY AND CARBON

THE CENTRAL ROLE OF ENERGY AND CARBON

CARBON

✓ CAN BE MEASURED.
HENCE,
✓ INTERVENTIONS CAN BE MANAGED BETTER

SEVEN PATHWAYS TOWARD A LOW – CARBON SOCIETY PARADIGM TRANSFORMATIONAL CHANGES IMPERATIVE

- **Technology**
- **Financing**
- **Economics**
- **Innovative Partnerships**
- **Social / Societal Determinants**
- **Education, Training, Capacity building**
- **Policy**

IMPACTS

- **ECOSYSTEM SERVICES**
- **WATER**
- **AGRICULTURE, FOOD**
- **HUMAN HEALTH, WELL BEING**

ENCOURAGING, FACILITATING NETWORKS

- **LOCAL**
- **NATIONAL**
- **REGIONAL**

PROMOTING INTERNATIONAL COOPERATION

GLOBAL ALLIANCE FOR PARADIGM CHANGE TOWARDS LOW –CARBON SOCIETIES

COLLABORATING MECHANISMS

Assisted by the E-Transformational Knowledge Facility, *E-TKF*

- **SHARING KNOWLEDGE, EXPERIENCE**
- **DISSEMINATING POLICY AND TECHNICAL BRIEFS**
- **JOINT RESEARCH**
- **DEVELOPING EDUCATION AND TRAINING PROGRAMMES.**
- **MOBILIZING RESOURCE.**

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 Tsinghua University, Beijing, China. (Low Carbon Energy Laboratory).

Hosted by Stony Brook University, State University of New York, supported by the Advanced Energy Research and Technology Center, The Center of Excellence in Wireless Information and Technology, and The Center for BioEnergy Research and Development

PLEASE JOIN US TO ACCELERATE TOWARDS THE PARADIGM OF A LOW-CARBON SOCIETY.

“ The Fiercest Urgency of Now ”

Roundtable Discussion 1: Visions, Concepts, Principles of LCS

Lessons from the Japan-UK Low-Carbon Societies Research Project

Dr. Junichi Fujino,

Senior Researcher, National Institute for Environmental Studies (NIES)

Dr. Fujino asked the question of what exactly is a Low-Carbon Society (LCS). Many definitions exist based on the local situation, but he finds there are some basic principles.

- Behaviour change and the impact on LCS, including city design.
- Alignment of sustainable development with LCS.
- Necessary financing to mobilise cities to LCS.
- Acknowledgement and addressing of the negative impacts of LCS and the barriers therein.

Dr. Fujino explained the lessons learnt from the Japan-UK Low-Carbon Society research project. In February 2006, the governments of Japan and UK launched the innovative joint research project on sustainable low-carbon societies with participation from a diverse group of some 20 countries. The project identified the necessary elements for realising LCS such as 1) actions for sustainable development, ensuring all group development needs and 2) making an equitable contribution to stabilise atmospheric concentration of GHG to avoid climate change through deep cuts in global emissions.

The project aims to review country-level GHG emission scenarios based on the understanding of the necessity for deep cuts of GHG by 2050, formulating win-win strategies to align sustainable development and climate change objectives, and identifying gap between goals and the current reality.

The project has held three symposiums and workshops. Discussions at the second workshop focused on the need for bold and innovative measures such as long-term policy signals, as well as changes in human behaviour and lifestyle. It was also concluded that existing technologies can make a major

contribution, but emerging technologies will also contribute in the medium- and long-term. At the last workshop, issues on behavioural change, sustainable development, investment, and opportunities and barriers were highlighted.

Although the political target of global reductions of GHG was agreed at the Heiligendamm Summit in 2007, there still remains the initial question of how the deep cuts can be achieved, and this is the reason why we need to unite science and policy, through dialogue.

One Japanese scenario study project concluded that a 40% reduction should be carried out on the demand side, while the remaining 30% should be on the supply side to achieve 70% CO₂ emission reductions by 2050 compared to 1990 levels. However, without presenting concrete measures to combine such options, it would not be possible to make an actual impact to the post-2012 climate negotiations. For such a purpose, issues around technologies and any positive and negative aspects must be evaluated. Barriers must also be eliminated before implementation can be carried out to build a safe and sound society with appropriate land uses.

Dr. Fujino concluded his presentation by pointing out that climate change is an issue that exists through generations. Even if we eventually could achieve deep cuts, the impact of climate change will only start to show up years later, so there is a serious gap between generations over the possible result to be felt. Thus, Dr. Fujino reiterated the remark made by Prof. Htun earlier, namely “a sense of urgency to act now” for developed countries. Such countries need to go straight to a LCS as there is no time to allow for increases in CO₂. Developing countries would pursue moving to a LCS, possibly using leapfrogging by technology.

Discussion

It was pointed out that one of the major messages for Dr. Fujino was that the LCS must offer people a higher quality of life. After which the discussion was opened to the floor and was followed by a number of issues raised by the participants.

Concern was expressed about the current framework having adequate transparency and accountability for research. In addition it was noted that there will be great difficulties in moving away from current practices like using coal. Transformation is not simply about new technologies but changing behaviour. Researchers should consider why these changes are difficult.

More broadly, participants wondered if the LCS concept is too abstract, and although it may be sufficient for modelling, it needs also to be realistic and find what is possible in practice. There are good intentions behind LCS, but these can be very difficult to grasp so focus should be put on other parts of the problem apart from technology and society – namely, finance. In addition, quality of life cannot be sacrificed easily in the short-run during transition, which is something to consider for policy-makers.

It was also discussed if LCS was appropriate for less-developed countries. LCS could be acceptable for newly emerging countries, but it is yet to be

understood and decided for other countries. When issues around LUCF are involved in LCS, the importance of developing countries is set to increase. Research on market mechanisms, institutional capacities, enforcing capacities in developing countries are called for. With the special focus on developing countries, adaptation and mitigation must come together because problems are inevitable. Mitigation is working, but unless there are giant leaps in technology, adaptation is going to be the most important way forward.

If we are to convince policy-makers, businesses, and civil society, there needs to be a combination of back-casting and bottom-up approaches. Dr. Fujino responded to this, based on his experience applying a back-casting model approach in Japanese projects on LCS, by pointing out the need for dialogue between conservative models and optimistic model researchers to develop more realistic ones.

Finally, the political vocabulary of LCS will be critical. It will only have force when politicians use it, in the same way that only after politicians started to use the phrase “sustainable development”, did it become a real concept for policy. Likewise, the debate in the 1990s on sustainable development did not stop us from helping the environment, and lack of clarity should not stop us from working on LCS.

Lessons from the Japan-UK Low Carbon Societies Research Project

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

Junichi Fujino(fuji@nies.go.jp)

National Institute for Environmental Studies (NIES), Japan, TOWARDS A LOW CARBON SOCIETY, LCS-RNet & ICLCS RT and ISAP, IGES, Hayama, Japan, 26 June 2009

2nd Workshop: June 2007 Achieving a Sustainable LCS



London 30 countries, 100 participants

- A wide range of stakeholders- from government, business, and civil society need to be engaged in finding solutions.
- A significant share of GHG is due to cities. Effective Action can be and is being undertaken.

3rd Workshop Feb 2008 Roadmap to Low Carbon World

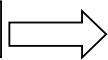


WS: 18 countries, 79 experts Symposium: 273 participants

- Creation of appropriate incentives for business using long-term policy signals to strengthen carbon pricing.
- Expanding financial flows, international cooperation in low-carbon approaches.
- Building trust between countries and stakeholders though enhancement of communication is important.

"Call for Action" and WS3 "Executive Summary" were delivered to G20 in Chiba, March 14-16 2008.

G8 Gleneagles 2005



G8 Environmental Ministerial Meeting, May 2008
G8 Japan, July 2008

LCS PROJECT: OBJECTIVES (1)

低炭素社会プロジェクトの目的

- Identifying and understanding the necessity for deep cuts in greenhouse gas (GHG) emissions toward 2050
- 2050年までに温室効果ガスの大幅削減が必要であることを認識し理解する
- Reviewing country-level GHG emissions scenario studies in developed and developing countries.
- 先進国および途上国で進められている国別の温室効果ガス排出量シナリオについてレビューする
- Formulating win-win strategies to align sustainable development and climate objectives
- 持続可能な発展と温暖化対策が両立するようなWin-Winな戦略を作る



Japan-UK Joint Research Project Sustainable Low-Carbon Societies (LCSs)

(Co-chairs : Shuzo Nishioka(NIES) and Jim Skea(UKERC))

In 2006, the Governments of Japan and UK established an innovative joint research project with participation from a diverse group of some 20 countries including most G8+5 countries, Asian countries (Australia, Korea, Thailand, Nepal, Malaysia, Indonesia), African countries, and others.

■ Launch of the Project : 16th Feb 2006 (Anniversary of Kyoto Protocol)



Former Japanese Environment Minister Yuriko Koike and UK Ambassador to Japan Sir. Graham Fry announced the launch of the joint research of the Low -Carbon Society.

1st Workshop: June 2006 Developing Visions for a LCS through Sustainable Development



WS: 19 countries, 54 experts Symposium: around 500 people

- A long-term perspective focusing on the need for urgent action to reduce CO₂ towards 2050.
- Achievement of LCS will involve the development and deployment of low carbon technologies, changes in lifestyles and institutions, and need to align with ² sustainable development.

ROADMAP TO A LOW CARBON WORLD

低炭素世界への道筋

Third Symposium of the Japan-UK Research Project on Low Carbon Societies (LCS) 第3回日英低炭素社会研究プロジェクト会合

Shuzo Nishioka, Advisor, NIES
国立環境研究所 参与 西岡秀三
Jim Skea, Research Director, UKERC
英国エネルギー研究センター 研究理事 ジム・スキ

15 February 2008

Hotel Metropolitan Edmont, Iidabashi, Tokyo



LCS PROJECT: OBJECTIVES (2)

低炭素社会プロジェクトの目的

- Studying methodologies to achieve LCS – visions, pathways, modelling, financial mechanisms
- 低炭素社会を実現する手法を研究する:ビジョン、道筋、モデル化、金融メカニズムを対象に
- Identifying gaps between goals and the current reality
- 目指すべきゴールと現状のズレを認識する
- Sharing best practices and information; identifying opportunities for cooperation
- 優良事例や優れた情報を共有する。協力する機会を見つけ出す



WHAT IS A LOW CARBON SOCIETY? (1)

低炭素社会とは？

- Takes actions that are compatible with the principles of sustainable development, ensuring that the development needs of all groups within society are met
- 社会のあらゆる層が必要とする発展を確かにしながら、持続可能な発展の原則に合った行動をとる。
- Makes an equitable contribution towards the global effort to stabilise atmospheric concentration of carbon dioxide and other greenhouse gases at a level that will avoid dangerous climate change through deep cuts in global emissions
- 大気中の温室効果ガス濃度を、気候変動による危機的な状態から回避するレベルに安定化させるための、等しい貢献を行う。



WHAT IS A LOW CARBON SOCIETY? (2)

低炭素社会とは？

- Demonstrates high levels of energy efficiency and uses low carbon energy sources and production technologies
- エネルギー効率をさらに高められることを示す。低炭素なエネルギー資源・低炭素な製造技術を使う。
- Adopts patterns of consumption and behaviour that are consistent with low level of greenhouse gas emissions
- 温室効果ガス排出の少ない消費／行動様式にする。



LOW CARBON SOCIETY TIMELINE

今までの経緯

- February 2006 – announced by Environment Minister Yuriko Koike and British Ambassador Graham Fry in Tokyo [2006年2月 立ち上げ]
- June 2006: *First* Low Carbon Society Symposium and Workshop, Tokyo [2006年6月 第1回会合]
- December 2006: Low Carbon Society Modelling Workshop, Oxford [2006年12月 モデル会合]
- June 2007: *Second* Low Carbon Society Symposium and Workshop, London [2007年6月 第2回会合]
- February 2008: *Third* Low Carbon Society Symposium and Workshop, Tokyo [2008年2月 第3回会合(これ)]



THE LCS PROJECT NARRATIVE

今までの会合の概要

- Workshop 1
 - Why do we need low carbon societies? なぜ必要?
 - Can they be achieved? どうすればできる?
 - Are they compatible with sustainable development? 持続可能な発展と両立する?
- Workshop 2
 - What are the options for achieving low carbon societies (concrete examples)? どんな方法がある? 具体例は?
 - What needs to be done? 何をしなければならない?
- Workshop 3
 - Key findings and policy recommendations 主要な検討結果と政策への提言
 - Dialogue with stakeholders 関わりの深い人々との対話



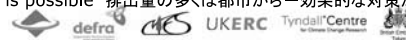
CONCLUSIONS: WORKSHOP 1 (2006年6月)

- Climate change represents a significant threat. Urgent action is needed to reduce global GHG emissions significantly 気候変動は深刻で速やかな排出量の削減が必要
- Deep cuts in GHG emissions by 2050 are technically and economically feasible – as much as 60-80 per cent in developed countries. 大幅な削減は技術的にも経済的にも可能
- The costs of transitioning to low-carbon societies are far less than costs associated with inaction. 対策のコストはやらない場合の気候影響による損害コストよりずっと安い
- A wide range of stakeholders – from government, business and civil society need to be engaged in finding solutions. 政府、ビジネス、市民など関わりの深い人々が一緒に解決策を見つけることが大事
- Creating visions of low-carbon societies can help to educate and motivate people and organisations. ビジョンを作ることで人々や組織をより低炭素社会になるように教育、動機付けを手助けできる



CONCLUSIONS: WORKSHOP 2 (2007年6月)

- we need bold and innovative measures: 強力で革新的な対策が必要
 - long-term policy signals 長期を見通した政策シグナル
 - enhanced RD&D 研究・開発・普及
 - mobilising investment resources for developing countries 特に途上国への投資が行われやすくなる
 - co-benefits and sustainable development コベネと持続可能な開発
- changes in human behaviour and lifestyle can contribute to low-carbon societies. 人々の行動と生活様式を変える
- existing technologies can make a major contribution but emerging technologies will also contribute in the medium to long term. 既存の技術も重要、開発中の技術で中長期的な大幅削減が可能に
- a significant share of GHG emissions is due to cities - effective action is possible 排出量の多くは都市から一効果的な対策が可能



KEY THEMES FOR THE THIRD SYMPOSIUM

第3回会合の主なトピック

- Behaviour 個人のライフスタイルの変更とその影響
 - Behaviour change and its impact on delivering LCSs.
- Sustainable Development 持続可能な発展とLCSの両立
 - Aligning LCSs with sustainable development
- Investment LCSを実現する投資
 - Financing the transition to LCSs
- Opportunities and Barriers セクター別に見たときのLCSに向けた障壁とチャンス
 - Identifying possible negative impacts and impediments to achieving LCSs 起こりうるマイナスの影響と障害の認識
 - exploring ways of overcoming them それを克服する方法の探索



EXPECTED OUTPUTS

今回の会合のアウトプット(予定)

- Full Report of the 3rd Workshop
- Executive Summary of the 3rd Workshop
- Summary of Conclusions from the Workshop Series
- Report from 20 countries on Low-Carbon Society Scenarios
- Call for Action



Japan-UK Low Carbon Society Project

2050.nies.go.jp



Call for Action and Executive Summary are available on Japan LCS homepage (<http://2050.nies.go.jp>). These are input for G8 climate change discussions.



Chair's Summary G8 Environment Ministers Meeting Kobe, Japan May 24-26, 2008

Transitioning to low-carbon societies and establishing an international research network on low-carbon societies

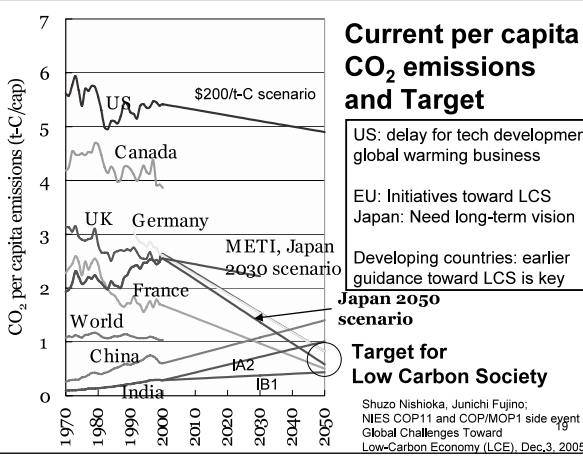
5. To realize such long-term goals, it is necessary to change the current socio-economic structures and transition to low-carbon societies. In so doing, there was general recognition of the importance of all the countries to have a clear vision of low-carbon societies. Strong support for establishing an international research network of institutions involved in the research on low-carbon societies was shown by a number of countries, and other countries also expressed their support for the consideration of its establishment.

➔ G8 Italy, 2009

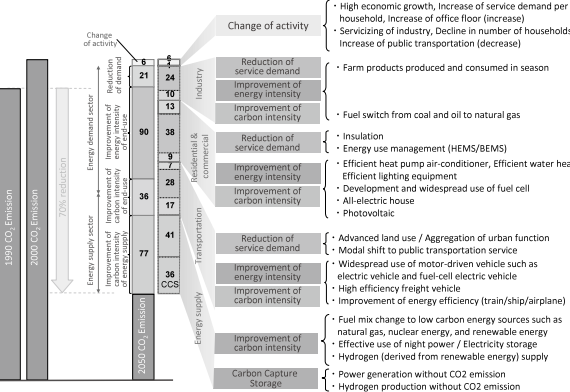
Summary of the G8 Program on July 8, 2008

(2) Environment and Climate Change

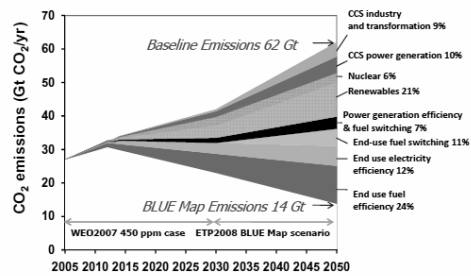
- (a) Prime Minister Fukuda stated at the beginning that this was a very important summit, one that should determine whether humanity can move toward a **low-carbon society**, severing its dependence on fossil fuels and addressing challenges including global warming and resource depletion countries.
- (b) Long-term Goal
With respect to the goal of achieving **at least 50% reduction of global emissions by 2050**, the G8 leaders agreed to seek to share and adopt it with all Parties to the United Nations Framework Convention on Climate Change.
- (c) Mid-term Goals
In order to achieve absolute emission reductions in all developed nations, G8 leaders agreed to implement ambitious economy-wide mid-term goals.
- (d) Sectoral Approach
- (e) Climate Investment Funds



GHG 70% reduction in 2050 Scenario A: Vivid Techno-driven Society Demand side energy -40% + Low carbonization of primary energy + CCS with moderate cost of technological options as 0.3% of GDP in the year of 2050

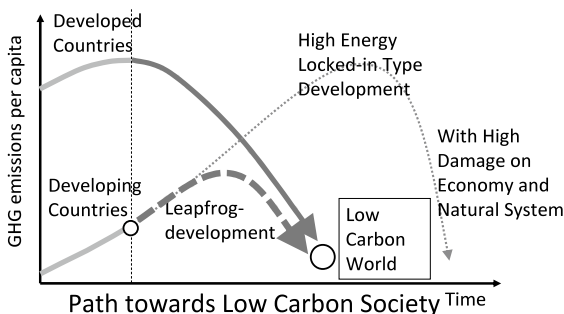


A New Energy Revolution: Cutting Energy Related CO₂ Emissions



ENERGY TECHNOLOGY PERSPECTIVES 2008
Scenarios & Strategies to 2050
INTERNATIONAL ENERGY AGENCY

COP14 side event on 8th Dec 2008 in Poznan Sustainable Low-Carbon Asia: how can it change the post-2012 climate negotiations?

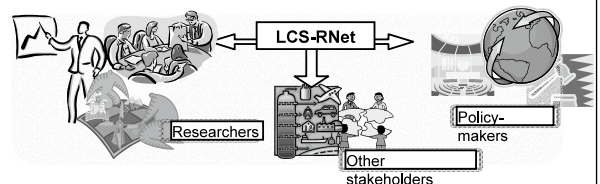


New research project "Low-Carbon Asia" (FY2009-2013) has just started 23
(project leader: Mikiko Kainuma, funded by GEF, MOEJ.)

G8 Japan Initiatives

LCS-Research Network

Linkages and interactions between research activities and policy processes for science-based policy making towards LCS



- Information exchange and research cooperation amongst research institutions of any CRS related fields,
- Dialogues with policy-makers, businesses, citizens and others to share possible visions on future LCS,
- Contribution to international political processes on climate change including the G8 process by providing research outcomes and recommendations.

1st annual workshop will be held in Bologna Italy, 12-13 October 2009

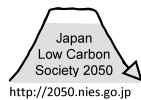
LCS is not only to avoid dangerous climate change, but to...

- 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
- and ...

We need good scientific findings to innovate systems to pledge people's activities for LCS

25

Discussions!



Contact person: Junichi Fujino (fujj@nies.go.jp)

What gift can you provide for our future?



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

Roundtable Discussion 2:

How to Make the Developing Path towards a LCS?

Low-Carbon Development in Asia: Diverse Pathways toward a Common Goal

Dr. Kentaro Tamura,

Sub-Manager, Climate Policy Project, IGES

Dr. Tamura introduced the IGES component of its research plans for the S-6 Project. Three pilot countries, Indonesia, China and India, will be studied to assess opportunities, potentials and limitations of developing Asia for LCS. This roundtable articulated research questions in the context of moving towards LCS. Firstly, research on the role of domestic institutions including financing will be carried out to consider what is the equitable and sustainable growth-path for countries of the region. Analysis on development patterns and how technology leap-frogging could be facilitated will also be one of the main research areas. Thirdly, studies will review and identify traditional practices and Asian values that foster low-carbon development.

The first research component introduced was the power sector with the example of Indonesia's

power sector, in which key drivers for promoting a distributed energy system are examined. The second research component is the agriculture sector, where the major question is to understand the capacity, and traditional values and practices of Asian agriculture to contribute to LCS.

The LCS concept should be carried out in the context of social equity in order to foster long-term collaborations. Modelling using the AIM programme can help to provide insights in the conditions needed to attain both LCS and social equity.

The research is expected to answer the questions about whether Asia is in good position to move towards LCS, and what hindrances there may be, such as political institutions.

Discussion

The question; "Is Asia in a good position for LCS?" was put to the floor.

Two issues were discussed in relation to this topic – technology and finance and how to handle these in relation to developed and developing countries, and necessary research topics in this area.

Financing was discussed mainly as an issue for developed countries. However, with regard to political institutions to encourage technology transfer, developing countries may have to improve their roles.

ODA cannot be expected to provide investment and funding for innovation and technology. On the other hand, leapfrogging cannot be achieved by simply

transferring technology from one country to another. While, what about maintenance? How do we get a workforce ready to support a new technology? Here, ODA has a role to play in LCS; in the area of capacity-building. The challenge is how to combine available sources and characteristics of funding from ODA and institutions such as World Bank/ADB, and public/private investment, and then sequence these resources in an intelligent way.

Some participants felt that technology transfer should mainly be done by businesses. Import products bring in new technology from developed to developing countries. Licensing is also an option, as is capacity building to develop new facilities in developing countries. To support this, policy can be developed to make favourable

tax and import conditions, to protect property rights, and put the onus on developing countries to ensure security and sustainability of the investment.

In addition it is not feasible to depend on importing technology because each country will have its own unique local conditions. Developing countries should develop their own technologies suitable for their respective economic and political environment. Developing countries must create favourable conditions for developed country companies to do business. There needs to be assistance in importing low-carbon alternatives with market driven ideas based on sufficient government policy. In some cases the technology can be developed at the local level rather than top down through transfer, thus helping ensure locally relevant and sustainable technology created within the framework of the local infrastructure.

Regarding the negative cost option, questions were raised as to why it even exists. The answer may be institutional barriers, which developed countries should help developing countries to overcome. But with technology transfer, cost is just one issue; capacity and infrastructure are also barriers as was mentioned before. In addition, many Asians have a high savings rate with significant investments in the West. Consideration should be given to how these savings are being used, especially externally compared to investing in domestic development.

As for technology, it is easy to say that leapfrogging is a solution, but there are many challenges to address within this construct. For example many photovoltaic projects failed as there was no system or programme developed to support the technology. Although various researches on technology transfer exists, there needs to

be more research on political institutions and regimes to assist it, and further analysis on countries' negative cost to remove obstacles for private businesses to transfer technologies.

One of the participants warned that the current general concern puts too much focus on technology as a solution. This situation was also referred to as the "Technology Dependence Syndrome". Technology is not a panacea. Particularly, we still do not have an exact image on how to use technologies, what type of technologies societies needs, e.g. for a highly aging society. To avoid being locked-in to obsolete or inappropriate technologies in future, we need to figure out the clear aim and direction to go from now on.

In light of those points, it would be necessary to differentiate terminologies of Technology Transfer and the technology leapfrogging.

There was also a concern expressed to build societies that ensure the benefits of LCS prevail in developing countries.

To the question on whether Asia is best positioned for LCS, the answer would be "Yes" given its long tradition of conservation and making wise resource decisions.

Any actions are incremental, and it could be said that we are not moving fast enough. We need to be quick enough to catch up to the urgency of social requirements to shift to LCS. We also need to integrate the time dimension of development towards LCS into research items. In the end, technology, finance, and human behaviour are key issues that must be addressed simultaneously.

Low-carbon Development in Asia: Diverse Pathways toward a Common Goal

Research Outline

Kentaro Tamura, PhD
Climate Policy Project
Institute for Global Environmental Strategies (IGES)

1

Outline

- Goal and objective
- Components
 - Development patterns
 - Technology leap-frogging
 - Traditional values
- Questions for discussion

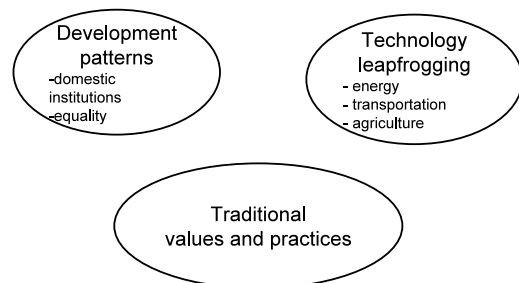
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Goal and Objective

- Research project “Low-carbon development in Asia: Diverse Pathways toward a Common Goal” was launched in April 2009.
- Goal
 - Assess opportunities, potentials and limitations of developing Asia for taking low-carbon development pathways
- Objective
 - Determine how domestic institutions promote or inhibit low carbon development
 - Analyze enabling conditions which promote low-carbon technology leap-frogging
 - Review and identify traditional values and practices in Asia, which promote low-carbon development

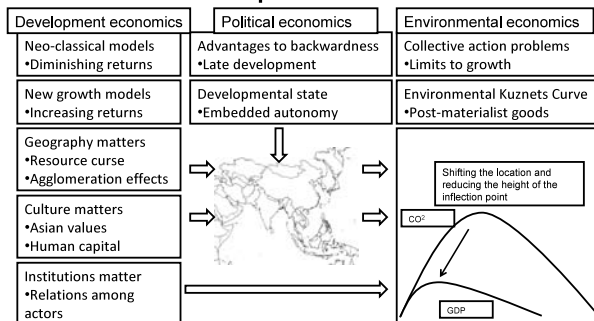
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Components



4

Development Pattern



Rules of “game” Research Questions

- What are the current trends, and likely developmental paths in Asia?
- How can we facilitate the shift to low carbon development in Asia?
- What are the driving forces (external and internal), which will impact this shift to low carbon development in Asia? How domestic institutions influence such shift?

7

Decentralization and Low Carbon Transport: The Cases of India and Indonesia

- Question: Why have India and Indonesia achieved varying degrees of success implementing low carbon transport reforms?
- These reforms require:
 1. **fiscal transfers** to cover investment in public transport;
 2. **strong vertical coordination** to integrate fuel, vehicle and travel demand policies; and
 3. **clearly defined implementing responsibilities** to integrate mixed land use and mode shifting policies.

	1. Fiscal Transfers	2. Vertical Coordination	3. Clearly Defined Implementing Rules
India	**	**	*
Indonesia	*		

- Hypothesis: India will enjoy more success because it has more mature federal institutions.
- Alternative Hypothesis: Degree of decentralization does not matter as much as other variables.
- Method: Comparative case study of transport policies with interview data on implementation.

Financing Low Carbon Development in Asia: Comparative Study

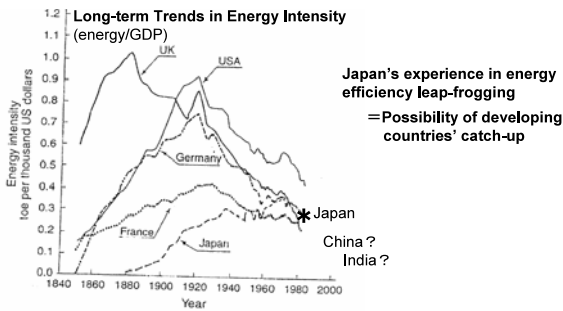
- Background
 - High saving rates and predominance of domestic capital in infrastructure investments imply the possibility of self-finance to low carbon development in China, India and Indonesia.
 - However, a key challenge is to ensure that investment will flow into low carbon energy technologies and energy efficiency in a timely fashion to avoid carbon lock-in.
- Objective
 - Determine how domestic financial systems promote or inhibit energy efficiency investments
 - How do different institutional structures of financial systems (e.g., indirect finance [via banks] in China and direct finance [through developed capital markets] in India) matter?
- Methodology
 - Comparative case study of institutional structures of financial systems

7

What are the equitable and sustainable growth paths for developing Asia?

- Concept:
 - In Asia, social, economic conditions of countries are quite diverse. To foster a long-term cooperation in the region, it is necessary to share a sustainable and equitable vision. Then, it becomes possible to develop effective growth paths toward low carbon societies in Asia.
- Methodology:
 - Using AIM models, an equitable long-term vision and the paths will be explored. Future climate frameworks for cooperation in Asia will also be examined under the considered development paths.

Technology Leap-frogging



- **Research questions**
 - How can we facilitate technology leap frogging to promote low carbon development?
 - What would be mechanisms (international and national, market and non market) that could facilitate those leap-froggings to low carbon technologies?

Technology leapfrogging: the experience of private firms in the energy and transport sectors in selected Asian developing countries

Concept

Technology leapfrogging (TL) is described as where industrializing countries:

- avoid the resource-intensive patterns of economic and energy development by leapfrogging to the most advanced energy technologies available, rather than following the same path of conventional energy development undertaken by industrialized countries (Gallagher 2006);
- technology transfer is found to be a common feature of TL (Sauter and Watson 2008)

Objective

- Examine the institutional mechanisms that effectively facilitate TL in Asian developing countries Specific (Year 1)
- To document the key issues, challenges and opportunities confronted by private firms engaged in the development and transfer of low carbon technologies; and,
- To identify the policies and measures which have assisted private firms in successfully carrying out technology transfer which have led to low carbon technology leapfrogging

Methodology

Using a case study approach, Year 1 will be the conduct of interviews and focused group discussions (FGDs) with the following:

- 1) pre-selected private firms in Indonesia (focus for Y1), India and China engaged in energy technology leapfrogging;
- 2) Pertinent government agencies/ bodies involved in TT/TL either as a policy-making, regulatory, financing institution; and,
- 3) NGOs/research institutes involved with local policy analysis of the energy and national innovation systems

Analysis on Low-Carbon Power Sector Development in Selected Asian Developing Countries

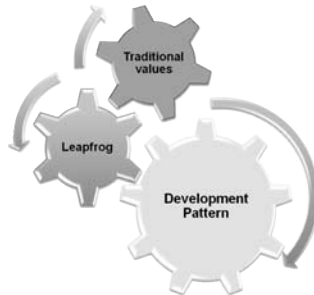
- **Objectives**
 Analyzes alternative, low-carbon power sector development path for the selected Asian developing countries by
 1. Identifying factors in promoting distributed power generation
 2. Examining potential leapfrogging RE technologies for distributed power generation (power storage and waste heat transfer), and their applicability to the selected Asian developing countries
 3. Examining various financial policy options to support low-carbon power development (adoption of carbon tax, Feed-in-Tariffs, subsidies)
- **Research Questions**
 - What are the key factors for promoting distributed energy system? (i.e. Is it policy-driven, or market-driven?)
 - What are the key leapfrogging RE technologies applicable to the Asian developing countries?
 - What is economically the optimal adoption and operation of distributed energy resources (DER) by a hypothetical Indonesian decentralized microgrid: 1) The appropriate level of installed capacity, 2) the least cost combination of DER technologies to be installed, and 3) how should the installed capacity be operated to minimize energy bill?
- **Methodologies**
 - Quantitative Analysis (Regression Analysis, Model Analysis with DER-CAM (Consumer adoption model))
 - Qualitative Analysis (Case Studies, Stakeholder Interviews)
- **Expected Outcomes**
 - Research findings to be reflected to policy recommendations for CCPL
 - Providing numerical inputs to NIES Model Team for LCS Scenario development
 - Determining technical and investment priorities in the private sector

Low Carbon Agriculture for Low Carbon Society

- **Background**
 - Agriculture contributes, directly and indirectly, to significant GHG emissions in AP region.
 - Current and future trends indicate an increasing share of direct and indirect energy use in agriculture
 - Increased mechanization due to rural outmigration, irrigation pumping, and transportation
- **Objectives**
 - To assess the capacity of Asian agriculture to contribute to low carbon society
 - To identify both indigenous and leapfrog technologies and policies with potential to scale up in agriculture sector in AP region
 - To identify research, technology and policy gaps for maximizing the mitigation potential of agriculture in AP region
- **Methodology:**
 - Delphi survey/expert elicitation, carbon abatement costs, multi-criteria methodologies, and country case studies
- **Expected Outcomes:**
 - Identify entry points for infusing LCS practices in Asia Pacific Agriculture with possible strengths and weaknesses.

Traditional values and practices

- **Background**
 - Values matter in choosing a pathway toward low-carbon development.
 - Development paths should be compatible with traditional values and practices.
- **Objective**
 - Review and identify traditional values and practices in Asia, which promote low-carbon development



Bottom line is....

Much of Asia is in a good position to realize low-carbon development (?)

Roundtable Discussion: Questions

- **Development pattern:**
 - Is Asia better positioned to achieve low-carbon development than other regions?
 - What kind of political institutions promote or hinder low-carbon development?
- **Technology leap-frogging:**
 - How can key stakeholders (governments, enterprises etc) facilitate technology leap frogging to promote low carbon development?
 - What would be mechanisms (international and national, market and non market) that could facilitate those leap-froggings to low carbon technologies?
- **Traditional values/practices:**
 - Does Asia have distinguished values that promote low carbon development?
 - What are the local values and practices in Asia that can contribute to low carbon development?
 - How can such values be integrated and mainstreamed into policy and action which promote low carbon development?

Appendix

ISAP Opening Session Report

26 June, 2009

Opening Remarks:

Prof. Hironori Hamanaka
Chair of the Board of Directors, IGES 23

Guest Remarks 1:

Mr. Kazuhiko Takemoto
Vice Minister for Global Environmental Affairs, Ministry of the Environment, Japan 23

Guest Remarks 2:

Mr. Yoshihiro Ono
Vice-Governor of Kanagawa Prefecture 24

Keynote Speeches:

Moderator: Ms. Charmine Koda
Journalist 25

Keynote Speech 1:

Low-Carbon Society for Sustainable Asia and the Pacific
Prof. Nay Htun
State University of New York, Stony Brook 25

Keynote Speech 2:

**Research Frontiers for Low-Carbon Energy Systems:
Some Reflections on UK Transition Pathways**
Prof. Peter Pearson
Director, Imperial College, Centre for Energy Policy and Technology 29

Panel Session 1:

Efforts to Shift towards Low-Carbon Societies in Selected Countries
Moderator: Ms. Charmine Koda
Journalist 35

Efforts to Shift towards Low-Carbon Societies in Selected Countries
Dr. Eric Kaler
Provost and Senior Vice President for Academic Administration,
State University of New York, Stony Brook 35

Low-Carbon Development in China

Prof. Xia Kunbao

Member of the Board of Directors and Advisor, All-China Environment Federation 37

Efforts to Shift towards Low-Carbon Societies (LCS) in India

Dr. Ritu Mathur

Associate Director, The Energy and Resources Institute (TERI) 38

Low-Carbon Economy and Green Growth in Korea

Dr. Hoi-seong Jeong

Former President, Korea Environment Institute;

President, Korea Environmental Policy and Administration Society 41

Efforts to Shift towards Low-Carbon Society: Japan

Dr. Shuzo Nishioka

Senior Research Advisor, IGES;

Senior Visiting Researcher, National Institute for Environmental Studies (NIES) 43

Panel Session 2:

Efforts to Shift towards Low-Carbon Societies in Japan

Moderator: Ms. Charmine Koda

Journalist 45

Efforts to Shift towards Low-Carbon Societies in Japan – Policy Context

Mr. Hiroaki Takiguchi

Director, Office of International Strategy on Climate Change,

Ministry of the Environment, Japan 45

Efforts to Shift towards Low-Carbon Societies in Japan – Local Government Initiatives

Mr. Reiji Hitsumoto

Director for Eco-Model City Affairs, Environment Bureau, Kitakyushu City 47

Efforts to Shift towards Low-Carbon Societies in Japan – Context of Industries

Mr. Masayuki Sasanouchi

Senior General Manager, CSR & Environmental Affairs Division, Toyota Motor Corporation 49

Toward New Paradigm of Energy & Environmental Policy From Mode1 to Mode 3

Mr. Tetsunari Iida

Executive Director, Institute for Sustainable Energy Policies 51

Efforts to Shift towards Low-Carbon Society in Japan – Research Context

Dr. Mikiko Kainuma

Chief, Climate Policy Assessment Research Section, Center for Global Environmental Research,

National Institute for Environmental Studies (NIES) 52

Opening Remarks:

Prof. Hironori Hamanaka, Chair of the Board of Directors, IGES

Prof. Hamanaka opened the session by saying that since its inception in 1998, IGES has been conducting strategic, innovative and pragmatic research on policies and practical solutions to support sustainable development, particularly in Asia and the Pacific, with a view to making research results applicable to actual policy-making. Having celebrated its 10th Anniversary last year, IGES must now explore, in collaboration with its stakeholders, ways for better achieving its mission to contribute to international community, particularly Asia and the Pacific.

Low Carbon Society (LCS) - Looking towards achieving significant GHG emission reductions by 2020, Japan needs to develop and deploy on a large scale low carbon technologies, and to move toward a transition to a low-carbon society. Important point to be noted here is that in several developing countries in Asia low-carbon development are being seriously pursued, not only by governments but also by business, universities and research institutions. In this symposium, we would like to take up the issue of LCS, and consider how government, business and academia can work together to transform social structures towards a low-carbon society and achieve significant reductions of GHGs.

Guest Remarks 1:

Mr. Kazuhiko Takemoto,

Vice Minister for Global Environmental Affairs, Ministry of the Environment, Japan

Mr. Takemoto offered his congratulations to IGES, which celebrated its 10th anniversary last year. It is expected that ISAP would be a trigger to take IGES into the next decade. The Ministry of the Environment of Japan, Kanagawa Prefecture, UN Environment Programme, and many other institutions have been supporting IGES and he hoped that this support would continue into the future.

Sustainable Consumption and Production (SCP) – In view of the rapid growth of wastes and depletion of natural resources as industrialisation and urbanisation proceed in Asia and the Pacific, we would like to deepen discussion on what actions should be taken to achieve SCP, bearing in mind the social, economic and cultural diversity of the region. Also, we would like to discuss environmental leadership development toward establishing LCS.

Loss of Biodiversity – The question is whether it can be slowed. With the upcoming COP10, the Convention on Biological Diversity in Nagoya in 2010, we would like to have discussions on actions to fill the gaps between policies to slow the loss of biodiversity and their actual performance, as well as on international cooperation to be pursued for this purpose.

Introducing the above issues which will be covered in related sessions of ISAP meeting, Prof. Hamanaka asked participants to actively participate in discussions, and hoped that they would take this opportunity to enhance partnerships and build networks among themselves.

He stated that climate change, which is one of the major themes of the forum, is the most critical issue the world faces today. The Japanese government has published its cabinet decision on an action plan for a Low Carbon Society (LCS) to include concrete measures such as green tax system, innovative technology development and its diffusion, as well as promotion of actions by individuals such as implementation of changes in business/life style. This can be marked as the first step towards an LCS.

In consideration of an international target to halve GHG emissions on global scale by 2050, the Aso administration announced Japanese mid-term targets in June, which showed Japan's commitment to make every efforts to take the lead in a low-carbon revolution. Japan will also continue contributing to reduce emissions by transferring its advanced energy-saving and environmental technologies to developing countries whose efforts are to be another key to solve climate change.

Biodiversity is another main theme of this forum. Japan has committed itself to the success of COP10

Guest Remarks 2:

Mr. Yoshihiro Ono, Vice-Governor of Kanagawa Prefecture

Mr. Ono welcomed participants to Kanagawa, the prefecture that won out in the competition to host IGES in the Shonan International Village. Since then, Kanagawa has extended its contribution to the global environment through supporting IGES.

Kanagawa launched its Cool Renaissance campaign in January 2008 aiming for GHG emissions reduction, and has put in place initiatives for 13 leading projects, including promotion of lifestyle/business style change and Eco-Drive to encourage drivers to be more eco-friendly. The promotion of Electric Vehicles (EV) is also one of the projects. In collaboration with industry, academia, and government, Kanagawa has put forward the EV Diffusion Promotion Policy which aims to have 3,000 units on the road within about 5 years after EVs become commercially available. There are generous financial support measures offered, including subsidy of JPY700,000 per unit by the prefectural government that is in addition to the one provided by the central government, as well as tax benefits and discounts for parking fees and highway fees. Kanagawa has also

of Convention on Biodiversity. The enhancement of conservation and sustainable use of biodiversity must be given priority across the whole world. Possible measures and international cooperation to face this issue are expected to be discussed in the forum.

Thus, focussing on the hot agenda including initiatives towards a LCS, co-benefit approach, forest sinks and biodiversity, the forum is hoping to provide the findings and opinions open to the public through deep discussions among relevant experts and researchers.

set up subsidy schemes for households to introduce solar power equipments, which support JPY35,000 per kilowatt up to a maximum of JPY120,000 in total, in addition to the one from the municipalities.

Kanagawa Prefecture is also involved in international collaboration to promote solar rechargeable lanterns in India, with a project called "Lighting a Billion Lives" launched by Dr. Rajendra Pachauri, Chair of the IPCC. Contributions have been offered from local companies, and lanterns have already been sent to India.

In these ways, Kanagawa promotes diverse measures against global warming showing itself as an environmentally advanced prefecture.

GHGs emitted in Asia and the Pacific have global effects. Asia Pacific countries must cooperate to show the pathway to a Low Carbon Society and Sustainable Development. ISAP is expected to be a platform for knowledge sharing for these issues.

Keynote Speeches:Moderator: Ms. **Charmine Koda**, Journalist**Keynote Speech 1:****Low-Carbon Society for Sustainable Asia and the Pacific**Prof. **Nay Htun**,

State University of New York, Stony Brook

Prof. Htun started by stating that achieving a sustainable Asia-Pacific will significantly contribute to global sustainability. The context, parameters and the understanding of sustainability and sustainable development is expanding. It can consist of large areas such as energy, environment (biodiversity, water, soil and forest), economic aspects and ethical/societal determinants. Climate change is at the very centre of sustainability and could be seen as the mother of all changes.

There are many telling indicators of diversity, complexity, vulnerabilities, challenges and opportunities in the Asia-Pacific region. For example, the region has a large population, coastal megacities, as well as having the most island states, most rainforests etc. Particularly in the Asia-Pacific region, there are two very important indicators - a population under 15 years of age (with high expectations for sustainable livelihoods, systems, education and healthcare) and an ageing population, which has experience and knowledge, but is also very vulnerable to climate change. All these indicators and more will be affected by climate change and how we use or do not use energy. Within the expanding impacts of climate change, the role of carbon is key.

Increasing resource energy efficiency and productivity is extremely important. He introduced the McKinsey Global Institute Report “The Climate Challenge – the fierce urgency of now” – a report from the symposium by the Royal Society of London, with Nobel Laureates, experts and US Energy Secretary. The report mentioned that by 2020 there needs to be a 10-fold rise in economic output for every tonne of GHG emitted. The report believes this rise is manageable in terms of cost and benefit (similar to the Stern Review

estimates). It is well worth investing to gain more energy productivity, and the report urges governments at all levels as well as the scientific community, to join with business and civil society to seize hold of this historic opportunity to transform our carbon-intensive economies into sustainable and equitable systems.

There are three milestones of great transformation: 1) delivering an effective and just global agreement on climate change (at COP15 in Copenhagen, at least as a step in the process), 2) delivering a low-carbon infrastructure, and 3) delivering tropical forest protection, conservation and restoration. Without effective management and control of tropical deforestation, there will be no management and control of climate change.

Transforming system efficiency and productivity must be the next great wave. Instead of taxing labour, we must look at how to promote resource productivity. We need to focus on sectors but must go beyond tinkering with sectors. We need to look at how to systemically transform systems. The ecosystem, transportation and infrastructure system, built environment system must all be looked at in an integrated manner.

A report by the Center for American Progress Economic Plan for the Next Administration (in 2007) says that there needs to be major transformation in increasing vehicle fuel efficiency, boosting production and availability of low-carbon alternative fuels and investing in low-carbon transportation infrastructure. It has been called a carbon revolution, and history and economics give confidence that this can be done.

The top five priorities which represent a large share of the opportunities to curb global energy demand and CO2 emissions include; new industrial capacity to best practice in China, replacement of least efficient power generation capacity globally, global standards for new buildings in China, improvement of US residential energy efficiency, removal of road transportation subsidies – these “low hanging fruits” can be added up and show how to reduce energy demand and where CO2 emissions reduction can come from. There needs to be a common understanding, not only in the US and OECD countries, but also China, India and many other countries in the Asia-Pacific region. There has been call for a Global Green Deal, after the recent financial crisis which can be seen as an opportunity for systematic innovation and revolution. Some examples are social conscience building, moving in 10 to 15 years towards an equal civilisation, long-term goals on different pathways with different actions, many of which are being implemented already.

The transformation of industry would mean restructuring, technology upgrading, energy saving and pollution abatement, and phasing out outdated capacity of production. Some of these concepts lead a paradigm change and the expanding context of sustainability. We need more of the 3R to add up 4th R – “Rethink” the system. This will lead to revolution, transformation and innovation.

In the Asia-Pacific region (and in other regions), a low-carbon society is linked to a sustained society on environmental, economical and social levels, and is a platform for a more secured society.

In conclusion, Prof. Htun stated that we must think beyond the current revolution. The first revolution was the Industrial Revolution. We are now in the second revolution, the Carbon or Green Revolution, and we are moving towards a third revolution, the Bio Revolution. The diverse, dynamic Asia-Pacific region plays an important role in the carbon revolution.

ISAP 2009 Towards Copenhagen
A New Development Pathway to a Low-Carbon Sustainable Asia and the Pacific **IGES**

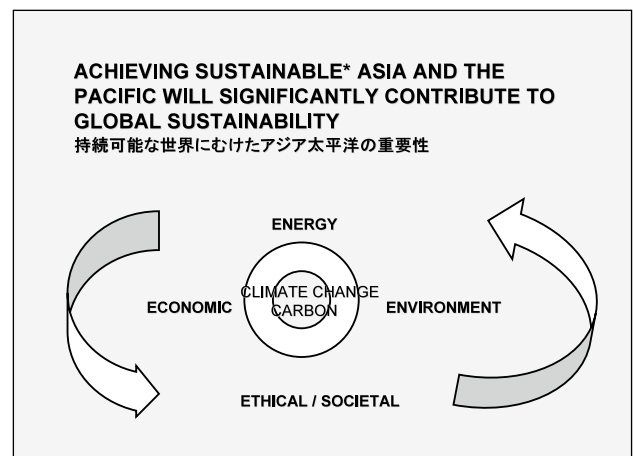
LOW CARBON SOCIETY FOR SUSTAINABLE ASIA AND THE PACIFIC
低炭素社会：持続可能なアジア太平洋のために

Keynote Speech
基調講演

Professor Nay Htun, PhD, FIC
State University of New York, Stony Brook
Member, IGES Board of Directors
ネイトゥーン ニューヨーク州立大学ストーンブルック校教授

International Forum for Sustainable Asia and the Pacific -
Towards Copenhagen: A New development Pathway to a Low-Carbon Sustainable Asia and the Pacific.

At
The International Institute for Global Environmental Strategies,
IGES, Hayama, Japan
26 to 27 June 2009



ASIA AND THE PACIFIC

Some telling indicators of diversity, complexity, vulnerabilities, challenges & opportunities

アジア太平洋の課題とチャンス: 多様性、複雑性、脆弱性

- 4 billion population; over half of this population is under 20 years; and over one-third under 15.
- Four of the world's most populated countries, with two-thirds of the mega-cities, nearly all located at or very near to the coast.
- GDP US\$ 18 trillion (ppp)
- Second and third largest economies.
- Largest number of people in poverty.
- Most island states.
- Largest and highest watershed – the Himalayas
- Most glacier lakes
- Most rain forests, coral reefs, mangroves.
- Fast embracing technological revolution
- Millennium of civilization and culture

THE ST. JAMES'S PALACE MEMORANDUM

Nobel Laureate Symposium, Royal Society London.
26 -28 May 2009

セントジェームズ宮殿の覚書 「持続可能で公平な未来のための行動」

“The St James's Palace memorandum calls for a global deal on climate change that matches the scale and urgency of the human, ecological and economic crises facing the world today. It urges governments at all levels, as well as the scientific community, to join with business and civil society to seize hold of this historic opportunity to transform our carbon-intensive economies in sustainable and equitable systems. We must recognize this fierce urgency of now.”

TRANSFORMING SYSTEM EFFICIENCY AND PRODUCTIVITY (NOT TINKERING WITH SECTORS)

システム効率と生産性の変革(修繕ではなく)

ECOSYSTEM

- Atmosphere, Hydrosphere, Geosphere, Biosphere,

TRANSPORTATION & INFRASTRUCTURE SYSTEM

- Roads, Electricity grids, water supply

BUILT ENVIRONMENT SYSTEM

- Homes, Workplace, Knowledge & Learning centers, Recreational & Wellness parks and spas

TRANSPORTATION & INFRASTRUCTURE

交通とインフラ

- **INCREASING VEHICLE FUEL EFFICIENCY**
- **BOOSTING PRODUCTION & AVAILABILITY OF LOW CARBON ALTERNATIVE FUELS**
- **INVESTING IN LOW CARBON TRANSPORTATION INFRASTRUCTURE**

John Podesta, Todd Stern, Kit Batten "Capturing the Energy Opportunity." "Creating a Low-carbon Economy" Center for American Progress Economic Plan for the Next Administration 27 Nov 2007.

INCREASING RESOURCE / ENERGY EFFICIENCY & PRODUCTIVITY 資源・エネルギー効率と生産性の向上



- BY 2020 TEN FOLD RISE OF ECONOMIC OUTPUT FOR EVERY TONNE OF GHG EMITTED
- EVERY TONNE OF CO2 EMITTED, CURRENT CARBON PRODUCTIVITY OF US\$740. GDP NEED TO PRODUCE US\$7,300.
- 1830 TO 1955 US PRODUCTIVITY INCREASED TEN FOLD. CARBON REVOLUTION NEEDS TO BE ACHIEVED IN ONLY 42 YEARS.
- "MANAGABLE" AT ABOUT 0.6 to 1.4 % GLOBAL GDP BY 2030

McKinsey Global Inst Report . June 2008
Similar costs estimate in Stern's Review.

THE FIERCE URGENCY OF NOW MILESTONES OF THE GREAT TRANSFORMATION

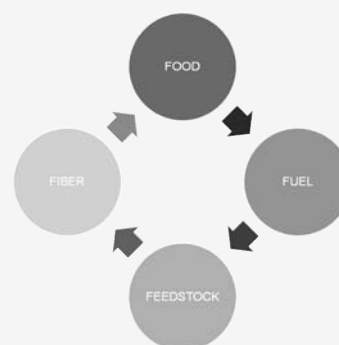
変化のために今なすべきこと

- DELIVERING AN EFFECTIVE AND JUST GLOBAL AGREEMENT ON CLIMATE CHANGE
- DELIVERING A LOW CARBON INFRASTRUCTURE
- DELIVERING TROPICAL FOREST PROTECTION, CONSERVATION AND RESTORATION.

“WE KNOW WHAT NEEDS TO BE DONE. WE CANNOT WAIT UNTIL IT IS TOO LATE. WE CANNOT WAIT UNTIL WHAT WE VALUE MOST IS LOST”.

ECOSYSTEM

Atmosphere, Hydrosphere, Geosphere, Biosphere
エコシステム(大気、水、地表、生態系)

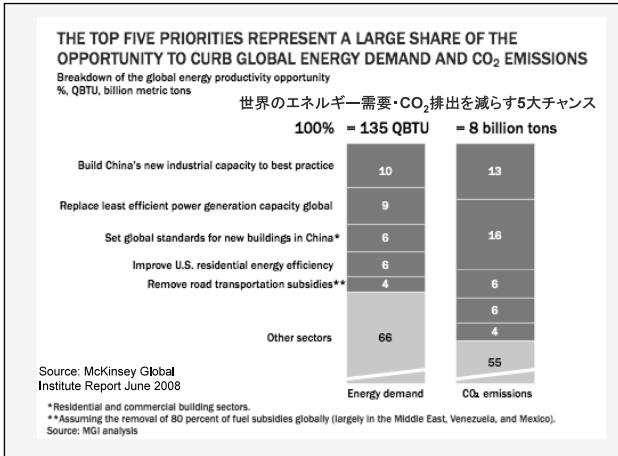


CARBON REVOLUTION

炭素革命

- BY 2050 TEN FOLD INCREASE IN ECONOMIC OUTPUT FOR EVERY TONNE OF GREENHOUSE GASES EMITTED
- EVERY TONNE OF CO2 EMITTED, GDP NEED TO INCREASE FROM CURRENT US\$740 TO US\$7,300
- US LABOUR PRODUCTIVITY INCREASED TENFOLD BETWEEN 1830 AND 1955.
- INCREASING CARBON PRODUCTIVITY TEN FOLD IN LESS THAN 50 YRS WILL BE ONE OF MANKIND'S GREATEST CHALLENGE.
- HISTORY AND ECONOMICS GIVE CONFIDENCE CAN BE DONE
- COSTS "MANAGABLE" AT ABOUT 0.6 TO 1.4 % OF GLOBAL GDP BY 2030.

- McKinsey Global Institute Report June 2008
- Cost estimates comparable with Stern's Review



Common understandings:
 an opportunity rather than a crisis only—systematically innovation/revolution
 共通の理解：たんなる危機ではなく革新／革命の機会として

GREEN is the new global BIG deal
 GREEN ECONOMY INITIATIVE

- Franklin D. Roosevelt 'New Deal' after the Great Depression of the 1930s
- A Global Green Deal after the 2008 Financial turmoil

Resource and Environmental Aspects
 資源と環境

Social consensus-building	Conservation culture/eco-civilization
Long-term goal	Resource-saving and environmental-friendly society
pathways	<ul style="list-style-type: none"> Sound and fast development—resource-saving and environmental protection become preconditions to determine the growth rate of GDP Three shifts in relationship between environment and economy
Actions	<ul style="list-style-type: none"> Help each other cooperatively promote and jointly protecting targets Energy saving and pollution abatement with two leading Circular economy National program for climate change Economic policies SEPA to MEP Local carbon economy.....

Rebounding Programs of Nine Industrial Sectors
 産業セクターの回復プログラム

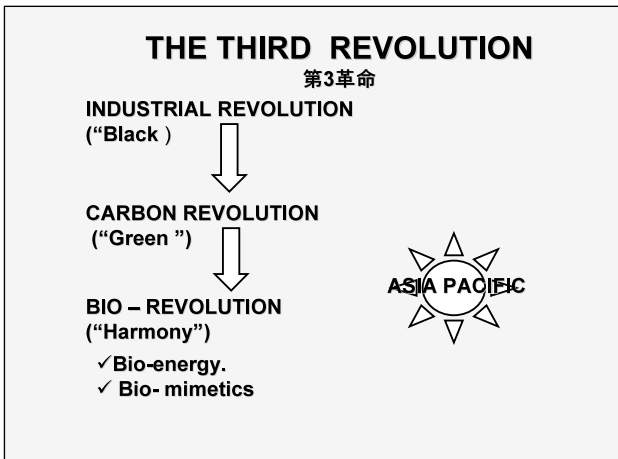
Green Targets, tasks and measures	Restructuring	Technology upgrading	Energy-saving and pollution abatement	phasing out outdated capacity of production
Automobile	✓	✓	✓	✓
Steel and Iron	✓	✓	✓	✓
Electronic and IT		✓		
Transportation and storage				
Textile	✓	✓	✓	✓
Manufacture	✓	✓	✓	✓
Colored metal	✓	✓	✓	✓
Light industry	✓	✓	✓	✓
Chemical	✓	✓	✓	✓

SOME EMERGING CONCEPTS AND THINKING TOWARDS PARADIGM CHANGE
 パラダイムチェンジを目指す新思考

- THE EXPANDING CONTEXT OF SUSTAINABILITY
- 3 Rs → 4 Rs (RETHINK)
- CIRCULAR ECONOMY
- LOW CARBON ECONOMY
- LOW CARBON SOCIETY
- NEW GREEN DEAL
- ZERO EMISSION
- ECOLOGICAL SOCIETY
- REVOLUTION, TRANSFORMATION, INNOVATION

ASIA AND THE PACIFIC
 アジア太平洋

- ✓ LOW - CARBON SOCIETY 低炭素社会
- ✓ SUSTAINED SOCIETY 持続可能な社会
- ✓ SECURED SOCIETY 安全な社会



Keynote Speech 2:**Research Frontiers for Low-Carbon Energy Systems:
Some Reflections on UK Transition Pathways****Prof. Peter Pearson,**

Director, Imperial College, Centre for Energy Policy and Technology

Prof. Pearson explained the key challenges for the UK pathways, based on the study of the UK's history of transitions, although he gave caution to the audience not to presume that other countries would follow the example of a single country.

Some key research and policy challenges from a UK perspective are: Can we create strategies for an energy system that is low-carbon, resilient, just and affordable? It is necessary to aim to do all three of these things at once. Can we build a low-carbon energy system that can assist in recovery from the credit crunch? A number of technologies that we want for a LC future system cannot immediately be rolled out to provide jobs that the economic recovery requires. Can we learn from past transitions and policies? Can we develop and deliver better technologies on both supply and demand side? Can we understand and affect the changing behaviour of key energy system actors? There needs to be a balance of the market, government policy and intervention, and actions by people.

Looking back the history of energy transitions in the UK, from the 16th century to the 19th century, Britain went from a traditional agricultural economy with limited flows of energy, into a new regime using fossil fuel stock (coal) for bigger energy flows, along with new innovations and other institutional, social and political changes. In the 18th century, coal and new steam technologies (beam engines, rotary steam engines) emerged. Steam power assisted in the UK development and diffusion of technology, due to advanced mobility (the engines could be moved to where they were needed) and efficiency. Thus the factory system was developed. Railways and ships developed national and international transport and markets. The growing energy needs along with this

change were satisfied with the use of coal, which peaked in the 1930s. Then, coal use declined (due to concerns about resource depletion), to be replaced with petroleum. Prices matter with an inverse relationship between energy intensity (rising trend) and real energy prices (downward trend).

New technology diffusion took time to develop, for example electric light took about 40 years to become economically competitive compared to gas. It can take time for the benefits to emerge. Modern transitions can be much faster than historical ones, however, it still takes time to build new infrastructure, particularly in mature industrial societies, to overcome the lock-in situation of older technologies and turn over the old capital stock. The benefits of the energy system with lighting is an example, where costs have been lowered and quality of services have increased over several centuries, moving from the use of candle light with dirty tallow, animal fat and whale oil, to gas light, kerosene, up to the dominant electric light. This meant a rise in the quality of life. Energy innovations have profound effects on human development and welfare. However, there can be inertia in the systems, with first mover advantage in carbon-based energy which can lead to path dependence, e.g. textile industries in UK were the first to adopt steam, but were the last to adopt electricity.

Regarding the response to the costs of energy transition, such as health problems from pollution and acidification of the air, the UK was slow to act, but eventually there was the Clean Air Act in 1956. As more recently in 2008, the UK created a new Department to combine Energy and Climate Change issues, and has legally binding GHG target of 80% by 2050. However, there is evidence that government policy can make a difference.

What the future is for low-carbon energy systems? Previous revolutions were about manufacturing – textiles, iron and steam in 18th century, and then in the 19th century – electricity, chemicals, petroleum and mass production. Improved technology, the combination of energy and information and communication technologies e.g. in smart grids, might help break the link between energy services, fuel demands and emissions. It could help enhance macro level productivity. We might see energy and Information and Communication Technology (ICT) as General Purpose Technologies (GPT) that can take us to another industrial revolution. GPT have two key features such as technological dynamism (efficiency and low costs), and innovational complementarities (to find new ways to use the technologies). However it takes time to raise productivity so patience is needed.

UK Energy Research Centre is an interdisciplinary, independent virtual centre spread across the UK. One of its major achievements is the Energy 2050 project. The project focused on two goals– firstly, an 80% cut in emissions by 2050 and ensuring that

energy is delivered reliably, and secondly, trade-offs. The messages from the project report were that a resilient LC UK energy system is technically and economically feasible at an affordable cost. A key trade-off is between reduced demand or decarbonisation on the supply side. Although new and improved technologies are vital, there needs to be more R&D investment with a balance between the private and public sectors. Technology take-up depends on policy and consumer behaviour.

Lastly, citing transition pathways to a low-carbon energy system focusing on electricity, Prof. Pearson explained how patterns of governance shift balance in the triangle formed by actors in government, liberalised markets and civil society. Civil actions can in fact change society from the bottom up. Perspectives on energy system transitions involve interactions for example, between fuels and energy converting technologies, between infrastructures, environment and most importantly, people that must require more focus than fuels and technologies.

Imperial College
London icept

Research Frontiers for Low-Carbon Energy Systems: some reflections on UK transition pathways

Prof. Peter Pearson
Centre for Energy Policy & Technology
(ICEPT)

ISAP: Towards Copenhagen...
IGES, Hayama, Japan
26 June 2009

Page 1 © Imperial College London

icept

Outline

- Key challenges for the UK
- Past & prospective transitions in the UK
- Case studies: UKERC 2050 & EPSRC/E.ON Transition Pathways projects

Page 2 © Imperial College London

Some Key Research & Policy Challenges from a UK Perspective: can we

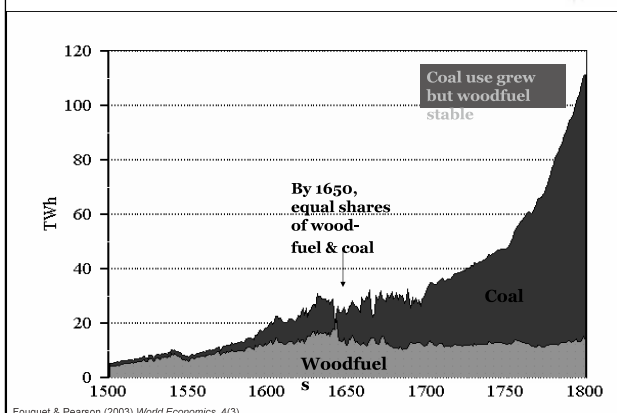
- Create visions, strategies & policies for an energy system that is simultaneously?
 - Low-carbon/ resilient/ just & affordable
- Build a low-carbon energy system that plays a key role in economic recovery from the Credit Crunch?
 - With tension between jobs now & investment for future
- Learn from past transitions & policies, to promote 'better' future transitions & policy learning?
- Develop & deliver better 'technologies'?
 - Ideally with properties of General Purpose Technologies
 - On both demand & supply sides
- Understand & affect the changing behaviour of key energy system 'actors'?
 - In terms of overall system governance (market/govt./people)

Energy & Britain's 1st 'Industrial Revolution': C16th-19th energy transitions

- Britain went from a traditional agricultural economy, held back by limited
 - Productivity of scarce land &
 - **Flows** of energy for food, clothing, housing & **fuel**
- To a new regime: growth & welfare transformed by
 - Using fossil fuel **stock** (coal) to get bigger energy flows
 - Along with innovations
 - including steam engine
 - & other institutional, social & political changes
- Coal & steam helped drive mechanisation, urbanisation & Britain's 'Industrial Revolution'

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Fig. 1: UK Final Energy Consumption, 1500-1800 (TWh)



Fouquet & Pearson (2003) World Economics, 4(3)

C18: coal & new steam technologies

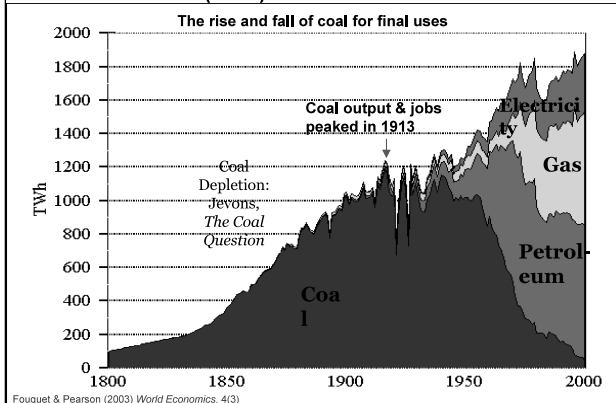
- Beam engines pumped water from coal & copper mines
 - By 1733, 110 Newcomen 'atmospheric engines' in 7 countries
 - 1769-1800: James Watt's separate condenser patent
 - raised efficiency & profits
- Rotary steam engine – rotative power
 - Could now drive machines: Watt (1782) & others
- But by 1800, only 2200 engines in mining & manufacturing
 - High steam/water power price differential

Steam Power: UK development & diffusion

- Steam/water power price differential slowly overcome
 - By mobility advantage of steam
 - More engine efficiency, from
 - Higher pressure boilers (1840s); Corliss valves (1860s)
- Steam let production move from water & wind power sites
 - Helped develop the factory system
 - Especially textiles: Manchester - 'Cottonopolis'
- Railways & then ships
 - Developed national & international transport & markets

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Fig. 2: UK Final Energy Consumption, 1800-2000 (TWh)



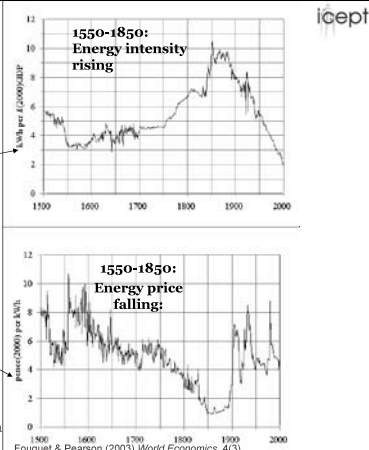
Fouquet & Pearson (2003) World Economics, 4(3)

Fig. 3: prices matter

Inverse relationship between:

Energy intensity (E/GDP) and

Real energy prices (p/kWh)



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Fouquet & Pearson (2003) World Economics, 4(3)

A Long-Run Perspective

- New technology diffusion **took time**
 - Major productivity fx. of steam engines, locomotives & ships only observable after 1850
 - Only a few steam-intensive industries
 - Mining, textiles & metal manufactures
 - Accounted for >1/2 of industrial steam power, 1800-1900
- Not just steam: electric light slow to dominate gas (40 years: 1880-1920)
- Modern transitions can be **much faster** – but still takes time
 - To build new infrastructure
 - Overcome 'lock-in', turn over old capital stock

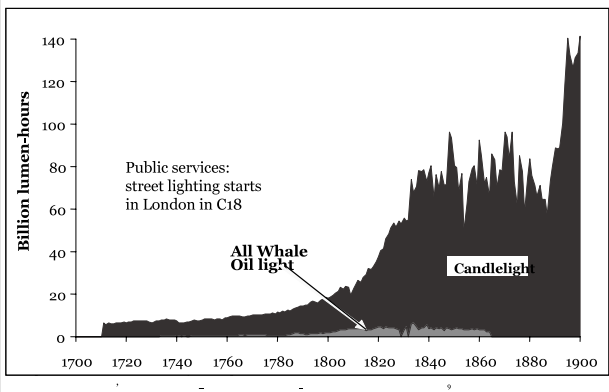
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Costs of Energy transitions: pollution & climate in the UK

- Growing C19th concerns about air, land, water pollution – but slow to act until C20
 - Alexis de Tocqueville - Manchester (1835): 'A sort of black smoke covers the city. Under this half daylight 300,000 human beings are ceaselessly at work...'
 - London's long air pollution history
 - 1952 'Great London Smog': est. 3500-4000 early deaths
 - 1956 Clean Air Act – zoning, 'smokeless' fuel
- Then concern with small particles & acid deposition
- Now climate change & GHGs, including CO2
 - New Govt. Dept for Energy & Climate Change
 - Legally binding GHG targets

icept

Fig. 4. UK Consumption of Lighting from Tallow Candles & Whale Oil Lamps (billion lumen-hours, 1711-1900)



icept

Benefits of Energy System Transitions: UK lighting example

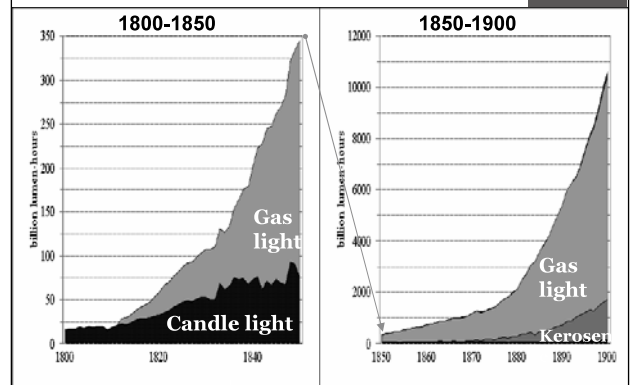
- What's the energy for? Energy services:
 - illumination, transportation, nice temperatures
- Evidence: innovation's extraordinary potential to
 - Lower costs, raise service quality & welfare
- UK lighting services innovation
 - Mostly after 1800
 - In fuels, technologies, infrastructures & supply
 - Brought lower lighting costs & rising incomes
 - Meant 'revolutions' in light use & quality

Page 12

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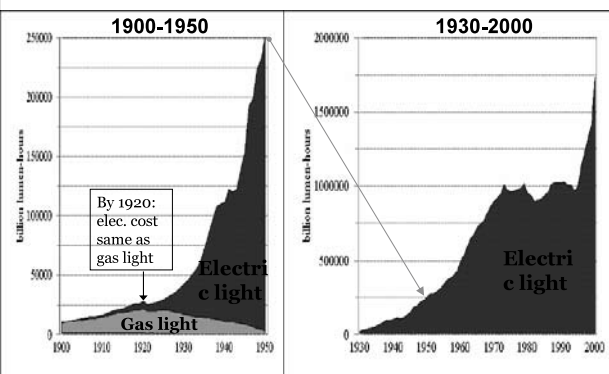
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Fig. 5. UK Consumption of Gas, Kerosene & Candle Light (billion lumen-hours)



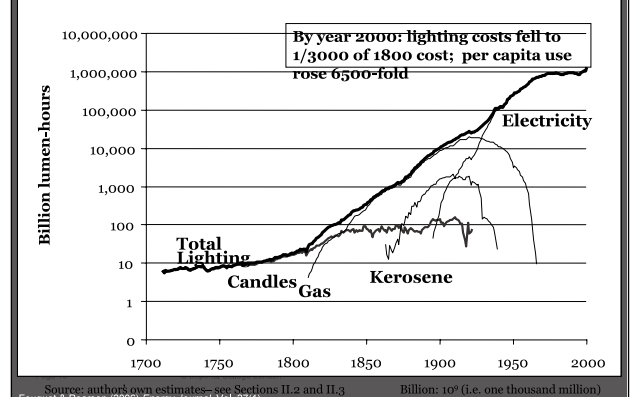
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Fig. 6. UK Consumption of Kerosene, Gas & Electric Light, 1900-2000 (billion lumen-hours)



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Fig. 7. UK Lighting Transitions – Consumption, 1700-2000 (bn. lumen-hours.)



icept

Source: authors own estimates—see Sections II.2 and II.3

Billion: 10⁹ (i.e. one thousand million)

Some Lessons from UK Energy Transitions

- development & welfare
 - But takes time for new fuels, technologies, infrastructures & institutions to develop & benefits to come through
- There can be much inertia in UK systems
 - Path dependence? First mover advantage?
 - UK mining & textile industries slow to adopt electricity
 - Relative to chemicals & engineering, shipbuilding & vehicles
- UK slow to address environmental impacts
- But evidence shows government policy can make a difference

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The Future for Low Carbon Energy Systems?

- Two previous UK Industrial Revolutions were about manufacturing
 - C18 revolution driven by textiles, iron & steam
 - end C19 2nd revolution: electricity, chemicals, petroleum & mass production
- Improved technology (energy & ICT, e.g. in smart grids) might help break link between energy services, fuel demands & emissions
 - Could enhance macro-level productivity
 - Energy & ICT as General Purpose Technologies
- A 3rd 'Industrial Revolution'?

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Climate Change & Low Carbon Technologies icept

- Two key features of GPT's:
 - *Technological Dynamism*: continuous innovation in efficiency of the technology, so costs fall/quality rises over time
 - *Innovational Complementarities*: new technology users improve own technologies, find new uses
 - Steam engines, ICE, electrification & ICT raised productivity growth (but took decades, so patience needed)
- How to get there from here?
 - Means more than substituting low carbon technologies into *existing* uses and institutions
 - Low carbon technologies need capacity:
 - For continuous innovation & cost reduction
 - To change what we do with them & how
 - To be *proactively* sustainable

Page 19

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The UK Energy Research Centre's Challenge

- Directed by Prof. Jim Skea & Dr John Loughhead, UKERC's role:
 - Promote cohesion across the UK energy research effort
 - A bridge between the UK energy research community & the wider world (local, national & international)
- UKERC's research
 - Interdisciplinary, independent & 'whole-systems'
 - Drawing on engineering, economics & the physical, environmental & social sciences.
- UKERC a "virtual" centre, with HQ at Imperial College London

Page 21

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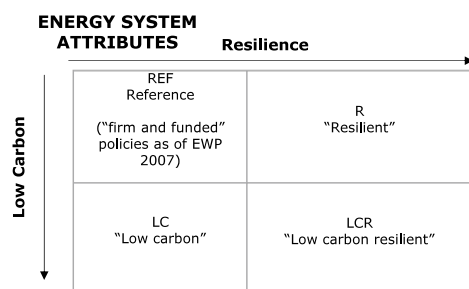
UKERC Energy 2050 Project

- How can UK move to a low-carbon energy system over next 40 years?
- Focus on 2 main goals & tradeoffs of UK energy policy
 - 80% cut in 1990-level carbon emissions by 2050
 - Ensuring that energy delivered reliably
- Broad approach
 - No forecasts or "best/preferred" futures
 - Acknowledge uncertainty
 - Combine scientific insights with integrating modelling tools & approaches

Page 22

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Core UKERC 2050 Scenarios



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High level messages

- A resilient low-carbon UK energy system is technically & economically feasible at an affordable cost
- Multiple pathways to a low-carbon economy.
 - A key trade-off: speed of reducing energy demand vs. decarbonisation of energy supply
- Cutting energy demand plays brings many benefits, ensures against:
 - Failure of key technologies to deliver
 - Social resistance to some supply side technologies
 - Price shocks & import dependence

Page 24

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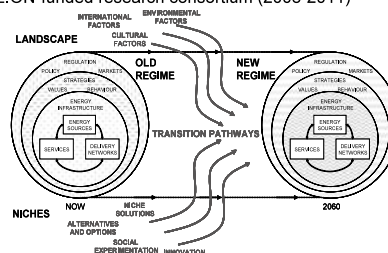
The promise of technology

- New & improved technologies vital for long-term CO₂ goals
- Supply side technologies need
 - Bigger commitment to RD&D
 - Stronger financial incentives
 - Lower regulatory/ market barriers
- Need more energy RD&D investment, & balance between
 - Early & late stage RD&D
 - Roles of private & public sectors
- De-centralised energy generation a potentially disruptive technology
 - Take-up depends on interplay of technology, policy & consumer behaviour

Page 25

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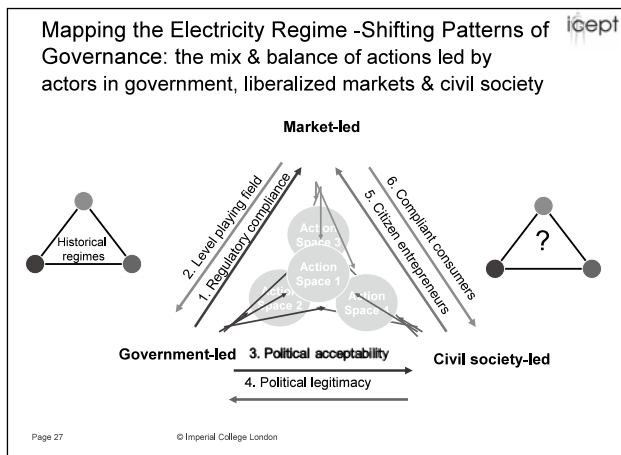
Transition Pathways to a Low Carbon Economy EPSRC/E.ON-funded research consortium (2008-2011)



- Partners at 8 UK Universities (Bath, Imperial, King's College London, L'boro, Strathclyde, Surrey, UeA)
- Explore dynamics of transition pathways in UK electricity
- 80% cut by 2050 - how to get there from here? Pathways matter.

Page 26

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Perspective on Energy System Transitions

- Transitions mean interactions between
 - Fuels & energy converting technologies
 - Infrastructures (transport networks, pipes & wires...)
 - Institutions (markets, companies, finance...)
 - Policy regimes (institutions, regulations...)
 - Economic variables (prices, income/output...)
 - Environment
 - People...
- These are complex, *evolving* energy systems
 - Must focus on much more than fuels & technologies

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Some Key Research & Policy Challenges from a UK Perspective: can we

- Create visions, strategies & policies for an energy system that is simultaneously
 - Low-carbon/ resilient/ just & affordable
- Build a low-carbon energy system that plays a key role in economic recovery from the Credit Crunch
 - With tension between jobs now & investment for future
- Learn from past transitions & policies, to promote 'better' future transitions & policy learning
- Develop & deliver better 'technologies'
 - Ideally with properties of General Purpose Technologies
 - On both demand & supply sides
- Understand & affect the changing behaviour of key energy system 'actors'
 - In terms of overall system governance (market/govt./people)

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Questions for Speakers:

Ms. Charmine Koda, as a moderator, posted the question - "Given the diverse aspects of Asia and the Pacific, can low-carbon be endorsed by the region? Is the urgency shared by all countries?"

Prof. Htun commented that the Asia-Pacific region recognises the urgency. The general public knows, for example, that there is something happening with the weather, but the public is not sure what it can do, or if it is responsible. "Low-carbon" is understandable by simple methodologies such as "switch off the light".

As far as giving advice to Asia, Prof. Pearson pointed out that there was a danger of oversimplifying the energy challenge vision. There should be an emphasis on resilience and justice of the system.

Everyone has to pay – we all need to recognise the resource impacts and social/environmental costs. Internationally, industrialised countries can offer assistance. However, each country in the region will have to find its own perspective with regards to LCS.

Panel Session 1:

Efforts to Shift towards Low-Carbon Societies in Selected Countries

Moderator: Ms. Charmine Koda, Journalist

Efforts to Shift towards Low-Carbon Societies in Selected Countries

Dr. Eric Kaler,

Provost and Senior Vice President for Academic Administration, State University of New York, Stony Brook

Dr. Kaler started by pointing out that US President Obama has brought a dramatically new way of looking at climate change and there is now a new emphasis on science-based analysis and policy, specifically on energy policies include energy and greenhouse gases (GHGs) with cap and trade, clean coal technologies, and aggressive and realistic fuel efficiency standards. President Obama pushed through a stimulus package in response to the credit crisis, including energy savings, smart grid technologies, renewables development, and investment on clean energy technologies and a large budget on research.

A report called “Lighting the way - towards a sustainable energy future”, funded by Brazil and China, and chaired by US Energy Secretary Steven Chu identified several conclusions as follow.

- Meeting the basic energy needs of the poorest people is a moral and social imperative.
- Energy efficiency must be improved and the carbon intensity of the world economy must be reduced.
- Technologies for capturing and sequestering carbon is important for cost-effective management.
- Competition for oil etc. increases geopolitical tensions.
- Nuclear power, renewables and biofuels are important ways to address energy shortfalls.
- Cost-effective storage and energy carriers must be developed.
- The science and technology community has a critical role together with the public to reduce carbon footprint.

ISAP 2009 Towards Copenhagen
A New Development Pathway to a Low-Carbon Sustainable Asia and the Pacific **IGES**

International Forum for Sustainable Asia and the Pacific ● 26-27 June 2009

Panel Presentation Session 1
パネル討論1

Efforts to Shift towards Low-Carbon Societies in Selected Countries

主要各国における低炭素社会への移行に向けた取り組み

Eric Kaler
Provost and Senior Vice President for Academic and Administration,
State University of New York, Stony Brook

エリック・ケイラー
ニューヨーク州立大学ストーニーブルック校教務部長兼担当副学長

Low Carbon – A US Perspective

- The Game changed 20 January 2009
- President Obama, Secretary of Energy Steven Chu, Science Advisor John Holdren, and others
- A new emphasis on science-based analysis and policy
 - Energy and Greenhouse Gases
 - 80% reduction in CO₂ by 2050
 - Cap and Trade
 - Clean Coal
 - Fuel efficiency standards
 -

Specific Steps

- Obama stimulus package
 - Energy savings
 - Improvement of energy efficiency (smart grid technologies)
 - Development of renewable and clean alternative
 - Investment in new energy and clean energy technology R&D (\$2B this year)
 - Large investments in research teams

More Conclusions

- CONCLUSION 4. Competition for oil and natural gas supplies has the potential to become a source of growing geopolitical tension and economic vulnerability for many nations in the decades ahead.
- CONCLUSION 5. As a low-carbon resource, nuclear power can continue to make a significant contribution ...
- CONCLUSION 6. Renewable energy in its many forms offers immense opportunities
- CONCLUSION 7. Biofuels hold great promise for simultaneously addressing climate-change and energy-security concerns.
- CONCLUSION 8. The development of cost-effective energy storage technologies, new energy carriers, and improved transmission infrastructure could substantially reduce costs ...
- CONCLUSION 9. The S&T community—together with the general public—has a critical role...

What Might US Policy Look Like?

onsider: "Lighting the Way: Toward a Sustainable Energy Future"

unded by Brazil and China, chaired by Steven Chu

ONCLUSION 1. Meeting the basic energy needs of the poorest people on this planet is a moral and social imperative that can and must be pursued in

concert with sustainability objectives.

ONCLUSION 2. Concerted efforts must be made to improve energy efficiency and *reduce the carbon intensity of the world economy.*

Low-Carbon Development in China

Prof. Xia Kunbao,

Member of the Board of Directors and Advisor, All-China Environment Federation

Prof. Xia pointed that low-carbon (LC) development is a new concept in China, but has now got the attention of the government and general public. China has two laws related to low-carbon societies (LCS) to promote cleaner production and to promote a circular economy. There is also a National Climate Change Program implemented in 2007, introducing policies and measures to address climate change

and contribute to the development of LCS. This has been implemented over the past two years with fairly good results. There is also government plans to reduce energy consumption, increase renewable and increase forest cover. He introduced research and new institutions on LCS. China is participating in UNFCCC, such as CDM projects, and willing to cooperate with other countries.

Low-carbon Development in China

中国における低炭素型開発

Xia Kunbao
All-China Environment Federation
シア・クンバオ
中華環境保護連合会理事/顧問

The Chinese Government pays great attention to the development of the low-carbon economy.

On 8 September 2007 at the APEC Summit, Chinese President Hu Jintao highlighted the need to develop low-carbon economy, research on and disseminate low-carbon energy technologies, increase carbon sinks and promote development of carbon absorption technologies.

2009-11-11

1

Legal development of the People's Republic of China toward LCS

低炭素社会実現に向けた法整備

- ✓ Law on Promotion of Cleaner Production (Jan. 2003)
- ✓ Law on Promotion of Circular Economy (Aug. 2008)

The common objective of circular economy and cleaner production

循環型経済・クリーン製造の共通目的

- ✓ to minimize the use of high-carbon energy sources and emission of CO₂.
- ✓ This is also the goal of low-carbon development.

These two legal instruments are conducive to the development of low-carbon economy.

2009-11-11

2

✓ The National Climate Change Program 国家気候変動プログラム

- ✓ publicized in 2007
- ✓ laid down policies and measures to address climate change, contributing to the development of a low-carbon economy in China.

* 国家気候変動プログラムの公布 (2007年)

✓ Government plans to reduce energy consumption

エネルギー消費削減計画

- ✓ per-capita GDP by 20%
- ✓ to increase renewable energy from 7% to 16% in the total energy mix
- ✓ to increase forest cover in the country by 20% by 2010 as compared with 2006.

2009-11-11

3

✓ Establishing research institutions

研究機関の設立

- ✓ Wuxi Research Center on Low-carbon Urban Development
 - established recently in the city of Wuxi
 - will develop a master plan for low-carbon urban development of the city
 - will research on and disseminate low-carbon technologies
 - will also organize education and training.

- ✓ China is actively participating in all the international cooperative activities under the United Nations Framework Convention, and implementing many cooperative projects including CDM projects.

- ✓ Great efforts are being made in China to develop low-carbon economy with involvement of all stakeholders. All-China Environment Federation is organizing activities on low-carbon development. Hope to develop cooperation with the other ICLCS members.

2009-11-11

4

Efforts to Shift towards Low-Carbon Societies (LCS) in India

Dr. Ritu Mathur,

Associate Director, The Energy and Resources Institute (TERI)

Dr. Mathur presented on efforts to shift towards LCS in India. She set the context for India in terms of its unique social, economic and development dimensions of sustainable development and climate change issues. Because of stress factors and the vulnerability of the population, many are deprived of basic facilities and amenities (electricity, water etc.). Energy intensity and the human development index are closely related and energy needs must be met sustainably.

India's National Action Plan on Climate Change with eight missions relating to mitigation and adaptation sets out priority areas in addressing climate change issues. There have also been several programmes and policies from the viewpoint of development but with climate co-benefits and reduced energy intensity across entire energy flow.

Various initiatives including Lighting a Billion Lives (LaBL), and corporate efforts to contribute to solar power development, improving R&D, technology provision to address LC options in India. Communities are also responding with examples of

clean and efficient fuel use, markets for clean end-use products, and green buildings. So there are actions not only by government, but by businesses and individuals.

In terms of international collaborative actions, India has a large share of CDM projects in renewable and energy efficiency. India is a partner of the Asia Pacific Partnership on Clean Development and Climate, to promote development, deployment and transfer of clean and efficient technologies. Partnerships of about 20 cases are mainly public-private partnership. There are still barriers to the huge challenges – technical transfer and absorption, financial issues, implementation models and R&D.

Dr. Mathur stressed a need for an early agreement on post 2012 regime to avoid the gap between the first and further commitment periods to motivate climate change and development co-benefit activities, and bring about investment in clean energy. She looks forward to international cooperation on facilitating technology and financial flows.

Efforts to shift towards Low Carbon Societies (LCS) in India

Presentation at the International Forum for Sustainable Asia and the Pacific - ISAP 2009

Ritu Mathur (TERI, India)

26-27, June, 2009



India and development challenges

- Key concerns
 - multiple stress factors: environmental (viz., deforestation and land degradation concerns), social (literacy and infrastructure development) and economic stress (low per capita incomes)
 - livelihoods of millions dependent on natural resources
- Many deprived of basic facilities and amenities
 - 500 million do not have access to electricity
 - Many more without access to safe drinking water
- Development Aspirations - Enhancement in infrastructure & human development (increasing access to roads, energy, electricity, educational facilities, health infrastructure etc)
- Climate change, an additional stress factor: influence both natural and human systems (agriculture, forestry, fishery and health)

Page # 2



Country efforts - National Action Plan on Climate Change

8 Missions delineating the priority areas for action with regard to both mitigation & adaptation:

- Solar Mission
- Energy Efficiency
- Sustainable Habitat
- Water
- Agriculture
- Green India
- Himalayan Ecosystems
- Strategic Knowledge

Page # 3



India: Several forward looking policies & programs with CC co-benefits

- **Reforming Energy Markets (Electricity Act 2005, Tariff Policy 2003, Petroleum & Natural Gas Regulatory Board Act, 2006, etc.):**
 - Focus on removing entry barriers & raising competition in exploration, extraction, conversion, transmission & distribution of primary and secondary energy; instituting price reforms to enable full competition at point of sale and promote optimal fuel choices; focus on augmenting & diversifying energy options, sources and energy infrastructure; implementing feed-in tariffs for renewables & strengthening/ introducing independent regulation
- **Integrated Energy Policy, 2008:**
 - Key GHG related provisions include energy efficiency improvement across all sectors, emphasis on mass transport, renewables; accelerated development of nuclear & hydropower; Technology Missions for Clean Energy; and focused R&D on several climate change related technologies
- **Auto Fuel Policy, National Urban Transport Policy for transport sector**

Page # 4



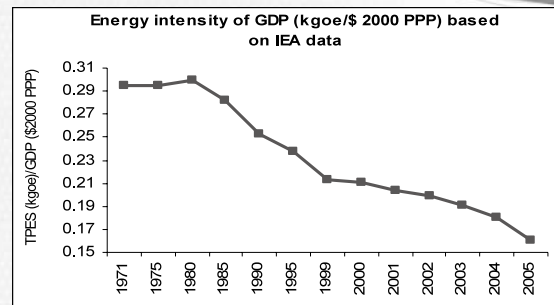
Some key policies and actions...

- Rural Electrification Policy 2006 (RGGVY): Promotes renewable energy technologies where grid connectivity is not possible or cost-effective
- Energy Conservation Act, 2001: Aims to reduce specific energy consumption across sectors; BEE established to institutionalize energy efficiency measures, monitoring, & measurement at plant and macro-levels
- New and Renewables Energy Policy, 2005: Focus on accelerated deployment of renewables through indigenous design, development and manufacture
- Biodiesel Purchase Policy: Mandates biodiesel procurement by petroleum companies
- Ethanol Blending of Gasoline: Mandates 5% blending of ethanol with gasoline in 9 States and 4 Union Territories from 1 January 2003
- Energy Conservation Building Code, 2006: Mandatory energy efficiency code for all building with > 500 kVA connected load or conditioned floor area > 1000 m²
- Bachat Lamp Yojana: Country-wide programme for replacing incandescents by CFLs in households (using CDM credits to equate purchase price)
- 50,000 MW Hydroelectric Initiative, 2003: 162 hydel projects have been identified for project preparation and implementation
- Others: Promotion of solar thermals, solar PVs, wind, biomass gasifiers, biogas and manure management, promotion of fuel cells, energy recovery from urban wastes, etc.

Page # 5



India's Decreasing Energy Intensity

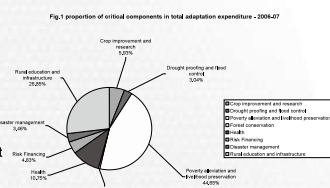


Page # 6



Adaptation Co-benefits: Policies and programmes

- Agriculture (Insurance Scheme, Watershed development for Rainfed areas)
- Health (National Malaria Eradication Programme; National Vector-borne Disease Control Programme)
- Disaster Management (Community based disaster risk management programme; Integrated Coastal Zone Management policies; Early warning networks/ ICTs)
- Afforestation and Reforestation (Joint Forest Management, National Afforestation Programme; Agro-forestry development)
- Poverty reduction (Integrated Rural Development Programme; Rural electrification)
- Water (water policy gives top priority to drinking water; accelerated Urban & Rural Water Supply Programme)



Page # 7

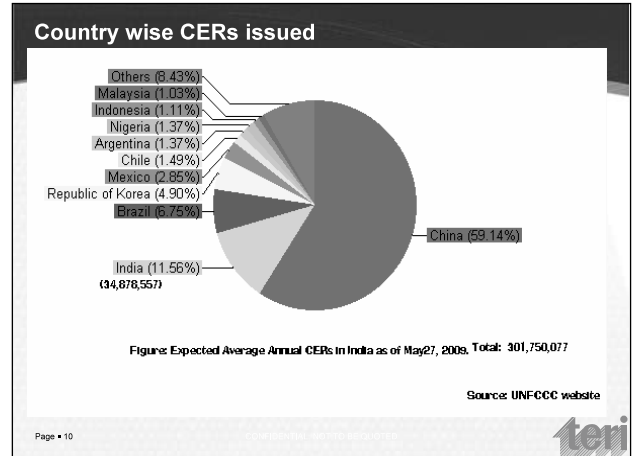
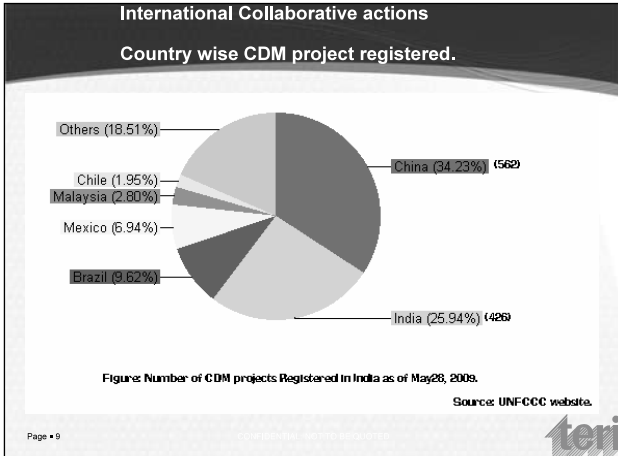


Action from businesses and communities

- Corporate White Paper on the National Action Plan on Climate Change
- Communities response:
 - examples of clean & efficient fuel use in religious institutions
 - Markets for efficient and clean end-use products (CFL etc.)
 - Green buildings

Page # 8





APP

- India is a member of the Asia-Pacific Partnership on Clean Development and Climate (APPCDC)
 - Objective to promote development, deployment & transfer of clean and efficient technologies in accordance with the national priorities of participating countries
 - Focuses on expanding investment & trade in cleaner energy technologies, goods and services in key market sectors
 - Seeks to enhance cooperation to simultaneously address challenges related to air pollution, energy security and GHG intensities
- India has joined in ~20 projects under Renewable Energy & Distributed Generation Task Force (REDGTF) out of a total of about 30 projects initiated by other partner countries
 - Projects focus on enabling markets, deployment and research, design & development
 - Partnership largely in terms of public-private partnerships involving all stakeholders – industry, government & research institutions

Page # 11

Barriers

- Technology transfer and absorption
- Financial issues both in leveraging national and international funds
- Implementation models, integrated approaches
- Research and development

Page # 12

Need for early agreement on Post 2012 regime

- To avoid gap between first and further commitment periods
- To ensure continuity of carbon market
 - Deeper emission cut by developed countries
- To motivate climate change and development co-benefit activities in developing countries
- Investment in clean energy
- International cooperation on facilitating technology and financial flows

Page # 13

Thank you!

Page # 14

Low-Carbon Economy and Green Growth in Korea

Dr. Hoi-seong Jeong,

Former President, Korea Environment Institute; President, Korea Environmental Policy and Administration Society

Dr. Jeong presented on low-carbon economy and green growth in Korea. The current government announced its vision on low-carbon green growth in 2008. There needs to be synergic development between environment and growth, in order to separate economic growth and environmental degradation, to formulate a grand vision (incorporating energy-environment issues, green job creation and a more competitive national economy, and land management and life style change) and to develop and share consensus among stakeholders.

There are several strategies and major policy tasks, including responding to climate change and becoming self-reliant in energy, creating a new motivations for national development (development of green technologies and industries etc.) and improving the environmental conditions and the quality of life.

Introducing the episode of controversies and disputes over the construction project of canals for GHG mitigation and a river water quality, he stressed the difficulties and importance in setting strategies, means and achievements.

“Low Carbon Economy and Green Growth” in Korea 韓国における低炭素経済と グリーン成長

June. 26th. 2009
Hoi-Seong Jeong, Ph.D
(President, KEPAS)

2. Concept & Principles (コンセプトと指針)

Synergic development between Environment and Growth
環境と成長の調和

<Vision and Goals> (ビジョンとゴール)

- **Vision : Advanced Green Country** (先進環境国)
- **Goals: Green Economy, Green Society, Green Korea**
(グリーン経済、グリーン社会、グリーン 코리아)
- **To decouple between economic growth and environmental degradation** (経済成長と環境劣化の分離)
- **To formulate a grand vision integrating** (グランドビジョン)
 - energy-environment issues
 - green job creation and strengthening competitiveness of national economy
 - land management and life style change
- **To develop and share consensus among stakeholders** (Government, Public, Business and NGOs) (コンセ

1. Background & Overview (背景と概観)

Background : Simultaneous crisis in environment and resources

(環境と資源に関する同時的危機)

- Worldwide concern and call for action on climate change
(気候変動に対する世界的な関心と行動の呼びかけ)
- “Soaring” energy price (上昇するエネルギー価格)
- International competition toward “Green Growth” (国際競争)

Overview

- Presidential declaration on 60th National Independence Day
(Aug. 15, 2008) (大統領令の公布)
 - + Long-term national development vision for “next 60 years”
 - + Government wide participation in planning and implementation
- Creation of ‘Presidential Commission on Green Growth’ on February 2009 (グリーン成長に関する大統領委員会)
- Preparing the enactment of “Act on the Promotion of Green Growth.” (グリーン成長促進法の準備)

3. Strategies & Major Policy Tasks (戦略と主要政策タスク)

Responding to the Climate Change and Energy Self-reliance

(気候変動への対応とエネルギー自給)

- Construction of the low carbon society
- Independent from oil and energy self-support
- Improvement of the climate change adaptation capacity

Creating the New National Development Driving force

(新たな国家発展活力の創出)

- Development of green technologies & industries
- Greening all industries
- Innovating the energy-intensive industrial structure
- Strengthening the low carbon & green economy base

Improving the Environment conditions and the Quality of Life

(環境と生活の質の向上)

- Creation of green national territory and transportation
- Green revolution in the livelihood (Green way of life)
- Achieving the model green growth nation

4. Controversies on the Green Growth Initiative

(グリーン成長イニシアティブに関する論議)

Most Korea agree that we need a new vision for the green development (多くの韓国人はグリーン発展を望んでいる)

However, some policies that current government adopted brought out serious controversies. (現行政策との齟齬)

- Policies brought out serious controversies most is 4 major river reclamation projects and some other SOC construction projects.
- Not a few environmental NGOs suspect the projects a prelude of grand Korean peninsula canal projects and many SOC related projects have more harms than benefits for national environment and even economy

Thank you

Efforts to Shift towards Low-Carbon Society: Japan

Dr. Shuzo Nishioka,

Senior Research Advisor, IGES; Senior Visiting Researcher, National Institute for Environmental Studies (NIES)

Dr. Nishioka presented the history of LCS related policies in Japan from 2007 to the current time. In Japan, in recognising LC is not only a matter of the economy, Prime Minister Fukuda used the terminology of Low Carbon ‘Society’. Setting up the International Research Network for Low Carbon Societies (LCS-RNet) was proposed and accepted at G8 Environment Ministers Meeting in Kobe, with IGES named as the secretariat. In 2009, Prime Minister Aso introduced the Low Carbon Revolution to recover from the current financial crisis, and then in June, he announced Japanese Mid-term target. So Japan has a good start towards COP15.

In Japan, research supports these policy decisions, for example, the report of the National Institute for Environmental Studies (NIES) showing the possibility to reduce CO₂ emission by 70% by 2050. It also proposes that Japan needs technological, industrial, infrastructure and social innovations to achieve the potential reductions. In evaluating options for mid-term targets, six levels of reduction targets using the integrated assessment models were proposed and

discussed. The Prime Minister then decided on its target level based on this evaluation process.

Research has just begun in collaboration amongst IGES and other research institutions on whether Asia is in a good position to shift to LCS, with the research hypothesis of positive answer by the application of leapfrogging (with low-carbon technologies).

He then sets out the objective of LCS-RNet with the value-added of a good information exchange. Research faces a challenge, because the society which we are aiming for is quite different from the high energy consuming societies of the industrial revolution. There needs to be a forum to promote understanding of LCS dialogues among researchers, society and industries. Therefore the LCS-RNet was proposed by G8 Environment Ministers Meeting and thus with a good connection between policy and research. There are already ten research institutes from six countries in LCS-RNet with IGES serving as the Secretariat. In Japan, the research is assisting the policy issues.




Low Carbon Society related policies in Japan

- 2007 Feb. : Low Carbon Society (NIES) research interim report
- June : PM Abe Cool Earth 50 (Global reduction of 50% in 2050) in Heiligendamm G8
- 2008 May: PM Fukuda's vision (60-80% reduction in 2050 from now) "Low Carbon Society" in PM's Basic Policy in Congress speech "Low Carbon City" -10 cities designated
- June: LCS Rnet proposed and accepted at G8 Environment Ministers Meeting in Kobe
- Nov. : 6 levels discussed for 2020 Mid -term Reduction Target 6 bottom-up /top-down techno-economic models invited
- 2009 April: LCS Rnet approved: G8 LCS Technology Forum in Trieste Prime Minister Aso: "Low Carbon Revolution" for recovering current financial crisis (solar energy, eco-car, eco-point,,) "Low carbon Asia" research project started (NIES/IGES/others)
- June: Prime Minister Aso announced Japanese Mid -term Target 15% domestic reduction (base year 2005)

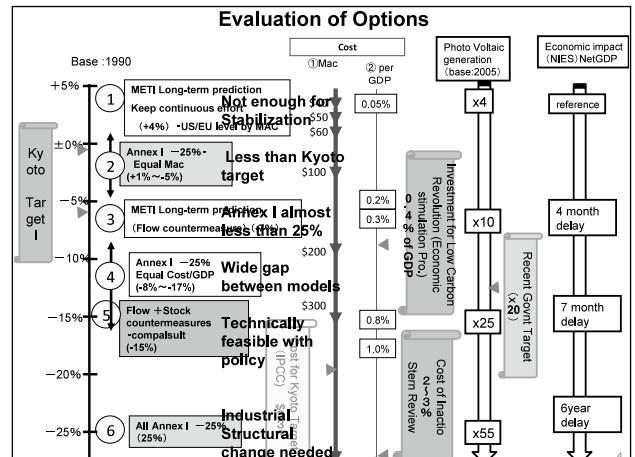
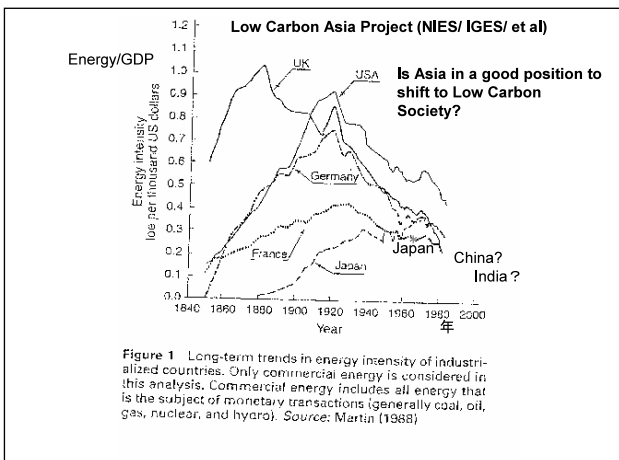
A research result to endorse Japanese policy of 60-80% reduction in 2050
2050 Low Carbon Society, Japan

Key conclusion:
 Japan has the technological potential to reduce its CO₂ emission by 70% compared to the 1990 level, while satisfying the expected demand for energy services in 2050.



Innovation necessary in technological/industrial/social infrastructure policy

Prime Minister Fukuda in Congress (Jan. 2008) "...maximize Japanese environmental power, lead world transition towards Low Carbon Society..."
 (May 18) Japanese long-term target 60-80% reduction until 2050,



- Organize worldwide Low Carbon Society Research Network**
- Objectives of LCS-RNet**
- Promote information exchange and research cooperation that covers various issues relating to low carbon societies (LCS).
 - Promote understanding of LCS dialogues between researchers and various stakeholders including policy-makers, businesses, citizens, and others to share national and sub-national visions on low carbon societies.
 - Contribute to international policy-making processes on climate change such as G8 and other high level policy processes by providing research outcomes and recommendations.
- Ten research institutes from 6 countries initiated
 - IGES serves as secretariat

Questions for Speakers:

Ms. Koda, as the moderator of the session, posed the question, "What are the next steps of the Network?"

There was a call for more research institutions to join the network to encourage more developing countries to make their own paths towards LCS by their own capacity, as well as assisting so that they can choose.

This was echoed by others. The goal is to enable exchange of best practices and influence policies in a cooperative and intelligent way. The need to transfer technology and financing to developing countries was also pointed out. This is both a challenge and an opportunity.

Panel Session 2:

Efforts to Shift towards Low-Carbon Societies in Japan

Moderator: Ms. Charmine Koda, Journalist

Efforts to Shift towards Low-Carbon Societies in Japan – Policy Context

Mr. Hiroaki Takiguchi,

Director, Office of International Strategy on Climate Change, Ministry of the Environment, Japan

Mr. Takiguchi from the Ministry of the Environment, Japan, presented on government efforts to move towards LCS in Japan. First, there are three principles (participation of all major emitters in future regime, combining environment and economy, and achieving long-term targets) for Japan's mid-term targets announced on 10 June (to reduce emissions by 15% from 2005 levels, by 2020). Furthermore, for the path to long term emissions reduction, and in order to achieve 70% reductions by 2050, it is necessary to increase the annual reduction rate from 1% to 4.5 %.

While it is necessary to reduce emissions as quickly as possible, it is also necessary to implement social changes at the same time. On the other hand, the governments' role towards LCS must include four pillars (institutional arrangement, enhanced intangible and tangible asset, and nature conservation). Finally, Mr. Takiguchi stressed that a sustainable society must be created from three components, namely LCS, sound material-cycle society, and a society in harmony with nature.

ISAP 2009 Towards Copenhagen
A New Development Pathway to a Low Carbon Sustainable Asia and the Pacific
IGES
International Forum for Sustainable Asia and the Pacific ● 26-27 June 2009

Panel Presentation Session 2
パネル討論2

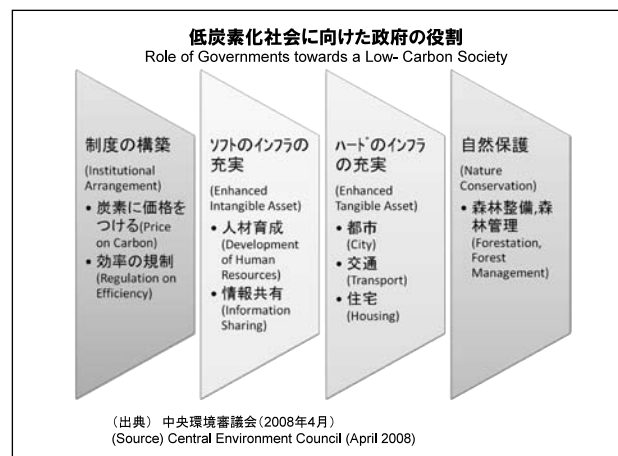
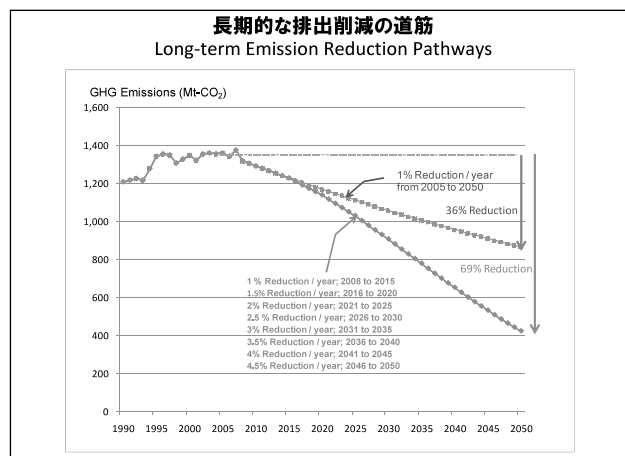
Efforts to Shift towards Low-Carbon Societies in Japan

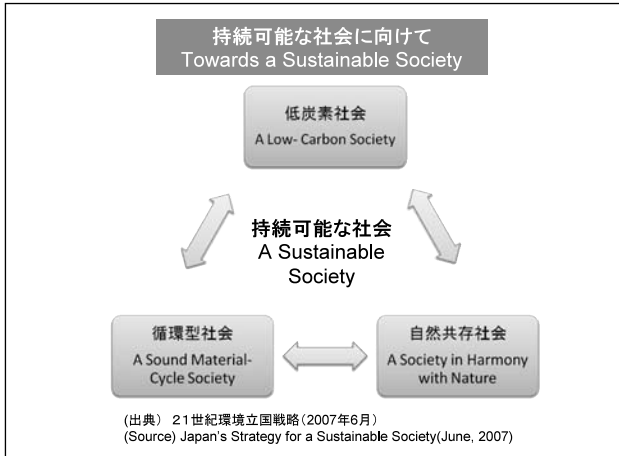
日本における低炭素社会への移行に向けた取り組み

HIROAKI TAKIGUCHI
Director, Office of International Strategy on Climate Change,
Climate Change Policy Division, Ministry of the Environment, Japan

龍口博明
環境省地球温暖化対策課国際対策室室長

日本の中期目標	Japan's mid-term target
<ul style="list-style-type: none"> 麻生総理は6/10、日本の中期目標を発表 目標は 2020年までに2005年比で15%減(国内削減のみ) 目標検討にあたっての三原則 <ul style="list-style-type: none"> 次期枠組みへの全ての主要排出国の参加 環境と経済の両立 長期の目標の達成 	<ul style="list-style-type: none"> Prime Minister Aso announced Japan's mid-term target on June 10, 2009. The target is 15 percent reduction from the 2005 level by 2020(domestic reduction) Three basic principles in considering the decision: <ul style="list-style-type: none"> Participation of all major emitters in the post-2012 framework Making the environment and the economy compatible Achieving the long-term goal





Efforts to Shift towards Low-Carbon Societies in Japan – Local Government Initiatives

Mr. Reiji Hitsumoto,

Director for Eco-Model City Affairs, Environment Bureau, Kitakyushu City

Mr. Hitsumoto from Kitakyushu City introduced efforts towards LCS in Kitakyushu City. First, he looked back on efforts in Kitakyushu that achieved both environmental improvements and economic growth from the emergence of pollution issues in the 1960s. Learning from those experiences, Kitakyushu has been promoting international environmental cooperation with Asian countries through the Asian City Network and Eco-towns. Furthermore, in July 2008, Kitakyushu City was selected as a model environmental city for sustainable development towards LCS. There are four practical approaches that are being implemented by Kitakyushu City to achieve both CO₂ emissions reductions (50% reduction

by 2050) and economic growth. The first one is a promotion of LCS by including the concept in designing urban development, e.g. the development of Higashigata (Green Village). The second one is to develop low-carbon industries through technology and product development. The third approach is to promote capacity building for a LCS through eco-museums, eco-housing as well as the introduction of solar power systems at elementary schools. The fourth approach is to create an intercity network for environmental cooperation aiming for sustainable development in Asia by knowledge transfer from Kitakyushu City through the Asia LCS Centre.

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International Forum for Sustainable Asia and the Pacific ● 26-27 June 2009

Panel Presentation Session 2
パネル討論2

Efforts to Shift towards Low-Carbon Societies in Japan

日本における低炭素社会への移行に向けた取り組み

REIJI HITSUMOTO
Director for Eco-Model City Affairs, Environment Bureau,
City of Kitakyushu

権本礼二
北九州市環境局環境首都政策課環境モデル都市担当課長

Eco-Model City of Japan (July, 2008) / 環境モデル都市

Objectives:
Sustainable Development towards creating a Low Carbon Society in Kitakyushu
•Peoples' Happiness
•40% of Economic Growth
•Large Scale of CO₂ Reduction

Approaches:
•Urban Development / Low Carbon Urban Structure
•Industrial Development / Innovative Industries
•Human and Social Development / Life with Happiness
•Sustainable Development in Asia / Low Carbon Society

CO₂ Reduction Target in 2050
City: 50%
Asia: 150% of Kitakyushu emissions

Urban Development; Higashigata Green Village / Low Carbon

Higashigata Co-Generation System with high efficiency
CO₂ Reduction 20%

Electric Supply for Town
Thermal Supply for Factories
Water Supply
Waste Treatment
Community Center
Educational Area
Residential Area
Train Station
Higashigata Green Village Area
低炭素都市開発 東方グリーンビレッジ

Towards creating Low Carbon Societies in Asia / アジア低炭素社会への取り組み
City of Kitakyushu, Japan

Background and Resources

Economic Development and Environmental Improvement & Partnership among Stakeholders

International Environmental Cooperation & Kitakyushu Eco-Town

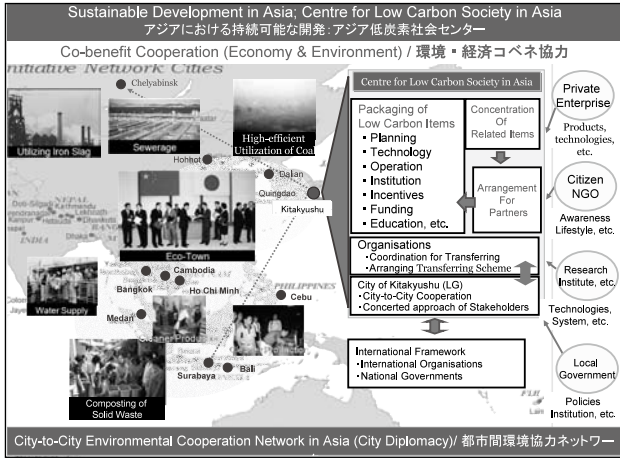
Industrial Development; Low Carbon Technology & Product / 低炭素型の産業育成

Water-saving type automatic cock with a self-power generation function
Rerited type Eco-Apartment House with Photovoltaic Power Generation, First in Japan
Efficient electromagnetic plate and sheet which contributes to energy saving

Kitakyushu Eco Premium

Human Development; Integrated System for Learning Low Carbon Society / 低炭素社会を担う人材育成

Eco Museum and Eco House
Solar Cell at Elementary School



Efforts to Shift towards Low-Carbon Societies in Japan – Context of Industries

Mr. Masayuki Sasanouchi,

Senior General Manager, CSR & Environmental Affairs Division, Toyota Motor Corporation

Mr. Sasanouchi from the Toyota Motor Corporation explained positions and views of businesses regarding moves to a LCS. First, he presented a map showing the burden-sharing for developed and developing countries. The map indicated that, in order to achieve emissions reductions of 50% by 2050, developing countries still have to reduce their emissions by 60%, even if developed countries could reduce emissions by 100%. Therefore, technological innovations are vital to achieve such results. The Kaya equation (CO₂ emissions formulated from carbon and energy

intensities with amount of activity per emissions source) well explains the position of industries which promote a sectoral based approach in order to reduce carbon intensities through technological development. In addition, comprehensive approaches in designing the measures are important, e.g. an assessment of the emissions through the whole product lifecycle, and corporate strategies and policies based on cost benefit analysis taking into account both the cost for CO₂ emissions reductions and the environmental cost.

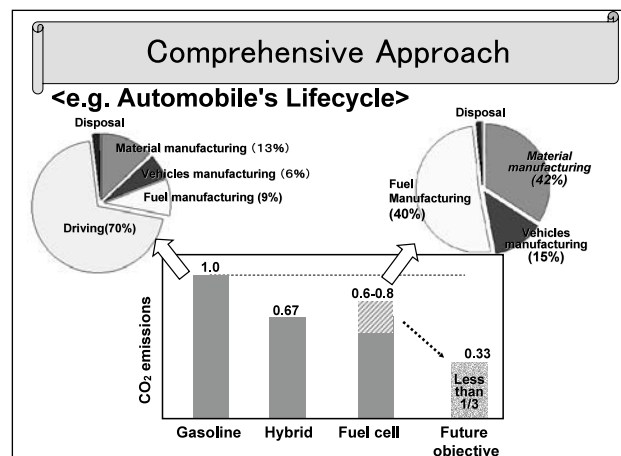
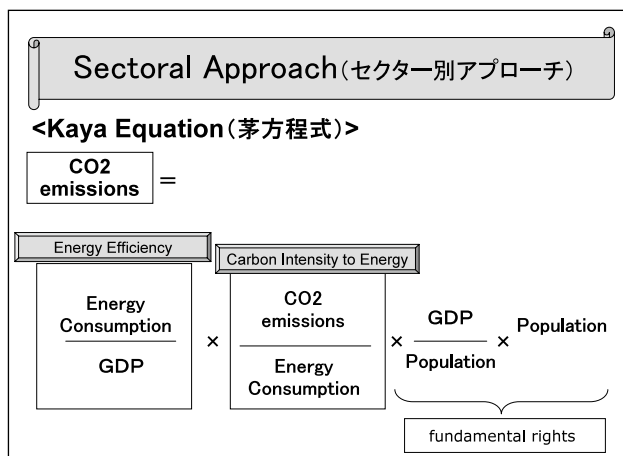
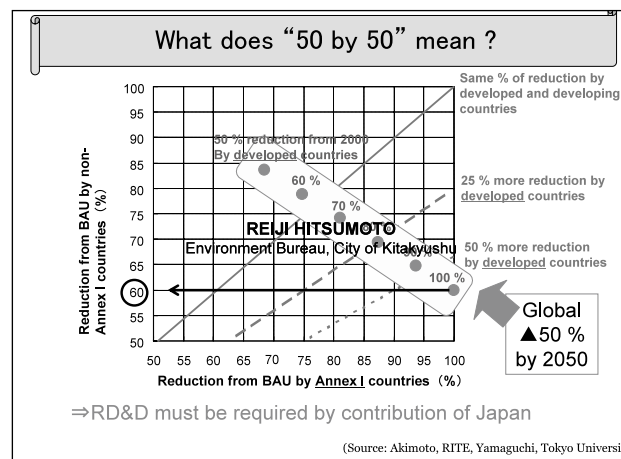
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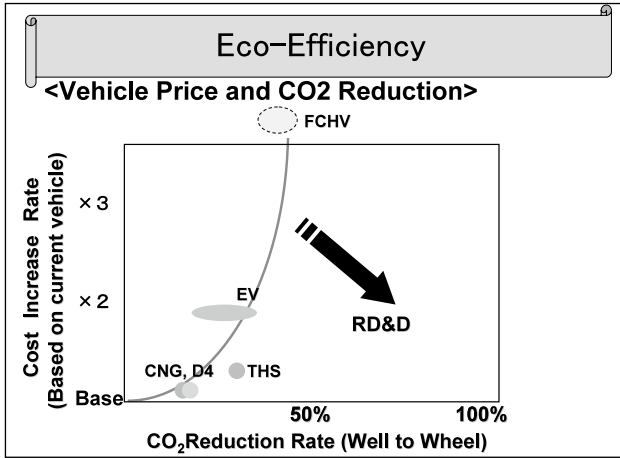
Panel Presentation Session 2
パネル討論2

Efforts to Shift towards Low-Carbon Societies in Japan
日本における低炭素社会への移行に向けた取り組み

MASAYUKI SASANOUCHI
Senior General Manager and Project General Manager of Environmental Affairs Department, Toyota Motor Corporation

笹之内 雅幸
トヨタ自動車株式会社 理事
CSR・環境部(兼)東京技術部 主査





Toward New Paradigm of Energy & Environmental Policy From Mode1 to Mode 3

Mr. Tetsunari Iida,

Executive Director, Institute for Sustainable Energy Policies

Mr. Iida from the Institute for Sustainable Energy Policies gave a presentation on Japan's environmental energy policies from a Japanese political context. First, the current world-wide boom of renewable energy diffusion can be characterised as energy diversification. As a result, the world market for renewables has expanded to about JPY 15 trillion at present. Indeed, the targets-setting (by policies) can give a boost to renewable energy diffusion. However, there has been an absence of the political initiative to shift to a more diverse energy-mix in Japan. This is the reason why Japan has simply continued to rely on thermal power generation to meet an increasing

energy demand, and the cause of a delay in taking the necessary measures for emissions reductions. Furthermore, due to the Japanese political structure, macrolevel model analysis are not fully utilised in policy-making, so as a result, policies are not effective enough in making concrete progress. For Japan to achieve its reduction target, there needs to be a new approach of knowledge-based policy-making combining a knowledge community and local communities. In this way, it is necessary to make a paradigm shift of current environmental energy policy-making.



Efforts to Shift towards Low-Carbon Society in Japan – Research Context

Dr. Mikiko Kainuma,

Chief, Climate Policy Assessment Research Section, Center for Global Environmental Research,
National Institute for Environmental Studies (NIES)


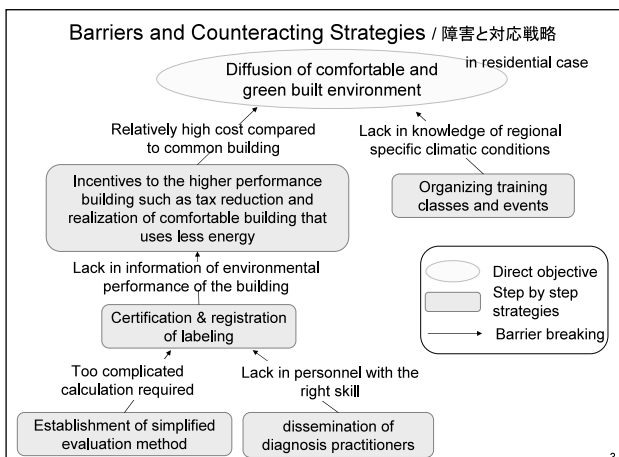
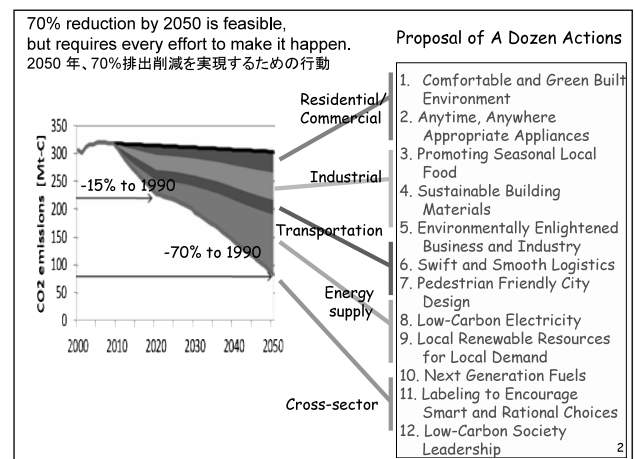
The final panelist, Dr. Kainuma from NIES, talked about measures needed to achieve a 70% reduction by 2050 compared with 1990 levels. The methodology applied for the research firstly drew imaginary societies achieving the reduction target in 2050, and then back-casting analysis was done to come up with 12 practical ways to achieve such societies. She pointed out the necessity to bring in policies

that offered incentives for measures associated with cost, in order to implement each of the measures. As steps towards a LCS, three measures are vital, namely public awareness raised, for example, by offering incentives, improvement of knowledge on technologies on both the supply and demand sides, and also having public participation, not just political leadership.

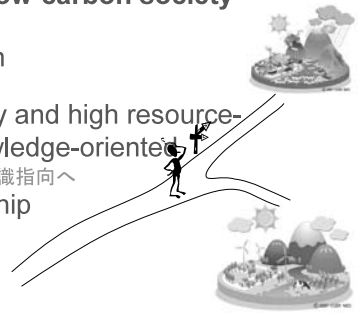
Efforts to shift towards Low Carbon Society in Japan
低炭素社会への移行に向けた日本の取り組み

Mikiko Kainuma
AIM Team
National Institute for Environmental Studies
26 June 2009
IGES, Hayama, Japan

Steps towards low-carbon society
低炭素社会へのステップ

- Long-term vision
長期的ビジョンの構築
- From technology and high resource-oriented to knowledge-oriented
技術・資源指向から知識指向へ
- Political leadership
政治的リーダーシップ



“Live simply so that others may simply live.”
- Mohandas K. Gandhi

Discussion

Ms. Koda, as a moderator, asked Mr. Sasanouchi if he takes the challenge of LCS as a risk or a chance. He indicated the fact that about 180 global companies are taking part in the WBCSD (World Business Council for Sustainable Development) may be an evidence

that those companies view LCS as a business chance e.g., through the participation in Emission Trading in energy sector. However, he stressed that his company Toyota would like to find its own way in taking a lead in manufacturing as a business chance.

