Overcoming barriers to low carbon societies

"Six messages" from Stakeholders Dialogue in Yokohama

IGES Global Environmental Seminar

March 15, 2010

Yokohama Workpia

LCS·R Net
International Research Network For Low Carbon Societies (LCS-RNet)

IGES
Institute for Global Environmental Strategies

- Overcoming barriers to low carbon societies -

"Six key messages" from the Stakeholders Dialogue in Yokohama

- Time to act. Change is an opportunity.
- Time to discover, find and create new values.
- Time to stop the compartmentalization of systems to make full use of the potential of each component in a harmonised way.
- Time to take risks and face challenges。
- For policy-makers, it is time to give a clear signal of the need to shift to a low-carbon society and formulate policies with a long-term perspective that include safety nets, and then share this vision with the private sector.
- Time to trust the capacity of the private sector and make use of it

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Acknowledgement

This Report draws together findings from the round table discussions during the Stakeholders Dialogue held in Yokoyama Japan on 15 March 2010. This should be of interest to all stakeholders in the society, as well as policy-makers and researchers, with the recognition that what we are aiming for to realise low carbon societies is the societies more sustainable for all in future. The report highlights six key messages from Yokohama for LCS policy-making and identifies gaps in knowledge to enable scientists to develop future research agendas.

Summaries of the presentations and round table discussions are also contained in this report.

I would like to take this opportunity to express our gratitude to the panellists and commentators of round table discussions who actively participated and contributed in the Dialogues.

Their presentations and discussions form the basis of six messages and the synthesis of this report.

Shuzo Nishioka
Secretary General
LCS-RNet Secretariat

Stakeholders Dialogue in Yokohama
To overcome barriers towards Low Carbon Societies
Six messages from Yokohama

Published by the Institute for Global Environmental Strategies (IGES) on behalf of the International Research Network for Low Carbon Societies (LCS-RNet)

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Six key messages from Yokohama

It is time to act. Change is an opportunity.

Japan is now in the midst of major changes as it faces a decline in population, an aging society, increased global competition for its industries, issues of managing national finances, energy security, the restructuring of land use, and so forth. Efforts to shift from the current energy-intensive society towards a low-carbon one will guide us in a major transition to realising a better future. It is thus important to consider these substantial changes as a major opportunity and make every effort to deal with them in a positive manner.

It is time to discover, find and create new values.

When the conditions surrounding the society change, this sheds light on things that were not sufficiently valued in the past. Discovering things that we lost due to industrialisation, such as traditional social systems that have long being maintained in local communities, traditions, institutions, and values, will help us to create new values to live in a low-carbon society. Venture business created using “Trust” capital is a good example. If people consider a house as a service to use in accordance with the needs of each generation, not something to “possess”, this will help to establish houses as good long-lasting social capital together with their environment.

It is time to stop the compartmentalization of systems to make full use of the potential of each component in a harmonised way.

By internalising new values in economics, new industries or businesses will be created. Business people should be more positive in trying to develop new enterprises through joint ventures with different industries as well as through cooperation between cities and rural areas. By rediscovering the basic strength that was gradually established through tough experiences, such as pollution and economic recession, and by finding ways to establish new collaborative relationships amongst different industries, the Kawasaki coastal industrial zone has become rejuvenated as a new industrial area from its previous obstructive style. It is important for each government agency to give up its bureaucratic and compartmentalised policy-making style, and try to achieve the integration and harmonisation of policies. As an example, in housing policies it is necessary to implement comprehensive policy revisions such the abandonment of policies that encourage people to become private home owners, as well as to promote capacity-building for local carpenters to construct houses with low carbon emissions, to extend the average life of houses by promoting renovations, to revise building standards to eliminate basic obstacles to energy-efficient houses, etc. Business sectors should also give the authority for decision-making to the people working at the front line.

It is time to take risks and face challenges.

In the midst of major social change, everyone must be ready to take risks to meet the challenges and build a new society. It is necessary to avoid adhering to the apparent current stability. It is encouraging to see more and more entrepreneurs who are willing to take risks. The financial sector could also apply methods of venture capital taking risks into account. The government must take up the role of providing safety nets for those who challenge these risks and guarantee opportunities to start over again.

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* as an example of the alliance with different companies to develop lithium-ion batteries may be resulted in very different advantages for the companies involved.

** See example of agroforestry in page 14, 15

Six key messages from Yokohama

For policy-makers, it is time to give a clear signal of the need to shift to a low-carbon society and formulate policies with a long-term perspective that include safety nets, and then share this vision with the private sector.

It is time to espouse a clear vision as a nation of how to maintain a prosperous Japanese economy and of the kind of society we would like to pursue. The role of the government is to give a clear signal to indicate that we are in a transitional period, to propose strategies for the future and roadmaps toward achieving them. It is also important to involve the demand side on a global scale, and to support the identification and accumulation of intellectual property that is necessary for the technologies and systems required. Developed countries are putting individual technologies, systems technologies and planning, infrastructure, and finance together as whole systems to develop low-carbon societies or for urban planning and to sell these in the global market, mainly targeting developing countries. There is a huge potential for Japanese technologies if they are integrated into larger technological structures and systems, and this is the direction for Japan to go forward. Subsidies to overcome the initial barriers to making this shift towards a low-carbon society must be implemented within an appropriate time frame in ways that support social capital development and strengthen the capacity of industries over the long term. The role of the government is to raise the levels of the lowest standards. It would be better to leave it to competition within the private sector to then raise general levels to the highest standards.

It is time to trust the capacity of the private sector and make use of it.

It is the private sector and individuals that will make the transition, and the government must trust their capacity. Japanese enterprises have sufficient potential to make changes. It is the private sector and individuals who will decide on, act on, and create the means to achieve a low-carbon society. It is important for them to demand what they require from each other. However, it is also important to make clear who will carry this out, and who are the objects of the changes. All stakeholders must be aware of their own responsibilities. Individuals and businesses must be aware of the mutual benefits and the importance of sharing them in order to design solutions in a rational way.

International Research Network for Low Carbon Societies (LCS-RNet)

The Japanese government proposed the idea of establishing the International Research Network for Low-Carbon Societies (LCS-RNet) to involve researchers around the world in promoting research on LCS-related issues on the occasion of the G8 Environment Ministers Meeting held in 2008. With the agreement of the participating countries, the Network started its activities with a Secretariat set up in IGES. On the occasion of the 1st Annual Meeting of LCS-RNet, held in Bologna, Italy, in October 2008, policy-makers and researchers highlighted the need to tackle issues including energy technologies, local planning, R&D, lifestyles, visions and scenarios, and their impact on economies.

Summary of key messages of the Inaugural Meeting of the LCS-RNet (Bologna, Italy, October 2009)

- Long-term and mid-term targets
  - World leaders aspire to bold targets for emissions reductions.
  - Co-benefits will arise from setting appropriate country- and region-specific targets.
  - Backcasting approaches can identify feasible and desirable pathways towards sustainable low-carbon societies.
- Economic aspects of low carbon societies
  - Co-ordination is needed between environmental goals and innovation policies.
  - Sectoral and regional perspectives need to be taken into account.
  - New financing paradigms will be required if developing countries' mitigation and adaptation needs are to be met.

Overview

The world is now shifting towards low-carbon societies. In Japan, discussions over visions for the nation's future have just begun with the expected decline in the population and the aging of the society, with globalisation in progress, and the need for energy security. The need to shift to a low-carbon society can be an opportunity to consider a new vision of the future for the country. A shift towards a low-carbon society requires the involvement of all stakeholders in the society such as the citizens, distributors, people in agriculture, forestry and fisheries, the business sector, including industries, commerce, and finance, NGOs, and policy-makers who are engaged in local and national planning. All these stakeholders have their own images of a low-carbon society and the steps to take and their roles in taking them. They do also have different opinions on the technical and social barriers to achieving a low-carbon society, and how to overcome these barriers. To understand the various different images and opinions and incorporate them into efforts to develop a low-carbon society, it is necessary to share knowledge throughout the world.
In Japan, various stakeholders have already stated their determination to shift towards a LCS. It is now important to maintain a dialogue among all stakeholders to identify the kinds of efforts required to achieve a drastic reduction in greenhouse gas emissions through the most efficient means, how to promote cooperation amongst the different groups, and so forth.

Recognising the importance of such dialogues, the 5th IGES Global Environmental Seminar 2009, Stakeholders Dialogue in Yokohama – Overcoming barriers to low carbon societies - " was held on 15 March 2010. The objective of this Dialogue was to provide an overview of efforts towards a transition to low-carbon societies that are currently being undertaken by various sectors, and to identify barriers and to propose the solutions, policy measures and research required to materialise low-carbon societies. The points discussed in the Dialogue will be synthesised by the LCS-RNet to be published and disseminated to policy-makers and other stakeholders throughout the world.

- The role of technology
  - Radical technological change is crucial in reaching a low-carbon society.
  - More investment in energy technology is needed.
  - Technology will not deliver a low-carbon society on its own.
  - Climate policies and R&D strategies must be synchronised.
- Public policy and lifestyle change
  - Public policy can lead the way to lifestyle change and a low-carbon society.
  - Facilitating behaviour change is not easy, but can be accomplished.
  - The most effective measures will be tailored to individual countries and localities.
  - LCS lifestyles do not have to entail sacrifice.
- Cross-cutting issues
  - A persistent signal is needed to stimulate change across all sectors.
  - Planning for land use change is essential.
  - Cities provide an excellent opportunity to promote a low carbon society.
  - Research that would allow developing countries to set their own targets and pathways is essential.
  - Human resource development is needed as well as technology co-operation.
  - We need to adapt to unavoidable climate change and remain alert to new scientific insights.

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Opening Remarks

Kuniaki Makiya
Institute for Global Environmental Strategies (IGES), Secretary General

He explained how this stakeholder dialogue is positioned in the trend of activities to combat climate change in Japan and the world.

Based on the Copenhagen Accord, national mid- and long-term targets were set in Japan, a group of scientists are now preparing a roadmap since last December. Recently, the Japanese Cabinet endorsed a new draft climate change bill that targets a 25% reduction in CO_2 emissions by 2020. Activities to combat climate change are now shifting to concrete actions such as setting reduction targets at local levels with local initiatives. Meanwhile, there are also conflicts over such actions due to their impacts on economic activities and the possible burden on households. To achieve the emission reductions targets for greenhouse gases, it is necessary to construct low-carbon societies by overcoming such conflicts among the stakeholders. Japan is facing now its major challenges, such as the ageing society, declining population, and globalization. Low-carbon societies need to be considered as positive visions for the future that fit for the changes in the societies and local circumstances in addition to a reduction in greenhouse gas emissions. Therefore, to make the transition to low-carbon societies, it is necessary to foster communication and an exchange of visions and knowledge among each stakeholder, and to clarify the obstacles and the means to solve the problems through policies, research and other activities.

It is expected that the outcomes of this stakeholders' dialogue will be summarized into a report with recommendations that will be input into the International Research Network for Low Carbon Societies (LCS-RNet), through which national and regional activities toward creating a low-carbon society in Japan can inspire others around the world.

Keynote Speech

Yasuo Takahashi
Director of the Climate Change Policy Division, Global Environment Bureau, Ministry of the Environment, Japan

Action towards a low-carbon society

He described the international trends in climate change policy and the policies in Japan, following to the emphasis of the need for large emissions reductions to stabilize the concentration of greenhouse gases in the atmosphere and the fact that the degree of climate impacts will be affected by the timing of such stabilization.

On 22 September 2009, at the United Nations Summit on Climate Change, Prime Minister Yukio Hatoyama announced the mid-term goal (a 25% reduction in emissions in 2020 based on the 1990 level), premised on agreement on ambitious targets by all the major economies, and indicated the will to utilize all possible measures including domestic emissions trading scheme, carbon taxes and feed-in tariff system for renewable energy to attain the mid-term target. He also announced the Hatoyama Initiative including financial support and support for technologies for adaptation measures in developing countries. In December 2009, Parties of the UNFCCC COP15 took note the Copenhagen Accord. Japan will continue its initiative to set up a framework for after-2013 with its bold targets.

As for the Japanese target under the Kyoto Protocol, Japan is now anticipating to achieving its 6% emissions reduction target compared to 1990 level. As for mid- and long-term targets and the planning of roadmaps to achieving those, all possible measures must be employed. The pricing of carbon and the visualization of emissions (e.g. carbon footprints) must be placed at the center of those measures.

On 12 March 2010, Japan's Cabinet endorsed the Bill for the Basic Act on Global Warming Countermeasures and sent it to the Diet. This bill is expected to establish the framework, and the important thing to note is its inclusion of mid- and long-term targets. The three pillars of the bill are the creation of a domestic emissions trading system, environmental tax to deal with climate change, and a feed-in-tariff system for all renewable forms of energy.

At the end of December 2009, a group of experts, chaired by Dr. Shuzo Nishioka, started to consider roadmaps for mid- and long-term targets, to propose scientific and technological advice for the government. On 30 December 2009, Japan’s Cabinet decided on a New Growth Strategy (Basic Policies) and the environment is considered as one of the most important fields for growth. The national campaign Team Minus 6% has been developed into the Challenge 25 Campaign since 14 January 2010). Discussions on roadmaps will now become much more important. This requires different ways of thinking through inter-ministry coordination. In particular, it is necessary to introduce unique local activities to spread throughout the country (e.g. environmental model cities). The stage of discussion is now over and we have to start creating roadmaps by sharing activities and knowledge.

Shuzo Nishioka
Senior Research Advisor, Institute for Global Environmental Strategies (IGES)

To overcome the obstacles to achieving low-carbon societies

He explained the importance of stakeholders overcoming obstacles and the general scope of this stakeholder dialogue.

The new draft climate change bill was decided on by the Cabinet and concrete actions toward creating a low-carbon society have been taking place. To stabilize the climate, the society has to change drastically. Now, the phase of arguing whether or not emissions reductions are possible is over, and we have to start thinking about how to actually construct a low-carbon society by combining the vision of each stakeholder through the dialogues. There are many types of stakeholders. Conflicts, demands and cooperation may occur among them as we move toward a low-carbon society. Ways of thinking about common obstacles and coming up with solutions are the points of the discussions.

There are three key elements of the scope of stakeholders' dialogue. The first one is an industrial transformation that must be accomplished up to the period 2030-2050. The second is regional management. Management at the level of prefectures and cities is an important issue to be considered in the situation of an ageing society with a declining birthrate. The third concerns the changes in ways of living. There are arguments as whether we need to change our lifestyles by ourselves or through changes to the social systems that naturally result in such lifestyles. It is important for people to freely enjoy a lively society without being forced into a certain lifestyle. The important roles of politicians and administrators stand at the cross-cutting intersection of these three elements where potential conflicts and cooperation among stakeholders arise. This is because obstacles (e.g. values, customs, traditions, ties of obligation, regulations and institutions) have to be overcome to ensure a rich and low-carbon society.

Another issue to be considered is how Japan can sustain its economy in the international society. It is necessary to set the right direction for changing the economy to achieve green growth without anxiety.

In today's dialogue, in the first part, each different vision will be presented from the micro level. In the second part, these will be systematically arranged and their entire scope will be discussed through a general discussion session. The outcomes of this dialogue will then be transformed into propositions from Japan for dissemination to the international society.

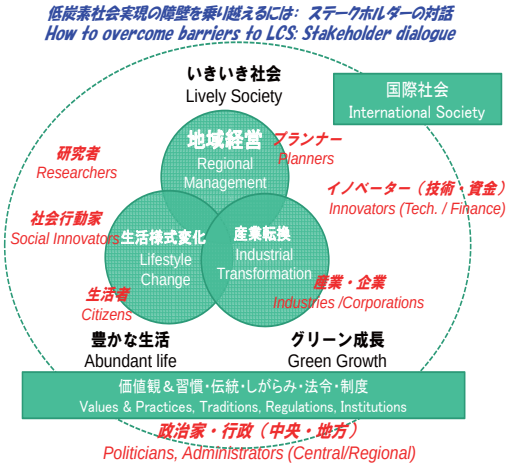
Roundtablle Discussion

低炭素社会実現への障壁を乗り越えるためには：ステークホルダー対話 in 横浜

Overcoming barriers to low carbon societies Stakeholders Dialogue in Yokohama

- 気候安定化に向けて社会を変える
  Changing society for stabilization of climate
  - ヴィジョン・計画
    Vision and planning
- すべての人・組織がステークホルダー（利害関係者）
  All the people and organizations are stakeholders
  - 相互関係：対立・要求・協働
    Interrelation: conflicts, requests, and cooperation
- 共通の障壁
  Common obstacles
  - どう越える？
    How to overcome?

⇒国内ロードマップ/低炭素社会国際研究ネットワークなど発信
Outcomes disseminated for national roadmap, LCS-RNet, etc.



Roundtable Discussion: Part 1

Yuji Kinoshita
Corporate Managing Director & Executive General Manager,
Senior Executive General Manager, Retail Business Unit, Tokyo Corporation

Barrier and cross-sectional vision for low-carbon societies (LCS)

He explained how companies' efforts toward establishing a low-carbon society can be supported from the viewpoint of enterprises.

It is important to design mechanisms for change so that enterprises can still operate successfully.

Since the first half of the 1970s, regenerative breaking has been introduced in the trains of the Tokyu Corporation and the electricity generated by this energy recovery mechanism is fed back into the supply system to be utilized by the trains that follow. Tokyu Corporation was an early adopter of such low-carbon technology which is now becoming popular. This technology can be applicable in compact cities with a high population density.

Another example is the NOx regulations introduced in the 1990s. NOx regulations came into force only in Tokyo and Kanagawa prefectures and some bus companies sought to take advantage of a legal loophole by changing their corporate location to another prefecture. However, Tokyu had been operating only in these two regions and had to newly buy and replace all its vehicles. As a result, research on fuel efficiency was expanded, idling reduction and hybrid vehicles were adopted earlier, and swift action to reduce greenhouse gas emissions was achieved. It can be said that steady and sincere efforts by companies to comply with the regulations can transform the challenge of facing the costs into growth in the long run. When regulations are introduced, loopholes should be avoided so that the national system as a whole can tackle the problems together.

Another example shows the importance of flexible measures that take the actual conditions of corporations into account when regulations are introduced. It has already been proved that regulations on the use of plastic bags do not lead to consumer complaints about it (e.g. Suginami city in Tokyo). However, there should be a measure that supports companies that have stocks of the bags accompanying such a regulation. It is necessary for administrators to take some measures that enable corporations to go through a provisional period and give them a certain degree of freedom when systems are changed.

From the beginning of the 1950s, in the development of the Tama Garden City, Tokyu conducted urban planning within the framework of Land Readjustment Programs and a well-planned infrastructure and compact city were achieved. This is partly due to the flexible measures adopted by Yokohama City. This example illustrates the successful allocation of roles between corporations and administrations. Administrators need to adopt a viewpoint that enables the private sector to come up with creative ideas and actions.

Roundtable Discussion: Part 1

Nobuhide Kobayashi
Director
Coastal Area Development Office General Planning Bureau Kawasaki City Office

Barrier and cross-sectional vision for low-carbon societies (LCS)

He presented the history and current situation of the industrial area of Kawasaki City and the strategies to accumulate environmental technologies and market the products of environmental industries.

Kawasaki City extends along the Tamagawa river. In the Edo period, there were some smaller cities in this area with water channels for agriculture taking water from the river. These cities were later merged through the period of industrialization in the Meiji period and formed the current configuration of Kawasaki City with its large industrial area on the coast. In this area, there is an iron and steel manufacturer that produces about 4 million tons of iron and steel per year, as well as two petrochemical complexes, one of which produces 30% of the gasoline for the Kanto region. Greenhouse gas emissions from industries account for up to 76% (of which 90% is from manufacturing) of total emissions, thus it is difficult for the municipality to control emissions through its own policies.

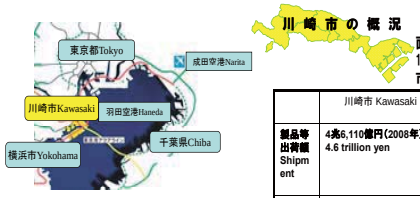
In the 1960s, during the process of developing these steel and chemical industries, heavy air pollution from NOx and SOx occurred, but the air quality has improved such that it is now possible to clearly see Mt. Fuji. This is due to the regulations for pollution control as well as the efforts of private corporations. Meanwhile, it is argued that regulations are not enough in an era of globalization. In the coastal area of Kawasaki, there are many kinds of environmental actions being carried out. Among these, there are also examples of where the area as a whole is promoting environmental actions beyond the limits of each business (e.g. a network for the use of steam from a gas-fired power plant).

The strengths of Kawasaki are that 1) it is one of the largest industrial areas in Japan, 2) it has a complex of several of the largest research institutions, 3) it has a history of pollution and the subsequent creation of an eco-town based on this experience, and 4) it is positioned close to the center of Tokyo. Through these characteristics, innovative environmental technologies have been accumulated, including ones related to energy efficiency, renewable energy, resources recycling and pollution prevention.

When considering environmental actions, it is necessary to have a vision of how to develop industries in addition to including the viewpoints of environmental movements and imposing environmental regulations. To do this, it is important to create environmental industries that consider the needs of the demand side. For instance, in some developing countries they are shifting directly to decentralized systems using solar panels and batteries for lighting and refrigeration, rather than relying on traditional ways of cutting forests and constructing electricity transmission lines from centralized power plants. What is needed here is not technological sophistication, but rather low cost, simplicity, general applicability and convenience. Without considering these aspects, it is not possible to market the products of Japanese environmental industries in other countries and take the initiative in establishing global standards. Because of this, strategies for selection and concentration in governmental support are required. Such coordinated actions will lead to a virtuous circle of success.

IGES地球環境セミナー2009第5回

川崎市の概況 Overview of Kawasaki City



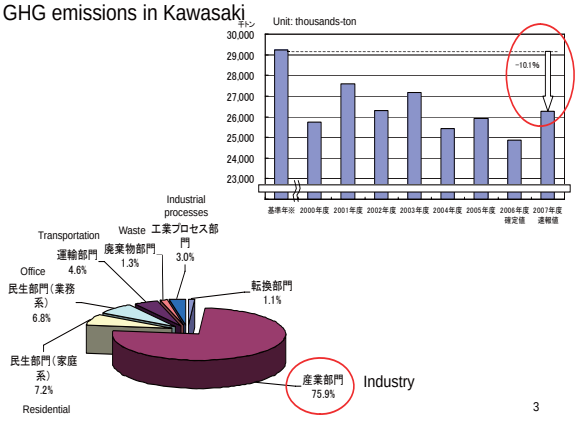
	川崎市 Kawasaki	首都圏・全国 Metropolitan area, Japan
人口 Population	1,409,558人 (2009年10月1日現在)	M) 首都圏 4,990,000人 J) 全 国 128 millions人 (2009年8月1日現在)
人口増加率	2.01%(2007年) Population growth rate	M)首都圏0.68%(2007) J) 全 国 0.02% (2007)
平均年齢	40.7歳 Average Age (2007年10月1日現在)	J) 全 国 43.9歳 (2007年10月1日現在)
労働力人口 Labor population	737,210人(2005年) (男male458,810人、 女female 278,400人)	M) 首都圏18,420,000人 (2005年) J) 全 国 65,400,000人 (2005年)

	川崎市 Kawasaki	首都圏・全国 Metropolitan area, Japan
製品等出荷額 Shipment	4兆6,110億円(2008年) 4.6 trillion yen	M)首都圏92兆円(2007年) 92 trillion yen J) 全国325兆円(2008年) 325 trillion yen
主要産業 Major industry	製造業(鉄鋼、電子・通信、精密機械、石油・化学)、情報・サービス	Manufacture(steel&iron, electronics, precision machine, petro chemistry) , information service
発展産業 Developing Industry	新製造技術、情報通信、環境、福祉・ライフサイエンス、生活文化	New manufacturing tech. IT, environment, welfare/life science, lifestyle and culture
外資系企業立地数 Foreign Corporations	115社 (うち本社機能83社：全国第5位)	M) 首都圏 2,988社 J) 全 国 3,500社

※出典『外資系企業総覧2006』東洋経済新報社

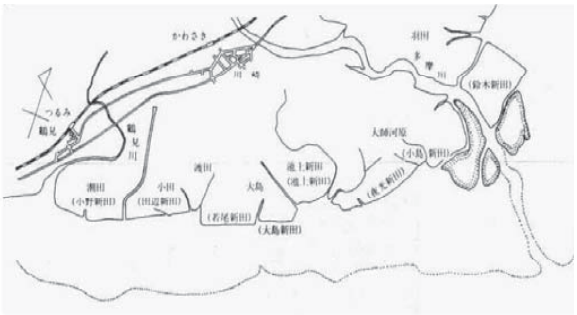
川崎市の概況 ー温室効果ガス排出量ー

GHG emissions in Kawasaki



明治末期の川崎臨海部

Coastal area of Kawasaki in the end of Meiji Era (1868-1912)

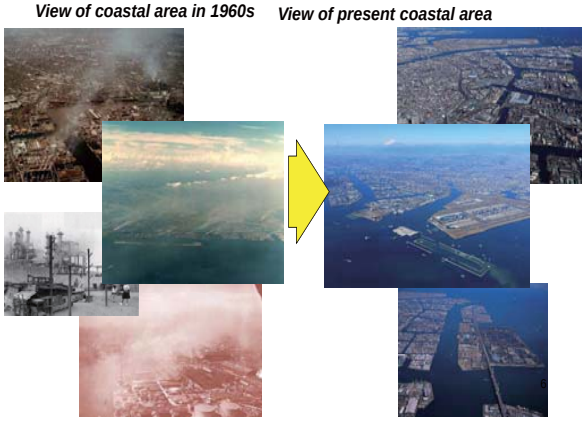


現在の臨海部 Coastal area at present

公害問題の克服に向けた取組の経験

Experience of overcoming pollution

View of coastal area in 1960s *View of present coastal area*



Roundtable Discussion: Part 1

臨海部に集積する環境技術～地球環境・エネルギー

Growing Environmental Technology in Kawasaki: Energy

臨海部に集積する環境技術～資源循環・廃棄物

Growing Environmental Technology in Kawasaki: Waste and Recycling

川崎の特徴・強み

Characteristics & Strengths of Kawasaki

川崎の特徴・強み

Characteristics and Strengths

- ●日本最大級の工業地域
  One of the largest industrial areas
  （製造品出荷額等大都市1位）
- ●日本最大級の研究学術機関の集約
  Many research institutions
  （研究員比率大都市1位）
- ●過去の公害問題・エコタウン創設の歴史
  The history of pollution and the sequent creation of eco-town
- ●都心に隣接した立地の好条件
  Close to the center of Tokyo

最先端の環境技術の集積

Accumulation of latest environmental technology

- ●省エネルギー
  Energy Saving
- ●再生可能エネルギー
  Renewable Energy
- ●資源循環
  （リサイクル）
  Recycling
- ●公害対策技術
  Pollution prevention technology

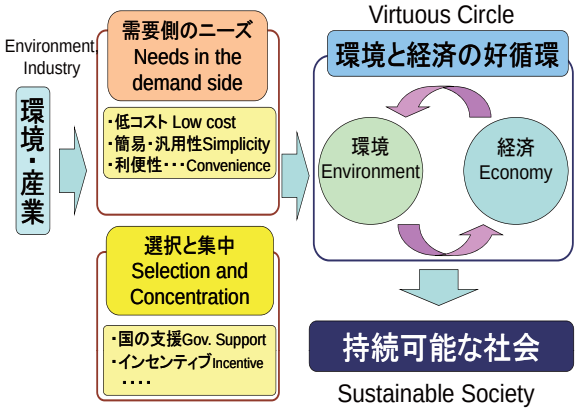
9

環境と経済の好循環

10

環境と経済の好循環

Virtuous circle of environment and economy



Yasuhisa Yamaguchi
President and CEO, Intellectual Properties Development &Investment, Inc.

Barrier and cross-sectional vision for low-carbon societies (LCS)

He explained the current situation and obstacles in relation to environmental venture capital in Japan and made suggestions for overcoming them and to vitalize environmental venture corporations and their technologies.

Intellectual Properties Development &Investment Inc. has developed the intellectual property development fund including private finances, manages it as venture capital. The fund was established to create industries for the next generation and to support companies in seed-stage and early-stage to grow.

In 2008, the total amount of environmental venture investment in the world was about 800 billion yen in total and investment has increasingly gone to environmental businesses. However, in Japan, even the total venture investment amounted to only about 26.2 billion yen in 2009 (about 30% of the peak in 2006), among which clean technologies account for only 8%, about 5 billion yen. In Japan, people do not take risks and risk money does not flow into venture capital. Clean-tech funds are in a bubble situation. There are doubts as to whether or not they are really contributing to reductions in CO_2 emissions and whether the funds are actually reaching venture companies or are solely being used for speculative investment.

The following environmental technologies are focused on by those providing venture capital; solar electricity generation, electric cars, bio-fuels, hydrogen gas from steel production process, LEDs, fuel cells, etc. Destructive and completely new technologies can sometimes succeed by going beyond institutions and business models.

[Actions by administrators] It is a challenge to find surprising and innovative environmental technologies and patents and then to commercialize them. Policy should support on the supply side (e.g. the creation of new industries) is necessary. Policy support including subsidies, tariffs and credit enables environmental ventures to turn themselves into real businesses. [Actions by business] The technologies owned by venture companies are those that large corporations do not deal with and have the characteristics of niche or blockbuster technologies. Blue ocean strategies should be adopted for the creation of intellectual property by making them internationally available and making technologies differentiated. Creative ideas in determining the prices of products and services and the conversion of service models are also necessary. [Actions by people] In environmental businesses, there are some areas where they cost too much to operate such as collection of waste of cooking oil for bio-diesel. It is very helpful if people help to separate and collect it in such case.

Roundtable Discussion: Part 1

知財開発投資株式会社

関係者外秘

知財開発ファンドの環境分野への取り組み

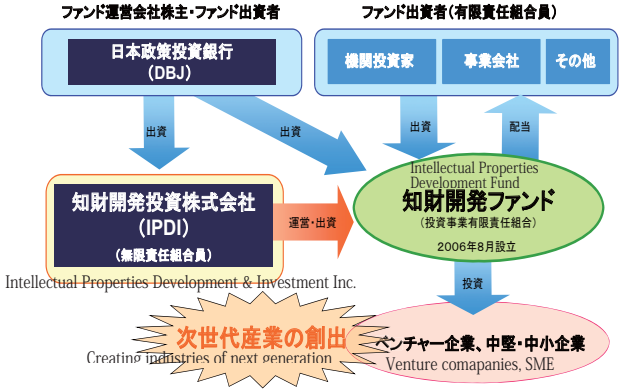
Intellectual Properties Development Fund in Environmental Field

2010年3月15日

知財開発投資株式会社
山口泰久 Yasuhisa YAMAGUCHI
yamaguchi@ipdi.jp

Scheme of Intellectual Properties Development Fund and Objectives

知財開発ファンドの投資スキームと目的



知財開発ファンドの知財・技術評価と投資判断プロセス

レベル1 特許情報解析・格付け（システム）
- ➢パテントリザルト社のパテントスコア・パテントエクスプレス®・パテントアトラス®を用いて特許・技術を公開済特許と比較することにより、対象特許の競合状況や、どのような特徴を持っているかを分析し、格付け。

レベル2 技術評価レポート（ヒト：特許・技術アナリスト）
- ➢技術の新規性や進歩性、既存・代替技術に対する優位性の有無、マーケッタビリティなどについて、各技術領域の専門家が定性的な分析・評価を行う。
- ➢公正で客観的な評価レポートを外部の第三者*に依頼して作成してもらう。

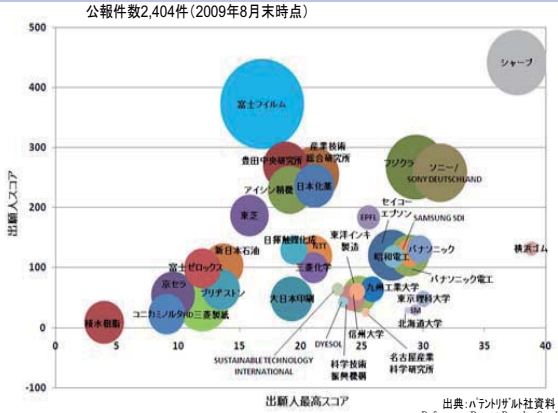
レベル3 市場性・事業計画評価（ヒト：ベンチャー投資アナリスト）
- ➢技術的に価値があると判断された案件に関して、ビジネスプランを評価。市場の現状把握、市場性評価、企業価値評価等を行う。
- ➢DBJの審査ノウハウを活用。

*IPDIでは、堀田氏（元新日鉄化学専務、材料分野）、小堀氏（シュタインバイス日本代表）、大隅氏（元NTT米国副社長、IT分野）、大津留氏（元ソニー、半導体分野）等の実務家をシニア・アドバイザーとして事業性について十分な議論を行う他、各技術分野の特許・技術調査専門家のネットワークを構築し随時活用している。

Example of patent applicants' MAP

色素増感型太陽電池に関する特許出願人MAP

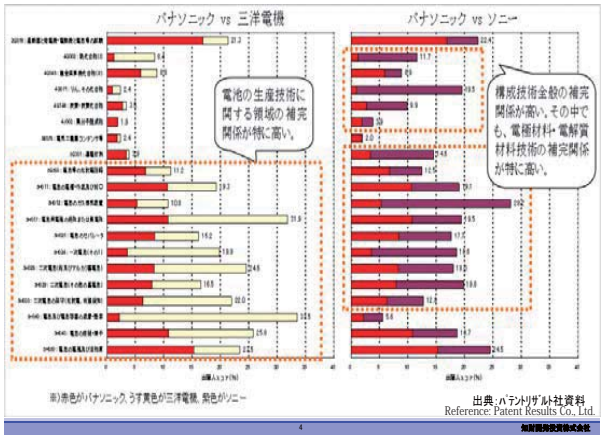
公報件数2,404件（2009年8月末時点）



出典：パテントリザルト社資料
Reference: Patent Results Co., Ltd.

Example of analysis on alliance effect of joint venture

リチウムイオン電池の技術領域アライアンス効果

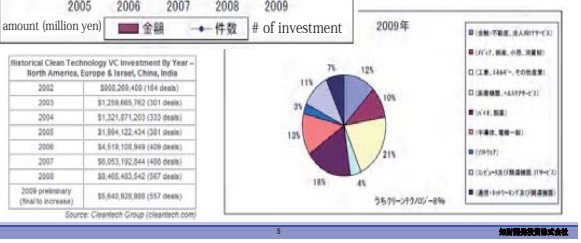


出典：パテントリザルト社資料
Reference: Patent Results Co., Ltd.

Trends of venture capital investment

ベンチャーキャピタルの投資動向について

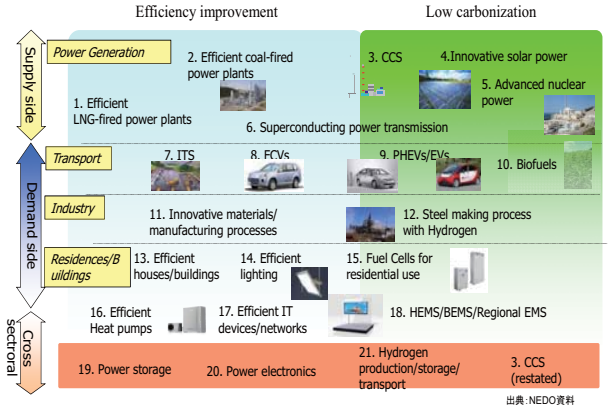
1. 年間投資額は、約262億円
2. ピーク時（2006年）の約3割まで落ち込む。
3. 2009年のベンチャー投資内訳をみると、クリーンテクノロジー向けは、約8%と50億円程度。
4. 一方、世界の環境ベンチャー投資は、8000億円を超えるバブル状況。



Roundtable Discussion: Part 1

Promising New Environmental Technologies

注目される環境関連新技術

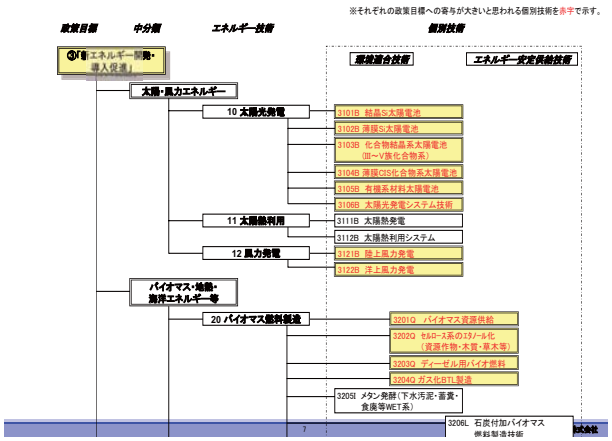


出典:NEDO資料

Technology Map of New Energy

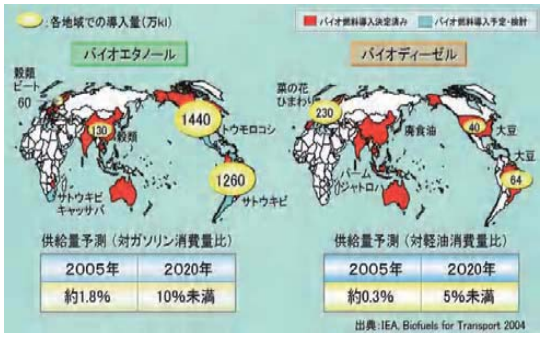
新エネルギー関連の技術マップ

出典:経済産業省資料



Diffusion of Bio-fuel

バイオ燃料の普及状況

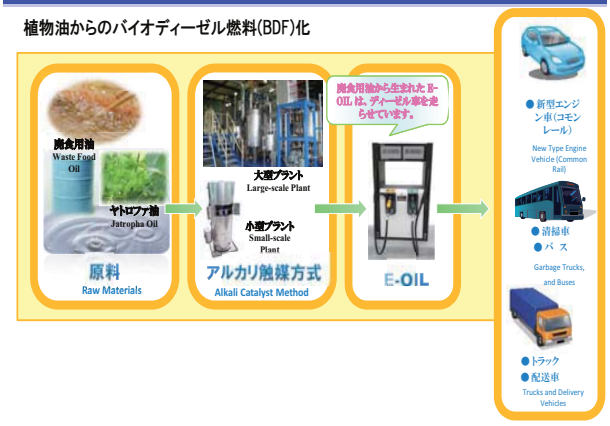


- 南米・北米は、バイオエタノール、欧州はバイオディーゼルが普及
- ガソリン消費量に比べると、普及率は低い。
- 食用植物を原料とするものは、食品価格に影響。

Examole of venture business of bio-fuel

バイオフュエル社が提供するBDF:製造と流通

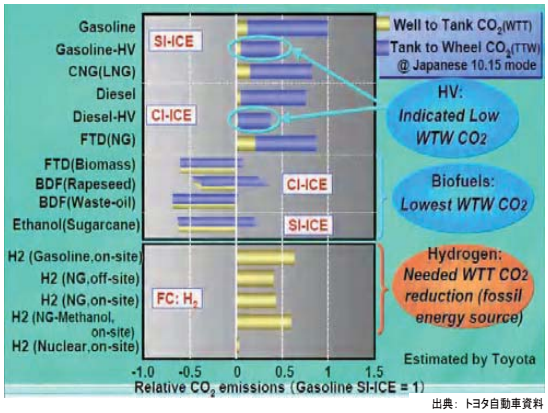
植物油からのバイオディーゼル燃料(BDF)化



バイオディーゼル燃料(BDF)の概要

- 植物油をメチルエステル化(エステル交換反応)し、ディーゼル機関用燃料としたもの
- 環境負荷の少ない軽油代替燃料
  - CO2削減効果が高い
  - 酸素を含む含酸素燃料
  - 硫黄分を殆ど含まない
  - 黒煙等の有害排気ガスの排出が少ない
- BDFの原料は、菜種、大豆、ヤトロファ、パーム、ユーカリ、微生物等から抽出された油
  - 日本では、コストの問題等で、主に廃食油を原料とした利活用が中心となっている。
- 日本では、2009年2月25日に品確法が改正。BDFを軽油に混合する基準・品質の確認を義務付け

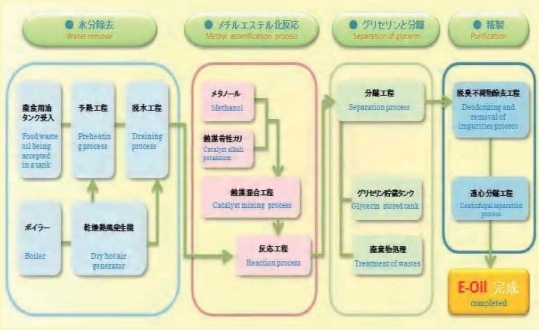
自動車燃料にみるCO2排出量比較(Well to Wheel)



出典: トヨタ自動車資料

Roundtable Discussion: Part 1

バイオフュエル社のコア・テクノロジー： 無水方式 の製造工程



- どのような廃食用油でも受け入れ可能。だから原料入手がスムーズ＆ローコスト。
- メチルエステル化反応後の水洗いなし。製造工程も環境に優しい。
- 製造工程の各段階で性状分析。徹底した品質管理を実現。
- 水分や不純物を徹底的に除去。安定して高品質の製造が可能。

バイオディーゼル岡山（農水省モデル事業第3号）

プラント内部

BDF給油所

廃油回収と生産能力

- 植物食用油の生産量　250万トン/年
- 廃食用油の排出量　90万トン
- 回収可能な廃食用油　40万トン
- 植物食用油で排出するダーク油　30万トン
- 家庭からの廃食用油　20万トン
- 未利用動物油　30万トン

計120万トン

原料

3000トン/年(8H稼働)
↓
1万トン/年(24H稼働)

× 40基 ＝ 40万トン/年

B100
800万トン/年
B5
20%
軽油
3500万トン/年

当社プラント40基のB5生産能力

日本の軽油消費量

VCからみた環境問題への提言

1. 日本国内に、さまざまな環境問題を解決する思いもよらない特許・技術が埋もれている。これを如何に見出し事業化するかが課題。新しい産業の創造（ベンチャー支援）など、サプライサイドへの政策的配慮が必要。（対行政）
2. ベンチャー企業が着目するテクノロジーは、大手企業がやらない分野。ニッチ、または、ブロックバスターの両極端。知的財産を国際的に確保し、技術による差別化により、ブルーオーシャン戦略を取るべき。（対企業）
3. 製品・サービスの価格決定に工夫が必要。サービスモデルへの変換が必要。環境ベンチャーについては、補助金、免税、タリフ（買取）、クレジット（排出権）など規制・制度の利用により、ビジネス化が可能に。（対企業、行政）
4. 環境ファンドは、バブル状況。CO2は、本当に削減されているのか？金融サイドでは、どの技術が本物が見抜けない。（対金融、対市民）
5. 破壊的、不連続なテクノロジーは、制度やビジネスモデルを超える。

Yuzo Minami
Adviser for Housing

Barrier and cross-sectional vision for low-carbon societies (LCS)

The current status and measures for eco-housing

He illustrated the problems of eco-housing in Japan whereby raising housing standards results in higher costs, and showed how to achieve high quality city planning by solving these problems

The main scope of this presentation is how to promote eco-housing using fundamental approaches. Eco-housing consists of three main elements; energy efficiency, prolonging the life of the house and promotion of the use of national timber resources. These three measures result not only in raising the level of housing standards, but also increase the costs, which have been covered by policies to provide subsidies in recent years, and the industry still has not fully caught up with this policy trend.

The average lifetime of houses in Japan is 30 years, compared to 55 years in the USA and 77 years in the UK. There are three reasons for this; 1) the houses themselves have no value, 2) houses are built under the authority of individual owners and 3) the housing industry tends to prefer building new houses to renovating old ones. The mechanism of these is as follows.

In Japan, the house and the land are valued separately and the house is considered a consumable item whose value is fully depreciated in 20 years. Thus, in the housing market, only the land is sold and the houses are generally demolished. Meanwhile in countries where they consider the house and land together, there is an incentive to increase the value of housing assets by constructing a good house and improving the surrounding environment. In Japan, people build houses just for themselves. If they built them as a social asset, the second hand market would be activated and the life of houses could be extended.

Concerning housing loans, in Japan houses are not considered to have value and the loan is made on the basis of the salary of each individual, which could turn into debt beyond the value of the house if the borrower’s economic activity ceases. Meanwhile, in the USA, the loans are a mortgage and nonrecourse financing is provided based on the value of the land and house alone. When the financial situation would be deteriorated, people could sell their houses to receive money to start something new. In an economic depression, such safety measures are necessary in order to promote the purchase of houses.

If there were a mechanism whereby a better house and environment could be sold at a better price in the future, raising the standard of housing would not lead to higher costs. It is wise for policies to focus on creating a secondhand housing market rather than to provide subsidies to promote more energy efficient houses.

Roundtable Discussion: Part 1

Takaaki Kaburagi
Secretary General, Hopeful Sustainable Society Project

Barrier and cross-sectional vision for low-carbon societies (LCS)

He introduced the example of pastures in forests, putting importance on a successful business whereby the value of natural assets is reflected in the price, and explained possible ways of changing human behavior through such businesses.

What should be done to change the quality of industry? Who is undertaking such activity? As an example, pastures in forests by Amita Holdings Co. Ltd. will be explained.

In Amita in Kyotango City, by using pastures in the forest, the milk that is produced from grazing cows (at 630 yen per 500 ml) is always sold out. This is not only because cows are cute and consumers sympathize with the willingness of the company to ensure forest preservation and create a sustainable society, but also because the price reflects these values. The point of achieving the transition to a low-carbon society is to develop such businesses one by one that are profitable due to an increase in the asset value of nature and human and social relations.

Businesses like this are not well known among the people. Innovative cases should receive more attention, but it is difficult to inform people of genuinely good things. People tend to believe only what they see. People also often only change their actions through experience. Thus it is important to actually create a sustainable community (e.g. the Nasu project), to attract people to come, see and then change themselves.

Roundtable Discussion: Part 1

森林酪農とは？？ ー アミタ京丹後での取り組み

Pastures in forests run by Amita Holdings Co. Ltd.

○1haあたり、0.5～2頭の放牧 →ふん尿の自然循環が可能

○牛の蹄で山を耕し、草地を形成する。（蹄耕法）

○365日、昼夜周年放牧

○輸入飼料に依存せず、森林の下草を活用する（舌草刈）

森林の下草刈り

真冬の牧場

0

Takaaki KABURAGI

森からの贈り物 Products of the project.

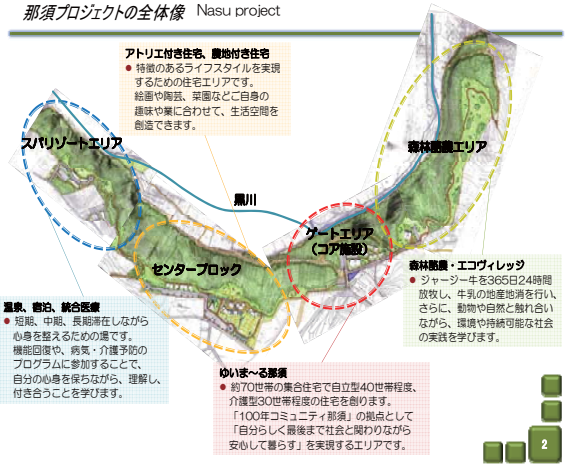
「森林ノ牛乳」
牛乳本来の味を活かすため
ノンホモジナイズ
低温殺菌牛乳

「森林ノアイス」
牛乳の風味豊かなアイス
（安定剤や乳化剤など不使用）

ソフトクリーム
牧場でしか食べられない
牛乳たっぷりのソフト

1

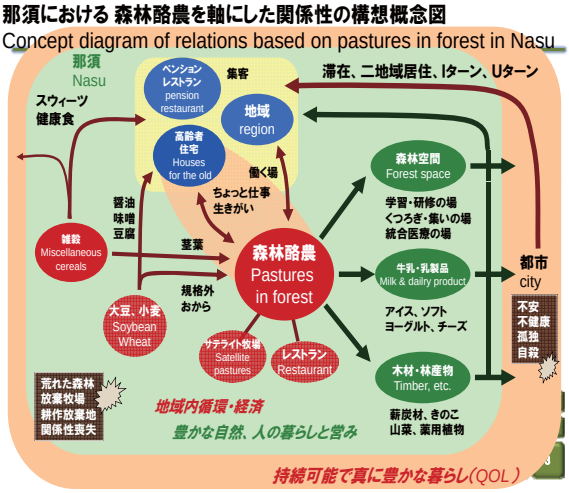
那須プロジェクトの全体像 Nasu project



2

那須における 森林酪農を軸にした関係性の構想概念図

Concept diagram of relations based on pastures in forest in Nasu



3

Roundtable Discussion: Part 1

Satoru Mizuguchi
Hakuhodo Inc. Corporate Communication Director

Barrier and cross-sectional vision for low-carbon societies (LCS)

His comments include (1)psychological barriers to deter Japanese to take actions towards low carbon economy, (2) roles of governments to secure basic human rights to make the transition easier (3) Japan's detachment from traditional low carbon life style after World War II may be another barrier.

Comment 1:
Four misunderstandings seem to constitute psychological barriers to deter Japanese to take actions towards low carbon economy.

The first barrier is the Japanese mind set characterized as "Economy OR Environment". As table 1 shows, some of European countries including Sweden, UK, Germany and Denmark have already been achieving the "Economy AND Environment" by decoupling GDP growth and CO_2 emissions. The differences may lie partly due to the fact that those decoupling countries have been pricing carbon by introducing carbon tax and/or cap & trade. On the other, many Japanese believe carbon tax and trading schemes are "regulatory policies" to limit free enterprise activities.

This constitutes the second misunderstanding. Pricing carbon has been regarded as an economic incentive policy to make up for market failures which caused climate change, as Stern review and OECD reports suggested.

Third misunderstanding is "household and office sectors are main contributors of CO2 emission growth after 1990". As table suggest, it is due to gradual growth of emissions from electricity generation because of the increasing use of coal, a halt down of a nuclear power, and stagnant growth of renewable energy.

Fourth misunderstanding is "Japanese environmental technologies are far advanced than others". It may be true in some areas, however, I have seen many renewable facilities made in Europe operating both in Asian countries and even in Japan.
European countries have been built eco-towns as showcases, where low carbon technologies are organized into one "system". And cabinet members take their roles of sales persons for exports. Government guarantees and World Bank loans are often used for exports. Japan may lack such an effort .

Comment 2:
Another obstacle to transition towards low carbon economy may
be inadequacy of social security in Japan. In Europe, unemployed people are able to receive job training while receiving unemployment benefits. And unlike Japan, they don't need to save much money because governments provide free education up to the level of higher education for their children and social security for the retired. In addition to that, property market secure values of aging houses as assets, people in need of money are able to sell it.

Since life, liberty and the pursuit of happiness are secured by the governments, Europeans seems to be unafraid of changing jobs, which may be good for labor transfer from high carbon industries to low carbon ones.

Comment 3:
Mr Kaburagi showed the example of high quality milk from “dairy farming from agro-forestry”. In Europe, those locally produced food with distinction are labeled specifically, to make available in the market with higher prices. Suitable labeling may help locally produced, traditionally produced, low carbon foods to survive.

Comment 4:
Japan’s detachment from traditional low carbon life style after World War II may be another obstacle. Ministry of Construction and Academy of Construction once had proclaimed “we don’t permit to build wooden architecture anymore” in the late 1940s. As a consequence, traditional skills to use sunshine indirectly at offices and houses were abandoned.

Comment 5:
Our next step may be to have dialogues how to overcome barriers by sector, and by theme. “Some countries in Asia, Africa and Latin America have followed development paths emulating Japan as a role model”(Timothy Tailor, Economics professor of Minnesota University), so now Japan has a new important role to show a way towards low carbon economy to such countries.

Roundtable Discussion: Part 1

低炭素経済への4つの「誤解」:その1 「経済か環境か」 → 「経済(GDP成長)も環境(CO2減)も」の国々と、そうでない国

水口

1st misunderstanding on low carbon economy: "Economy OR Environment"
⇒ Some countries achieving "Economy AND Environment"

	2007 1990年比の GDP成長	2007 1990年比の CO_2排出量	一定のGDPを創出する際に排出するCO_2の量 (CO_2/GDP)	一人当たり CO_2 排出量	京都 議定書の 目標	炭素税	排出量取引	主な自然 エネルギー 促進策
日本 Japan	26.2%	+8.2%	0.24kg	9.68トン	-6%	なし	試行段階	固定価格買取制(太陽光発電の一部)
EU15ヶ国 EU15	43.9%	-4.3%	データなし	10.34トン	-8%	なし	10年から第2ステージへ	EU 指令で20年までに自然エネルギー比率を 20 %に、(交通部門は10%に)
スウェーデン Sweden	47.8%	-9.1%	0.16kg	5.05トン	+4%	91年から導入	同上	グリーンエネルギー証書(小水力、太陽、風力、バイオマスなど)
デンマーク Denmark	44.5%	-3.3%	0.28kg	9.24トン	-21%	92年から導入	同上	固定価格買取制(風力、バイオマスなど)
ドイツ Germany	34.1%	-21.3%	0.39kg	9.71トン	-21%	環境税(Eco-tax)を99年から導入	同上	固定価格買取制(太陽、風力、バイオマスなど)
イギリス UK	53.4%	-17.3	0.3kg	8.6トン	-12.5%	気候変動税を01から導入	同上	固定価格買取制を10年から導入(小規模発電)
フランス France	38.2%	-5.3%	0.25kg	5.81トン	±0%	なし	同上	固定価格買取制(小水力、太陽、風力、バイオマスなど)

出典:IEA(国際エネルギー機関)資料などをもとに、スウェーデン大使館の協力で作成

低炭素経済への4つの「誤解」:その2 「炭素税、C&Tは規制的手法」 →市場メカニズムを生かす「経済的手法」

水口

2nd misunderstanding: Carbon tax and Cap & Trade are regulatory policies
⇒ They are economic incentive policy to make up for market failure

(1)Stern Review: Tackling climate change is the pro-growth strategy,,,,,Climate change is the greatest market failure the world has ever seen, and it interacts with other market imperfections. Three elements of policy are required for an effective global response. The first is the pricing of carbon, implemented through tax, trading or regulation.

(2)「OECD 環境パフォーマンス・レビュー 日本編」(2002年1月)

OECD Environmental Performance Review: Japan

①**日本のCO2排出量**は、G7諸国の減少傾向とは対照的に、1990 年代GDPと同じ割合で増加している。特に交通とエネルギーは、絶対値が増加している。

②ほとんどのエネルギー消費部門は、**効率改善**を達成しており、これ以上のCO2削減は難しい。
③**排出課徴金、排出量取引または環境税といった経済的手法**が、広く活用されていない。こうした手法は、90年代に見られた運輸、民生部門からの排出量の増加を、効果的に削減させうるものである。
④90年代を通じて、**道路建設などの特定用途**に、ほとんどの自動車燃料及び自動車に関する税が充てられた。対照的に、道路交通の環境への悪影響を緩和するためには、ごくわずかの税収しか充てられていない。

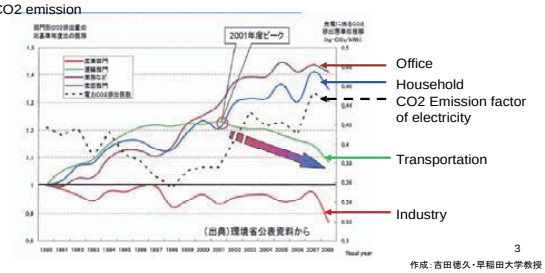
2

低炭素経済への4つの「誤解」:その3 「増えているのは家庭と業務」 →業務、家庭からの排出増と、電力CO_2排出係数の悪化は、比例

水口

3rd misunderstanding: Household and office sectors are emitting more CO2
⇒ The growth rate of emissions from household and office correlates to that of CO2 emission factor of electricity

CO2 emission



3

作成:吉田徳久・早稲田大学教授

低炭素経済への4つの「誤解」:その4「環境技術は日本が優れている」 →途上国で売っているのは欧州諸国

水口

4th misunderstanding: Japanese environmental technologies are far advanced than others.
⇒ European countries are selling them in developing countries.

1. ストックホルム内のエコタウンをシステムごと、中国・唐山市(天津の隣)に売るスウェーデン

スウェーデン貿易・商業省と中国・唐山市

Sweden selling the system of eco-town as a whole to China

4

Selling environmental technologies by integrating them as system and brand

2. 環境技術をシステムにして、ブランドにして売る

3. グループ・ブランドで世界に売る、閣僚が売る

Selling them by group-brand to the world, by Cabinet ministers

5

Dr Kimiko Kainuma
National Institute for Environmental Studies, Center for Global Environmental Research, Climate Change Research Program General Manager

How barriers to the formulation of a Low-Carbon Society (LCS) can be overcome?

Dr. Kimiko Kainuma who is an expert on climate change modeling and scenario analysis gave an outline of the "Japan Low-Carbon Society Scenarios toward 2050", a research project that was started in 2004. The project started from drawing a picture of a society with low GHG emissions and achieving high quality of life, analyzed barriers to realize such a society, and proposed options to overcome them..

The project was initiated with a long-term goal of reducing GHG emissions in Japan by 60-80% while global GHG emissions by 50% in 2050. When the project started, there were many opinions that the target was too severe to be achieved. However, the project promoted the movement to implement the significant reduction showing the feasibility of the reduction target and the specific measures to overcome barriers to prevent the achievement. There are two approaches to predict the future; the forecasting approach to analyze the trend expecting the future technological innovation and socioeconomic transformation and the back-casting approach to draft the roadmap from the vision in which the target has been achieved. This Japan 2050 project used the back-casting approach targeted to reduce Japan GHG emissions by 70% in 2050. The back-casting approach is effective considering the role of the government, industry and citizen and finding the pathway concerning the method and the timing the policy and activity should be implemented.

As the concrete vision, the project team visualized two socioeconomic scenarios (a vivid society and a slow society) estimating the type of lifestyle that we would have and how industries can carry out their business in the future with the aging of the society and declining fertility. From these viewpoints, the vision of a LCS was designed in such a way as to strike a balance between a comfortable and green built environment and energy-savings, while identifying the importance of three pillars to achieving this 1) the effective use of sunlight, 2) the development and dissemination of high-efficiency equipment, 3) information dissemination and recognition of the information supply system. In addition, the reduction for CO2 emissions by 40% based on CO2 2000 emissions levels by 2050 was described as the achievable target by reducing energy demand in each sector (industry, residential, commercial, transportation, energy supply), as an example, conducting the analysis of the reduction measures for transportation system under the regional specification (public transportation in the city, the policy

Roundtable Discussion: Part 2

for the use of individual vehicle in a countryside etc). Furthermore, for the rest part to achieve the goal of a 70% reduction based on CO2 1990 emissions levels by 2050, based on the discussion of how the energy system is converted to low-carbon in energy supplies level combining the energy mix of renewable energy, nuclear power, CCS-equipped fossil and biomass fuel-fired power plants, etc, it was estimated that the expansion of large scale energy technologies such as nuclear power plants, CCS and hydrogen was expected in the scenario of a vivid society while that of diffusive energy technologies in small scale such as solar and wind energy, biomass would be accepted in a slow society.

A dozen actions to be taken towards achieving a low-carbon society were proposed and the pathway to achieve the future vision in 2050 was described using the back-casting model under the 12 actions. The 12 actions are 1) development of a Comfortable and Green Built Environment, 2) By means of equipment rental and leasing, alleviate the initial cost burden of acquiring and installing high-efficiency equipment, 3) Promoting Seasonal Local Food, 4) Sustainable Building Materials, 5) Environmentally Enlightened Business and Industry, 6) Swift and Smooth Logistics, 7) Pedestrian-Friendly City Design, 8) Low-Carbon Electricity, 9) Local Renewable Resources for Local Demand, 10) the development of Next Generation Fuels and the infrastructure to deliver them, 11) Labeling to Encourage Smart and Rational Choices: Publicizing the energy use and CO2 cost of goods and services and public acknowledgement of consumers who use ones with low energy requirements, 12) Low-Carbon Society Leadership:

The cost-efficiency of financial investments was estimated to measure the timing and amount of the cost for the next 40 years in order to find cost-minimizing ways of achieving a LCS while the additional investment cost necessary for the conversion of conventional technologies into low-carbon technologies was discussed and calculated. The research findings show that the earlier the additional costs for reducing CO2 emissions are taken into account, the greater the resulting minimization of the total cost of investment in energy savings, the wider the diffusion of the technology and the more gradual the amortization of the equipment costs.

Lastly, Ms Kainuma mentioned that when the pathway for low-carbon life is considered using back-casting approach, the clearer target and the proposed actions are effective to overcome the various bottlenecks and to achieve the target. The 12 actions are ones which suggest when, where and how much direct countermeasures and policies, the action and choice and the initial supports are required. In order to implement the actions, the plan-making using the policy and system roadmap with long term vision is required concerning the order of the individual countermeasures and policy and estimating the time to implement it.

Visions and Actions towards a Low-Carbon Society

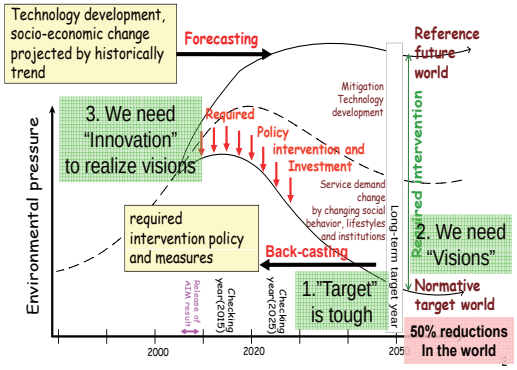
Mikiko Kainuma
National Institute for Environmental Studies

15 March 2010, Yokohama

1

Japan Low Carbon Society Scenarios toward 2050

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



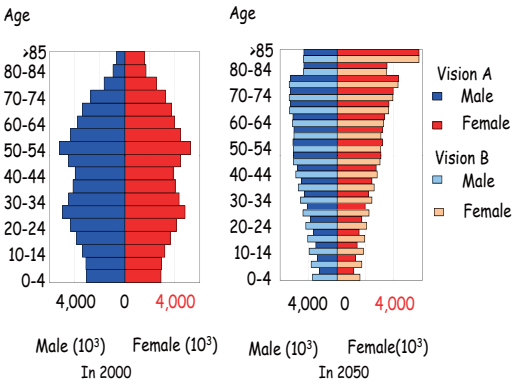
Visions

we prepared two different but likely future societies for Japan

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

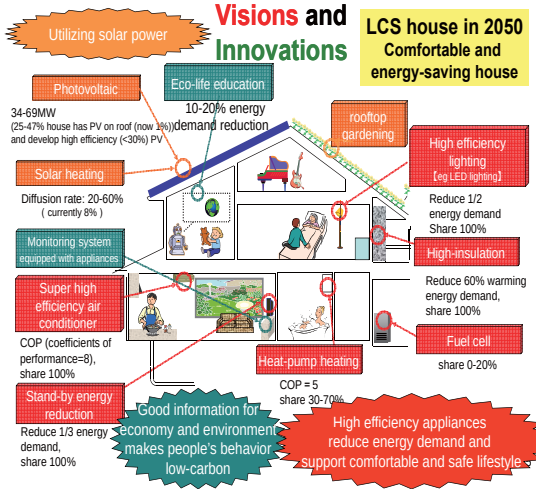
Japan: World Front Runner of Aged Society

What will Japan's population be in 2050?

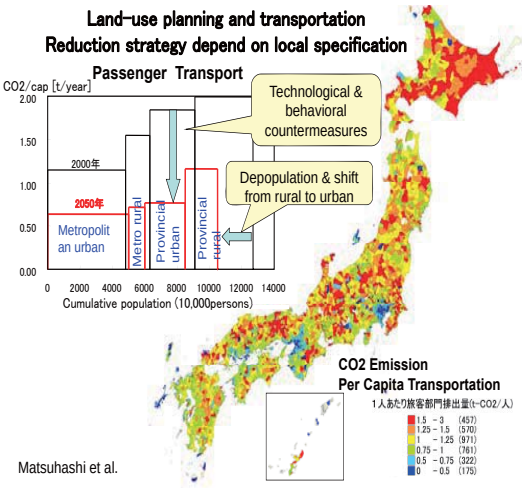


Visions and Innovations

LCS house in 2050
Comfortable and energy-saving house



Land-use planning and transportation Reduction strategy depend on local specification



Matsuhashi et al.

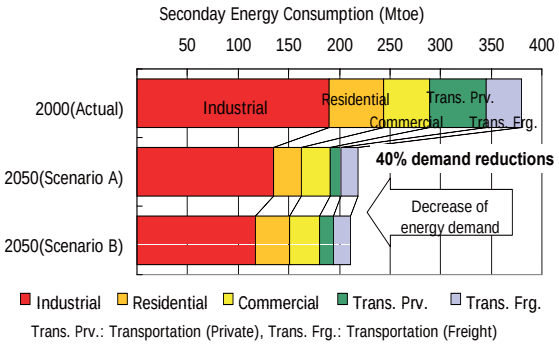
Roundtable Discussion: Part 2

Vision for 2050: Passenger transportation

	Metro Urban	Metro Suburb	Provincial Urban	Provincial Rural	Total
Compact neighborhood	△ Rehabilitation	○ Rehabilitation	△ Rehabilitation	○ Compact Settlement	112->33Mt To 1990
Compact city	△ City center renewal	△ Withdrawal	△ City center renewal	×	− 70%
Enhance public transit	△ Pricing	△ Park & Ride etc.	○ LRT	△ van pool, shared taxi	Including (Inter-city Passenger : 30km-)
Improve load efficiency	△ Utilize small vehicles		△ Enhance sharing	×	
Improve fuel consumption	◎ Urban mode	○ local mode			Index: ◎: − 30% ○: − 20% △: − 10% ×: no room
Low carbon energy	△ less room for improve	○ biofuel, Low Carbon Electricity for EV and PHEV etc.			
pop(million)	46→40	15→12	27→20	35→23	124→94
t-CO_2/capita	0.66→0.27	0.94→0.35	1.03→0.38	1.11→0.51	0.90→0.35

70% reduction by 2050

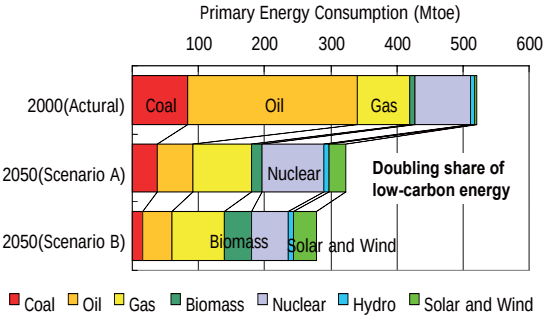
Matsuhashi et al.



Possible energy demands reductions for each sector:
Industry:structural change and introduction of saving energy tech. 30-40%
Passenger Transport :land use, saving energy, carbon-intensity change 80%
Freight Transport :efficient transportation system, energy efficient 50%
Residential: high-insulated and energy-saving houses 40-50%
Commercial: high-insulated building and energy saving devices 40%

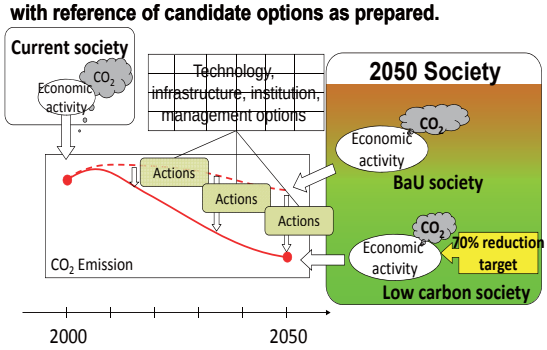
And we need low-carbon energy.

- Renewable energy
- Nuclear energy
- Fossil fuel + CCS



To achieve the 70% reduction goal by 2050, we investigated
- **which options should be selected,**
- **when options should be introduced,**
- **how much of each option should be introduced at each stage,**

with reference of candidate options as prepared.



A Dozen Actions towards Low-Carbon Societies

Press release on May 22, 2008

Residential/commercial sector actions

1. Comfortable and Green Built Environment
Efficiently use of sunlight and energy efficient built environment design. Intelligent buildings.

2. Anytime, Anywhere Appropriate Appliances
Use of Top-runner and Appropriate appliances. Initial cost reduction by rent and release system resulting in improved availability.

Industrial sector actions

3. Promoting Seasonal Local Food
Supply of seasonal and safe low-carbon local foods for local cuisine

4. Sustainable Building Materials Using local and renewable buildings materials and products.

5. Environmentally Enlightened Business and Industry Businesses aiming at creating and operating in low carbon market. Supplying low carbon and high value-added goods and services through energy efficient production systems.

Transportation sector actions

6. Swift and Smooth Logistics
Networking seamless logistics systems with supply chain management, using both transportation and ICT infrastructure

7. Pedestrian Friendly City Design
City design requiring short trips and pedestrian (and bicycle) friendly transport, augmented by efficient public transport

Energy supply sector actions

8. Low-Carbon Electricity Supplying low carbon electricity by large-scale renewables, nuclear power and CCS-equipped fossil (and biomass) fired plants

9. Local Renewable Resources for Local Demand
Enhancing local renewables use, such as solar, wind, biomass and others.

10. Next Generation Fuels Development of carbon free hydrogen- and/or biomass-based energy supply system with required infrastructure

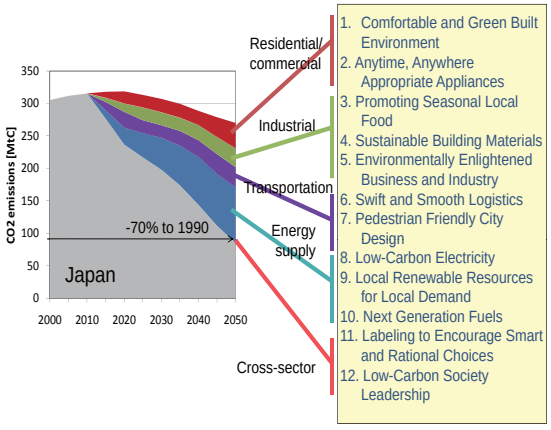
Cross-sector actions

11. Labeling to Encourage Smart and Rational Choices
Visualizing of energy use and CO2 costs information for smart choices of low carbon goods and service by consumers, and public acknowledgement of such consumers

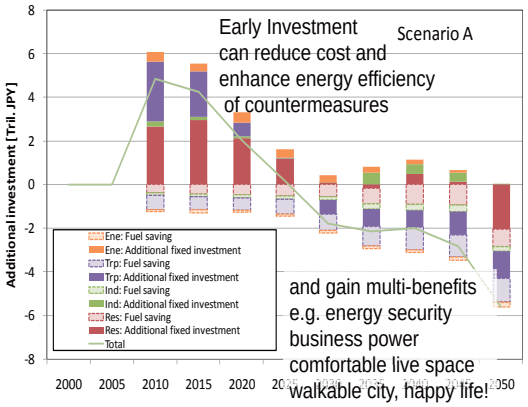
12. Low-Carbon Society Leadership Human resource development for building "Low-Carbon Society" and recognizing extraordinary contributions.

CO2 emission projections based on a dozen actions toward 70% reduction

AIM/LCS



How to reach the Japan LCS?

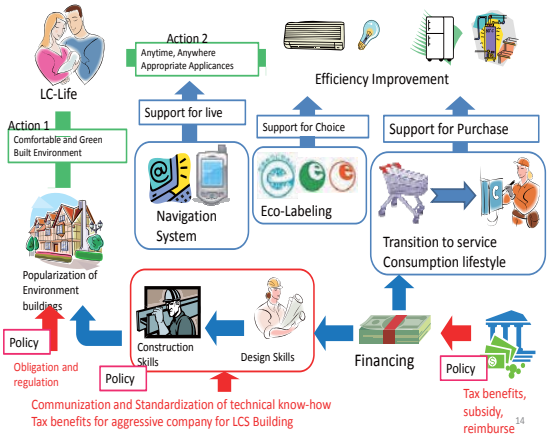


Early Investment can reduce cost and enhance energy efficiency of countermeasures

Scenario A

and gain multi-benefits
e.g. energy security
business power
comfortable live space
walkable city, happy life!

How to achieve Low-Carbon Life?



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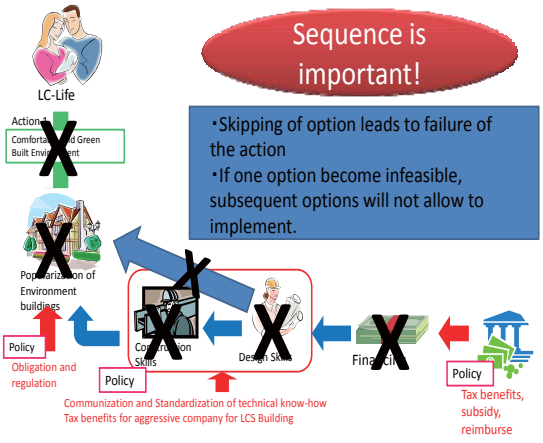
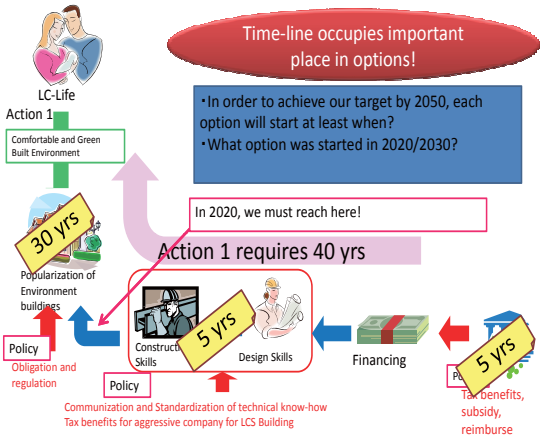
Sequence is important!



・Skipping of option leads to failure of the action
・If one option become infeasible, subsequent options will not allow to implement.

15

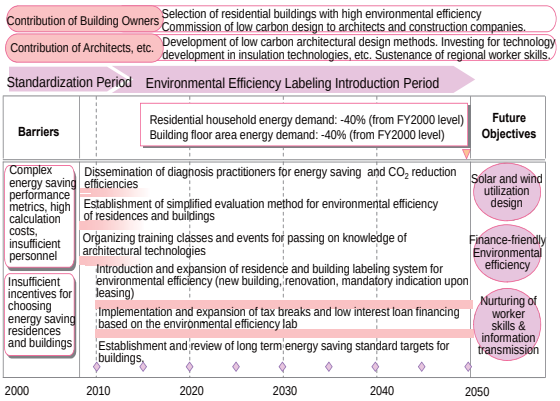
Time-line occupies important place in options!



・In order to achieve our target by 2050, each option will start at least when?
・What option was started in 2020/2030?

16

1. Comfortable and Green Built Environment



Low-Carbon Scenarios for Asian cities

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

18

Roundtable Discussion: Part 2

Takashi Otsuka
IGES Project Management Office, Project coordinator

How barriers to the formulation of a Low-Carbon Society (LCS) can be overcome?

As the lesson learnt from LCS researches and policy processes involved through IGES, Mr Otsuka introduced three issues; 1) the human resources required for a LCS, 2) the outcome of the First High Level Seminar on Environmentally Sustainable Cities and 3) Values and practices for Asian low carbon development

The human resources required for an LCS in the 21st century are those who can recognize the relationship and interactions between their own professional area and environmental protection, and who can internalize environmental conservation and its context in their daily life and work. A diagram of the relationship between the society, the economy and the environment is still discussed as a triple bottom line for sustainable development, whereby these three factors occur in parallel. However, I believe that it is important to recognize the comprehensive relationship of these three factors as social and economic activities are embedded within the comprehensive framework of the environment, where people conduct business activities.

Secondly, he talked about the "City and a low-carbon/low-pollution society session" in "the First High Level Seminar on Environmentally Sustainable Cities (ESC)", where the various case studies on leading environmental measures were introduced. The seminar was held under the framework of East Asia Summit (EAS) of Environment Ministers Meeting (EMM) with 16 East Asian participating countries. As an example, in Ahmedabad, India, the bus rapid transit (BRT) system is promoted as an alternative public transportation system in the city where has difficulty to build subway system.

In the seminar, the junior ministers and city mayors in each country participated to share and exchange information on what need to establish LCS and what the roles are of each stakeholder, local government, country, aid agencies and international organizations. The points written down in the chairman's summary was the importance of long-term city planning (long-term visions and goals) and of the formulation of roadmap to implement (short-, medium- and long-term achievement, policies and strategies). Furthermore, in order to guarantee the effective policy and strategies, the importance of the four pillars for ESC were also recognized; 1) governance, 2) knowledge management initiatives, 3) financing, and 4) community participation.

Mr Otsuka talked about a part of the researches, "the values and practices to anchor low-carbon development in Asia", in "Analysis on Foundation and Potential of Low Carbon Development in Diverse Asia" implemented as the Prioritised Strategic Research of the Global Environment Research Fund. The research is based on the statement that "in Asia, while the values and practices for sustainable livelihood and its preservation remain, it rapidly disappears because of economic development and globalization. Therefore, these should be analysed and documented in order to learn the lessons from tradition for low-carbon development". The international research team was established with the collaboration of Japan, Thailand, Indonesia and China and initiated the discussion regarding research framework and research methodology, as well as the scope of the values and practices which support low-carbon development. The past collaborative works led the team to focus on three key concepts, namely "coexistence

with nature (sustainable use of renewable resources),” “awareness of sufficiency,” and “coproduction, corporation, collaboration mechanism of community”.

For example, in the case of “the awareness of sufficiency”, mottainai concept in Japan, the sufficient economy in Thailand and Nyepi practice in Bali, Indonesia were introduced. As for the case of “coproduction, corporation, collaboration mechanism of community,” Gotong Reyong (mutual help) concept in Indonesia and its appearance in practice were introduced. There is a rice harvest method using traditional spike cutting hook called Aniani in Indonesia. By continually using such ineffective tool, it functions as a social safety-net in the community where all the member in the community can participate in the harvesting activities (creation of employment) and receive the harvested crops as the actual compensation. The next research topic is to consider how these value and practices affect to low-carbon development in rural and urban areas, and how it can be applied to. While in developing countries, how to draw the sufficient development pathway maintaining the social safety-net with mutual help remains the key challenge, Japan also need to consider slowing down the economic development and prioritizing the social safety-net.

Lastly, he talked about the necessity to comprehensively plan and coordinate the life with the awareness of coexistence with nature and the environmental capacity to overcome the bottleneck for LCS formulation. He shows the successful case study of planning and coordination implemented in Surabaya, Indonesia for organic garbage compost treatment technology through the collaboration of NGO, University, Japanese private company (J-power) and the neighborhood community association, the women association with finally obtained support from municipal government.

Roundtable Discussion: Part 2

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低炭素社会構築の障壁を どう乗り越えるか
How to overcome barriers to low carbon societies?

地球環境戦略研究機関（IGES）
プログラム・マネージメント・オフィス
大塚　隆志　Takashi OTSUKA
(otsuka@iges.or.jp)

Institute for Global Environmental Strategies

アウトライン

- 低炭素社会構築にむけて求められる人材
- 環境的に持続可能な都市に関するハイレベルセミナー（2010年3月2-3日、ジャカルタ）の結果
- アジアの低炭素発展を支える価値観と習慣
- まとめにかえて

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低炭素社会構築に向けて To build low carbon societies

- 求められる人材 Demands for human resource
  - 21世紀環境立国戦略（2007）
    Strategy for an Environmental Nation in the 21st
    - 環境保全に関する**基礎知識**(Basic Knowledge)をもち、環境に配慮した暮らしや環境保全のための**活動を実践**(Implementation of activities)できる（小・中・高等学校）
    - 環境**技術**、**政策**(technology and policy)等を学び行動する**企業人**(business man)や、幅広い関係者をつなげて持続可能な地域づくりを進める**コーディネーター**(coordinator)等、国内外で活躍できる環境リーダー（専門学校・大学・大学院）
  - 高橋・吉沢（2008）
    - 「あらゆる分野で、各人の専門分野と環境保全との**関係性を認識**(recognition of relations)し、職務等の追求の中で**環境保全の内在化**(internalization of environment preservation)に取り組むことのできる人材」を高等教育が目指す「環境人材」と定義

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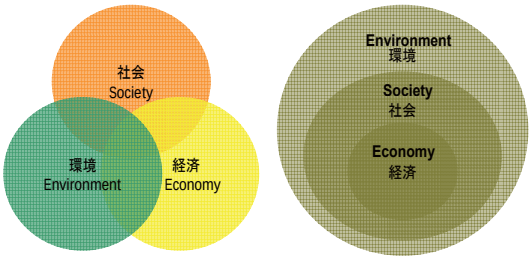
環境・社会・経済の関係は？
Relations between Environment, Society and Economy?



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東アジアサミット環境大臣会合の枠組みにおける
環境的に持続可能な都市に関するハイレベルセミナー
High Level Seminar on Environmentally Sustainable Cities
2010年3月2-3日、ジャカルタ、インドネシア
Jakarta, Indonesia

Institute for Global Environmental Strategies

環境的に持続可能な都市に関するハイレベルセミナー（1）

- 都市と資源効率性/3R
- 持続可能な都市開発を通じた気候変動への適応
- 都市と生物多様性
- **都市と低炭素/低公害社会**
- 資金調達及び能力開発
- 地域枠組み及び都市間ネットワーク

Roundtable Discussion: Part 2

Institute for Global Environmental Strategies

環境的に持続可能な都市に関するハイレベルセミナー(2)

- 東京(日本)
  - 公共交通(鉄道・バス)の充実、駅中心のベッドタウン開発
- アーメダバード(インド)
  - 公共交通(バス高速 輸送システム:BRT)、コベネ
- デグ(韓国)
  - 埋立地ガス利用(CDMプロジェクト)、コベネ
- リンアン(中国)
  - 環境保全モデル都市(計画・環境評価・汚染管理・法執行の強化等)
- オークランド(ニュージーランド)
  - 長期都市計画とマルチステークホルダー参加型アプローチ
- 北九州(日本)
  - 環境モデル都市(北九州グリーンフロンティアプラン)

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環境的に持続可能な都市に関するハイレベルセミナー(3)
High Level Seminar on Environmentally Sustainable Cities

- 長期的な都市計画が基礎となる
- 地方自治体は長期ビジョンとゴールを設定すべき
- ビジョンをロードマップに翻訳(短期・中期・長期目標、政策、戦略)
  - 統合的アプローチ
  - ギャップと障害の特定
  - 進捗把握のためのモニタリングと評価
  - **Long-term city planning is the basis for realizing ESC.** Local governments should set **long-term visions** and **goals** for ESC in respect to local history, tradition, culture, nature, geography, industry and other features. Visions should be translated into a **roadmap** consisting of basic principles, **short-, medium- and long-term targets**, **policies** and **strategies** using an **integrated approach** which links various sectors including energy, transport, urban planning, landscaping, housing, as well as water resources, solid waste and wastewater management, in addition to climate change **mitigation** and **adaptation**. Self-analysis could be conducted by local governments to determine the existing **gaps and barriers** to implementation, as well as necessary forms of support. **Monitoring and evaluation** with **measurable** indicators should be performed to verify progress made on ESC goals.

Institute for Global Environmental Strategies

環境的に持続可能な都市に関するハイレベルセミナー(4)

- **ガバナンス Governance**
  - 主要なステークホルダーの責任分担の明確化(特に中央政府と地方政府)
  - 政治的意思とリーダーシップ
  - すべてのステークホルダーの実効的参加(特に民間部門と地域共同体)
  - 分野横断的な統合
    - Effective **governance** provides a conducive and enabling environment through i) **clear definition of responsibilities** of key stakeholders, particularly the division of roles between national and local governments, ii) **political will and leadership,** which are identified as underlying success factors for many successful cases presented in the HLS; iii) **effective participation** of all stakeholders, including the private sector and local communities; and iv) **cross-sectoral integration** among the relevant sectors that contribute towards ESC;
- **知識管理イニシアティブ Knowledge management initiatives**
  - 知識と情報の共有
  - 伝統的知識・知恵の活用
  - 客観的かつ科学的分析とアプローチ
    - **knowledge management initiatives** to facilitate i) **knowledge and information sharing**; ii) making use of **traditional knowledge** and **wisdom**; and iii) **objective** and **scientific** analysis and approaches.

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環境的に持続可能な都市に関するハイレベルセミナー(5)

- **資金調達 Financing**
  - 現行課税政策の効果的運用と革新的資金調達メカニズムの導入(課金システム・誘因)
  - 投資環境の整備、民間投資の促進、民間部門の参入とPPP
  - 地方財政の強化(交付金等)
    - **Various modes of financing to** mobilize resources and funds from various sources, **starting from** i) effective enforcement of the current taxation policies and programmes; ii) encouraging the introduction of innovative financing mechanisms, such as **fee-and incentive-based models** in the provision of public services which would **ensure the sustainability of urban facilities and amenities**; iii) fostering a **favourable investment climate** by providing suitable regulatory frameworks and policies, and then involving the **private sector** in ESC initiatives through **public-private partnerships**; iv) **strengthening the local financial base** through the increased allocation of revenue from the central government, **matching** the expanded range of responsibilities devolved to the local governments; and v) **encouraging private sector investments** in the establishment of environmentally-friendly urban infrastructure and services towards a realizing a **green economy.**
- **コミュニティーの参加 Participation of communities**
  - 計画、意思決定プロセスへの参加(インフォーマルセクターの参加を含む)
  - オーナーシップの強化と意識向上のための環境教育機会の創出
    - **Meaningful participation of communities is an integral factor to promote the success of ESC efforts,** particularly by: i) involving communities, including the **informal sector**, in planning, decision-making processes, implementation and monitoring of ESC-related activities; ii) actively involving all levels of society **in community-based** initiatives to cultivate a **sense of ownership** that may ensure the longevity of ESC policies and projects; iii) providing extensive **environmental education opportunities** to various sectors to raise awareness for ESC policies and approaches and encourage active participation in relevant events and opportunities.

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地球環境研究総合推進費戦略研究課題6－2
アジア地域の多様性を踏まえた低炭素社会の可能性と
その評価手法に関する調査研究(発展基盤・メカニズム分析):

アジアの低炭素発展を支える価値観と習慣

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アジアの低炭素発展を支える価値観と習慣(1)

- アジアには、持続可能な暮らしとそれを維持するための社会的・文化的・共同体的背景(価値観と習慣)が依然として存在しているが、経済発展とグローバライゼーションによって、これらの一部は急速に失われつつある。
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- 日本・タイ・インドネシア・香港(中国)からなる国際研究チームを立ち上げ、低炭素発展を支える価値観に関する調査のスコーピング・調査方法に関する検討を開始

Roundtable Discussion: Part 2

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環境的に持続可能な都市に関するハイレベルセミナー(2)

- 東京(日本)
  - 公共交通(鉄道・バス)の充実、駅中心のベッドタウン開発
- アーメダバード(インド)
  - 公共交通(バス高速 輸送システム:BRT)、コベネ
- デグ(韓国)
  - 埋立地ガス利用(CDMプロジェクト)、コベネ
- リンアン(中国)
  - 環境保全モデル都市(計画・環境評価・汚染管理・法執行の強化等)
- オークランド(ニュージーランド)
  - 長期都市計画とマルチステークホルダー参加型アプローチ
- 北九州(日本)
  - 環境モデル都市(北九州グリーンフロンティアプラン)

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環境的に持続可能な都市に関するハイレベルセミナー(3)
High Level Seminar on Environmentally Sustainable Cities

- 長期的な都市計画が基礎となる
- 地方自治体は長期ビジョンとゴールを設定すべき
- ビジョンをロードマップに翻訳(短期・中期・長期目標、政策、戦略)
  - 統合的アプローチ
  - ギャップと障害の特定
  - 進捗把握のためのモニタリングと評価
  - **Long-term city planning is the basis for realizing ESC.** Local governments should set **long-term visions** and **goals** for ESC in respect to local history, tradition, culture, nature, geography, industry and other features. Visions should be translated into a **roadmap** consisting of basic principles, **short-, medium- and long-term targets**, **policies** and **strategies** using an **integrated approach** which links various sectors including energy, transport, urban planning, landscaping, housing, as well as water resources, solid waste and wastewater management, in addition to climate change **mitigation** and **adaptation**. Self-analysis could be conducted by local governments to determine the existing **gaps and barriers** to implementation, as well as necessary forms of support. **Monitoring and evaluation** with **measurable** indicators should be performed to verify progress made on ESC goals.

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アジアの低炭素発展を支える価値観と習慣(2)

- 自然との共生(再生可能資源の持続可能な利用)
  - 例:マングローブ植林と木炭生産 (トラット州プレドナイ村:タイ)、ゲイワイ(マングローブ林と潮の干満を利用した伝統的エビ養殖:中国南部沿岸地域等)、地産地消・旬産旬消(各国)など
- 「足るを知る」
  - 例: もったいない(日本)、Sufficient Economy (経済活動における中庸の勧め:タイ)、Nyepi(バリヒンドゥーの正月は火の使用を禁止、労働を禁止、外出を禁止、謹慎の勧め:インドネシア)
- 共同体における協働・協力・協調のメカニズム
  - 例:Gotong Royong (互助精神:インドネシア)、アニアニ(穂刈鎌:インドネシア)、Community Forest (入会林野:各国)

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アジアの低炭素発展を支える価値観と習慣(3)

- 事例に見られる価値観・習慣について、低炭素発展への**応用可能性**について引き続き検討(都市部及び農村部)。
- 互助精神に代表される**社会的セーフティーネット**を維持しつつ、経済的には中庸な発展パスを描くことができるか?
- 個人及び社会が中庸発展パスを**受容**できるのか?
- 「低炭素パラダイム価値観の受容」に関する意識調査の実施を予定。

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まとめにかえて

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低炭素社会構築の障壁をどう乗り越えるか
How to overcome barriers to low carbon societies?

1. 環境(低炭素)を感じるココロ
   Heart to feel environment (low carbon)
   - 自然との共生/環境容量を意識した暮らし
     Way of living within environmental capacity and coexistance with nature
2. 境界・業界を超える発想力・突破力
   Creativity and ability to go beyond boundaries
   - 統合的アプローチ Integrated approach
   - プランニング/コーディネーション Planning and coordination
3. 参加・協力・協働する行動力
   Participation and cooperation
   - 伝統的な共同体 Traditional community
   - 新しいタイプの共同体/ネットワーク New type of community /network

Roundtable Discussion: Part 2

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Discussion

1. Who are the actors in reducing GHG emissions?

During the discussion, it was pointed that the subject of "who are the actors" needed to be clear, as the subject of "who are the actors" is always omitted when people talking about issues of global warming. If the actors are not identified in the context of global warming, all the burden and responsibility for reducing GHG emissions comes down to private companies who are expected to make corporate efforts to fight global warming. Not only companies, the awareness of consumers also needs to be raised to reconsider their own lifestyles, preference, and the value. In Europe, retail stores are to be closed by half past six in the evening, and are off on Sunday. In Japan, people are taking for granted that stores open twenty-four hours a day seven days a week, even on the New Year holidays. Why does this situation occur in Japan? This is only because suppliers respond to the consumers' demand. If consumers take actions against global warming, reconsider their lifestyles, and change their habits and mind-set, energy-saving can be promoted. By raising the awareness of individuals, communities/societies can set regulations and agreements to tackle the issues. The reduction target for CO_2 emissions cannot be achieved through company efforts alone. Individuals, as one of the primary stakeholders, need to think about what they can do to contribute to the CO_2 reduction target and take actions. It is also necessary for individuals to think what they can do as members of their local community and the society with wider context to move towards a low carbon society.

2. Are subsidies needed to achieve a LCS?

The discussion moved onto the financing aspects of implementing a LCS. The efficiency and effectiveness of government subsidies was discussed focusing on their role in meeting the long-term target of reducing GHG emissions, taking up a topic discussed in an international meeting. The issue was considered of whether a tax system is more effective than subsidies for the long-term provision of funding and the sustainability of money flows. Speakers made various comments on the subsidy system and its economic effectiveness. From the business aspect, subsidies are beneficial in terms of their economic effect in the short term. For example, if a company needs to cut back some of its energy consumption, reforming the system as a whole is required by investing certain amount of money at a time. Subsidies are necessary to cover the cost for this. Taxes and tariffs concessions come after the subsidy scheme to help companies' running cost to produce environmental products to sell in the market on a wider scale. The reason why Japan used be one of the top photovoltaic suppliers in the world is because subsidies made them to foster R&D in short period and, at the same time, enabled them to do mass-production to supply their products in reasonable price. The case of hydroelectric generation in Sweden was also substantiated, which has also established a top position in the world for its wind power generation industry through long-term subsidies and financial support from the government.

3. City planning to promote the value of houses

The life of Japanese houses can be sustained for 50-60 years if they are well maintained. However, houses are usually demolished after 20 or 30 years and then replaced by a newly constructed house built for sale. Based on this fact, the value and traditional view of a Japanese house was discussed by comparing it with the western values and culture regarding houses. In Europe, city regulations have an important role in preserving and maintaining the exterior of a building as a part of the cityscape and for the protection of old buildings. Therefore, a house as a part of a city is recognized as a property asset in Europe. While in Japan, the house and the land are evaluated separately, and the value of the house drops to almost zero yen over 20 years. This is the background behind why Japanese do not spend money to reform their houses to add value. To raise the value of a house, the recognition of houses as a part of the townscape is required and adopted under city planning policies with a form of e.g. community agreements. As other example of

Discussion

the relationship between houses and the city, in America, in order to increase property values, land use zoning systems were introduced in certain areas which prompted the redevelopment of these areas with the result that house values increased, not just the land value. As the result, the increase in property values led to the residents making greater efforts to maintain the scenery and the environment of the zoning community with the expectation of further increases in the value of the area and a rise in the property value of the house. Japan also needs to have town planning strategies that maintain the environment of the communal society to increase the value of houses as a part of town development.

The case of Kawasaki City is one of the success stories. It was pointed out that key element in city environmental development was where the value of the area was reconsidered and planned with an area development strategy to increase the value of the city, while making the best use of the budget for city development.

4. Regulations and safety nets

The discussion developed to consider the issue of whether attempts to develop an area should be implemented on a regional scale. In Japan, town development activities have not been generated on a regional scale with horizontal connections. There are barriers to establishing horizontal connections among different stakeholders in order to develop regional activities. Although the private sector wants to create tie-ups with local communities and undertake corporative activities, they have to deal with the company regulations if the company is a subsidiary of a parent company with constraints imposed by the parent company and go through the process of obtaining permission. Furthermore, even if the subsidiary company obtains permission from the parent company, the next barrier is that a permit application to the town hall is required. However, as a new movement, the power to enforce horizontal connections has gradually increased through the establishment of venture companies that are carved out of the parent company through goodwill. In addition, a new policy has been formulated to back up this movement. As another issue, the social safety net required to support the initiation of new technologies and businesses does not exist in current policies. The absence of support systems to minimize risks for attempts of local businesses at e.g. developing solar power and methane recovery businesses do not encourage new entrepreneurs to go into new business. A system with policies and investors, to support such new businesses, is necessary for technology innovation and green development in Japan.

Other discussion points

The government can cover the whole area with a horizontal system while private companies have to list up the areas they cover and prioritize the ones for which to make an action plan, considering the company policy and strategy.

In order to introduce and export existing Japanese technologies overseas, especially to developing countries, Japan needs to make more effort to understand the demand of the target country and make a strategic business plan in cooperation with the government and private sector.

Through the discussion with different stakeholders, the ways to overcome barriers can be sought.

Lastly, Dr. Shuzo Nishioka concluded that in order to achieve a LCS, huge social reforms are required in the system of taking risks to make new investment and technological innovation possible and to develop new businesses. These innovations can be achieved through liaison between industries and the government in the form of horizontal connections. The discussions in this meeting were summarized into six messages.