

Exercising Leadership with Truly Effective Policies

**- Proposals for Environment Energy Policies including an International Framework
for a Post-Kyoto Protocol -**

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1. Introduction

Following on from the “13th Conference of Parties (COP-13) to the United Nations Framework Convention on Climate Change” held in December 2007, the G8 Summit will be held at the Lake Toya-ko resort in Hokkaido in July 2008. The coming one or two years will be a key period for determining the direction of an international framework for the post-Kyoto Protocol. The Kyoto Protocol was the first step towards solving global warming issues that required global and long-term initiatives. Its positive framework is to be praised, but limitations have emerged. The joint work by public and private sectors is essential to achieve the goal set in the Kyoto Protocol. In addition, it will be necessary to fix the direction for truly effective policies that will include reviewing and learning in order to develop a new framework for the post-Kyoto Protocol.

The COP13 has made substantial progress in terms of the agreement by all participating nations on the Bali Road Map for establishing a new framework. It is a welcome movement that the “sector-based approach,” which we agree with, has been well received. At COP13, however, conflicts were again identified; between advanced nations and developing nations, and among advanced nations. We will have to progress with discussions on specific items such as how to set goals, the detail design of the framework, role sharing between advanced nations and developing nations, and how to drive technical developments and support.

The Lake Toya-ko Summit will provide an opportunity for Japan to take the initiative in developing initiatives for reducing greenhouse gas emissions in every nation. Japan should not prematurely adopt a competitive stance regarding emission reductions and claims by developed nations, and should use its unique leadership in the consistent pursuit of truly global and effective policies.

In April 2007, we summarized a proposal, “Truly Global and Effective Framework -- Proposal for an International Framework for a Post-Kyoto Protocol”. In view of the above mentioned domestic and international circumstances, it will be necessary to further firm up and carry our proposal forward. The following chapters describe our proposals: the key points in developing a new framework, and directions regarding the environment and energy policies that Japan should take.

2. Basic Policies in Developing a Framework for Post-Kyoto Protocol

The Kyoto Protocol was the first step for solving the global warming issues that require global and long-term initiatives. It greatly contributed to achieving a global understanding and raising concerns related to global warming issues. Presently in Japan, the Kyoto Protocol is one of the forces driving joint activities by public and private sectors for reducing greenhouse gas emissions.

On the other hand, a lack of effectiveness has emerged in the Kyoto Protocol framework regarding global emissions reductions. The present framework covers only about 30% of the global CO₂ emissions because the US, which emits about one-fourth of the world total CO₂ emissions, is not participating, and big emitters¹ (such as China and India) have no obligation to reduce emissions. Even if all the nations obliged to reduce emissions achieve their goals, their average reduction rate will be about 5%. As a result, the total emission reduction will be only about 1.5% of the global emissions. Besides, countries that are not obliged to reduce emissions (other 70% of nations) will produce more emissions in future. Some provisional calculations including these factors show that CO₂ emissions may increase by 40% by 2010 compared to 1990², and CO₂ emissions may continue to increase with the annual rate of 1.7% until 2030³. We believe it is essential to incorporate effective measures in the future framework on the basis of above lessons to reduce global emissions.

When the Kyoto Protocol was reviewed, it was pointed out that the initial emission quotas were significantly inequitable⁴. Some nations such as Russia would have surplus emission quotas without paying any effort to reducing emissions. In addition, setting the year of 1990 as the reference year seems to have provided advantages for the UK and Germany: the UK promoted an energy source shift from coal to natural gas in the 90's and Germany was reunified in 1990. Provisional calculations based on "Intergovernmental Panel on Climate Change (IPCC)"⁵ show the marginal cost per carbon ton for achieving the goal of the Kyoto Protocol for each nation. These are -- Japan: 331 dollars, EU: 211 dollars, and US: 178 dollars. This data indicates that the initial emission quotas were inequitable. The above discussions show that imposing an upper limit (cap) for emissions on each nation (or firm) without discussion related to scientific or economic topics can generate major problems in terms equality. The rule that generated feelings of inequality is one of the reasons why the US withdrew their membership and Canada gave up aiming to achieve their goal.

Japan should establish the following three basic policies to overcome the above issues which emerged from the Kyoto Protocol and to create a new framework that is truly global and effective.

(1) Agreement on Global Long-term Goals

For all nations to consistently address global warming issues, it is essential to achieve an agreement on the long-term goals - a global philosophy shared by all nations.

1) Necessity for a long-term goal (not medium-term goal) and how to establish indicators

One possible long-term goal is the Japanese Government proposal⁶ “Halve global emissions of greenhouse gases below the current level by 2050.” Setting 2050 as a target year should be appreciated. If the target year is set to 2020 or 2030, which is near 2013, the year for the start of the post-Kyoto framework, conflicts of interests will arise among nations, as with conflicts over the quotas. In this case, it is obvious that making agreement will be very difficult, without looking into the example of COP13. When the aging and replacement cycle of facilities (such as power plants, manufacturing facilities, houses, and office buildings) are considered, setting the medium-term goal may be limited. However, if the target year is set to 2050, it may be possible to set an aggressive goal, in anticipation of the availability of innovative technologies.

Japan reportedly gained a bad reputation at COP13 because it did not clearly express numerical targets for the years 2020 to 2030. However, truly effective solutions for global warming depend on the worldwide prevalence of energy-saving technologies and development of breakthrough technologies. Discussing across-the-board numerical obligation for each nation before fundamental technologies become available may simply increase national conflicts. Who knows whether another Kyoto Protocol, with drawbacks that caused the US to withdraw, will reoccur? We may be agreeable to the need for setting goals for 2020 and 2030. However, our thinking is that full participation is what matters most, and that the long-term goals should be agreed to with full participation. As mentioned later, the medium-term goal should consider each nation's circumstances, and should include diverse targets based on fundamental technologies.

Three optional indicators for predicting the future state of the planet, as of 2050, are (1) Total greenhouse gas emissions, (2) Atmospheric concentration of CO₂, and (3) World average temperature rise since the Industrial Revolution. Japan uses “(1) Total greenhouse gas emissions” in its proposal to halve emissions, which is based on 50% of the current absorption capacity of the earth. The EU uses “(3)” in its proposal and has always claimed to limit the temperature rise to within 2°C, but they have changed the scheme so as not to directly express numerical values, as the difficulties have emerged.

If we return to the starting line, we can refer to Article 2: Objective of “the United Nations Framework Convention on Climate Change (UNFCCC)”⁷ that includes “The ultimate objective ... is to achieve ... stabilization of greenhouse gas concentrations in the atmosphere ...”. In fact, the IPCC Fourth Assessment Report⁸ shows some emission stabilization scenarios, categorized by CO₂ concentration that ranges from 350 ppm to 790 ppm (**Table 1**). Although the report includes CO₂ emissions and the temperature rise data, the basic discussion focuses on CO₂ concentration complying with the objective of the Framework Convention. The advantage of evaluating CO₂ concentration is that it is objectively measurable.

Table SPM.6 Characteristics of post-TAR stabilization scenarios and resulting long-term equilibrium global average temperature and the sea level rise components from thermal expansion only. {Table 5.1} (a)

Category	CO ₂ concentration at stabilization (b) (2000=379ppm)	CO ₂ -equivalent concentration at stabilization including GHGs and aerosols (b) (2000=375ppm)	Peaking year for CO ₂ emissions (a, c)	Change in global CO ₂ emissions in 2050 (% of 2000 emissions) (a, c)	Global average temperature increase above pre-industrial at equilibrium, using "best estimate" climate sensitivity (d), (e)	Global average sea level rise above preindustrial at equilibrium from thermal expansion only (f)	Number of assessed scenarios
	ppm	ppm	year	%	°C	m	
I	350-400	445- 490	2000-2015	-85 ~ -50	2.0-2.4	0.4-1.4	6
II	400-440	490- 535	2000-2020	-60 ~ -30	2.4-2.8	0.5-1.7	18
III	440-485	535- 590	2010-2030	-30 ~ +5	2.8-3.2	0.6-1.9	21
IV	485-570	590- 710	2020-2060	+10 ~ +60	3.2-4.0	0.6-2.4	118
V	570-660	710- 855	2050-2080	+25 ~ +85	4.0-4.9	0.8-2.9	9
VI	660-790	855-1130	2060-2090	+90 ~ +140	4.9-6.1	1.0-3.7	5

Table 1 CO₂ concentration stabilization scenarios by IPCC (Fourth Assessment Report)

2) Calm discussions and enlightening the true meaning of the objective

Many governments are offering a number of numerical goals as new framework discussions move into high gear. It is a matter of concern that it seems to be that nations are competing concerning their claims regarding their own emissions reductions. We must avoid a situation where nations, which claim emissions reductions higher than other nations before the meaning of numerical goals are well explained, take the lead in framework negotiation.

As an example, the true meaning of "Halve global emissions of greenhouse gases below the current level by 2050" is studied as follows. **Figure 1** shows the result of provisional calculations by Research Institute of Innovative Technology for the Earth (RITE)⁹. The figure shows the reduction ratios required to attain a 50% reduction, for advanced nations (Parties included in Annex I, Kyoto Protocol) and developing nations (Parties not included in Annex I). An extreme case is given: even if advanced nations could achieve zero emissions, reductions by developing nations must make up 60% of the resultant emissions in 2050 to achieve the global 50% reduction. If the advanced nations can reduce emissions to only 80% of 2000 levels, reductions by developing nations must make up 70% of the resultant emissions in 2050.

Similar case studies follow. **Figure 2:** Analysis with the goal of CO₂ stabilization at 450 ppm. **Figure 3:** Analysis with the goal of CO₂ stabilization at 550 ppm. The RITE report cited includes reasonable scenarios as in **Figure 4**.

Although there may be a room for negotiations on emissions quotas for advanced nations and developing nations, the advanced nations' obligations, 80 to 100% reduction from 2000 for a global 50% reduction, sound like a scenario about a world that cannot be imagined given current lifestyles. Developing breakthrough technologies is essential to achieve such goals.

We are not claiming that a 50% reduction is not necessary; we believe that every necessary effort should be. Our concern is that Japan's message - that the global 50% reduction almost means 80 to 100% reductions by advanced nations - is not get across clearly. The understanding and consensus of everyone are an absolute precondition for setting critical goals that could impact on a future national vision.

Analysis based on CO₂ produced by energy consumption

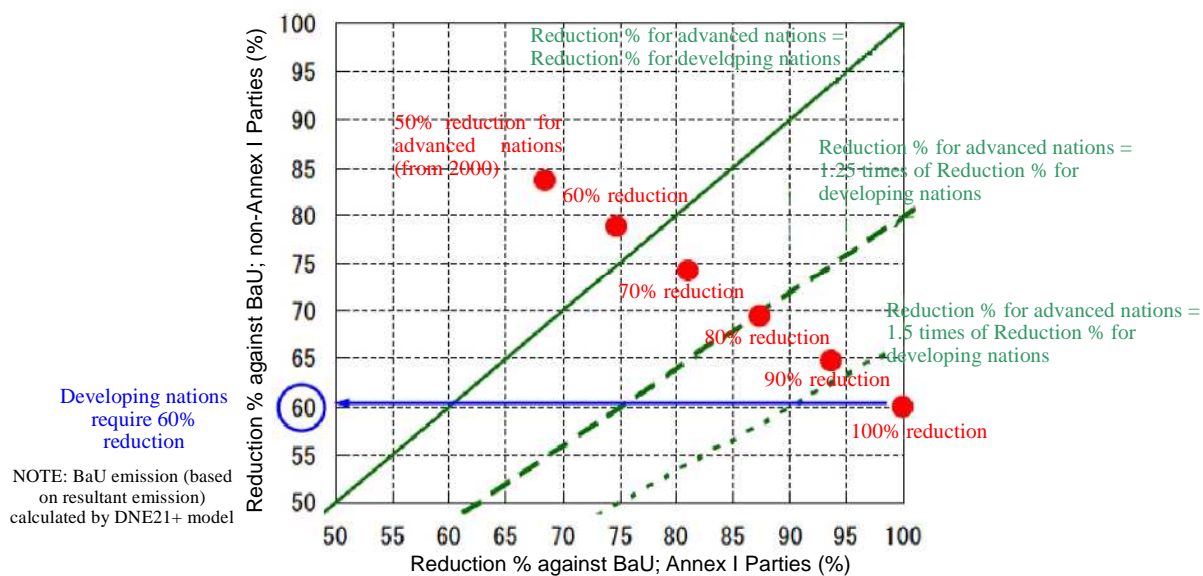


Figure 1 Reduction % required for 50% reduction by 2050 (RITE)

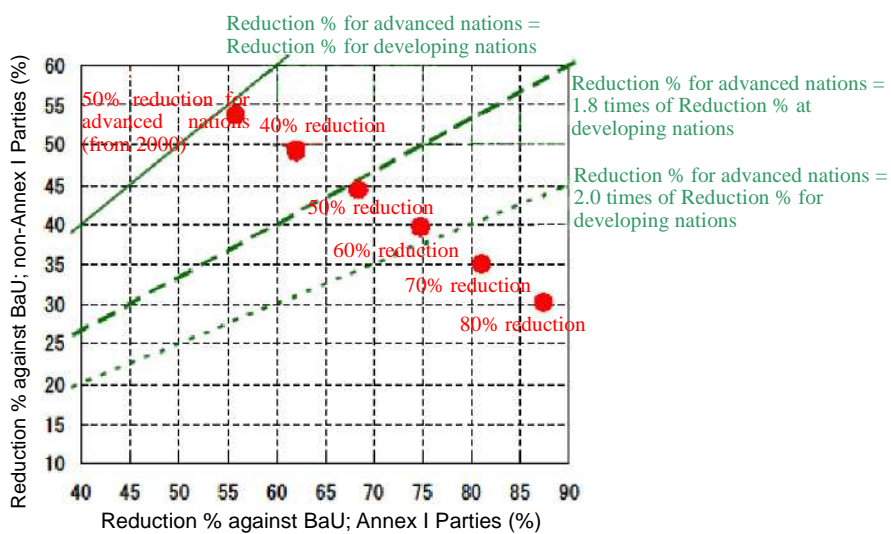


Figure 2 Reduction % required for CO₂ stabilization at 450 ppm (RITE)

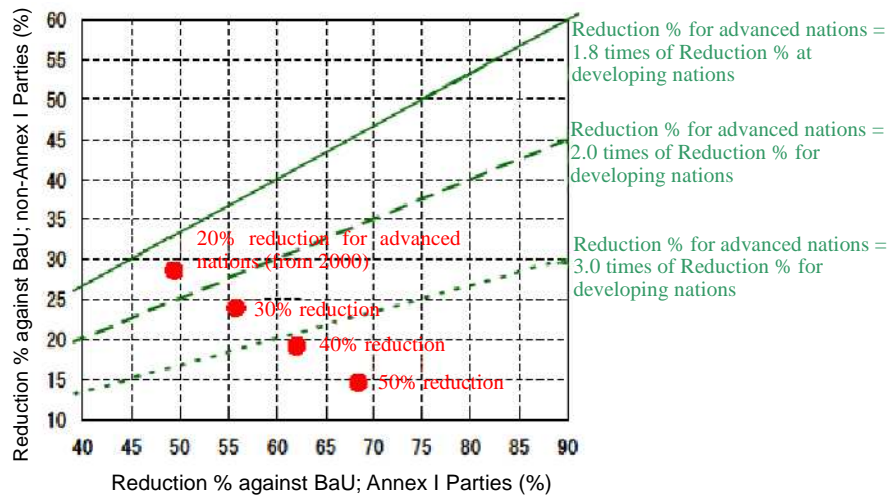


Figure 3 Reduction % required for CO₂ stabilization at 550 a (RITE)

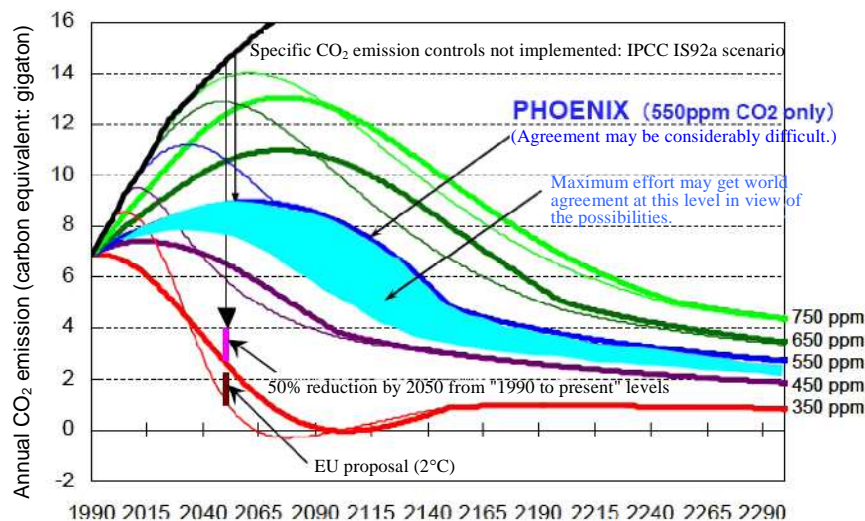


Figure 4 Scenarios seem to be reasonable (RITE)

Unfortunately, we cannot comment on the desirable long-term numerical goals at present. The reason is that we think the goals should be set after calm discussions are held with reference to scientific and economic issues. The progress of discussions, made by specialists from academic and industrial communities of each nation, should be followed.

The important thing is to create an environment that allows calm discussions on a globally desirable condition. Is it not possible to create a foundation that allows nations to respect the results of discussions irrespective of their own self-interests? For example, it may be possible to ask the IPCC to expand their role, and to ask them for some advice on setting consistent and long-term global goals for 2050, and permitting them to exceed the current level of “review and assessment of the most recent scientific, technical, and socioeconomic information.”

We want to carefully follow up the discussions while emphasizing the importance of an agreement on long-term goals.

As for future negotiations, it is desirable for each nation to build a general consensus on the true meaning before going into the negotiations on establishing global agreements on medium-term goals for 2020 and 2030, as with the long-term goal.

Medium-term and long-term programs may require a reference year. This reference year should be the latest year, not year 1990 specified in the Kyoto Protocol. Considering a situation where many new nations will participate in the framework, setting a year nearly 20 years ago as a reference is unreasonable. It will be necessary to discuss how to reduce emissions from the current level, ensuring effectiveness and equality.

(2) Bottom-up Method and Periodic Review as Foundation of Framework

Our thoughts on the preconditions for the future framework are described here. First, to ensure the global effectiveness of emissions reductions, at least major emitters such as US, China, and India must be committed to reducing (or suppressing) emissions. Japan should study a framework in which the US, China, and India can participate in, and should propose it positively. Second, for setting a goal for emissions reductions (or suppression), it is essential to establish rules that facilitate participation by more nations, and to reflect past emissions reductions efforts into the program. For example, making a rule based on the following concepts is recommended: set greenhouse gas targets with the exhaust basic unit¹⁰ -- the target should be the feasible lowest values for each category of industry or product; allow diversity by establishing a declaration system for the time frame for achieving the target based on each nation's circumstances; ensure equality for nations; and establish a rule that enables true global emissions reductions.

The following principles are stated in the Cool Earth 50 proposed by Japanese Government. We support these three principles that focus on establishing an international framework to address global warming from 2013 onwards.

- 1) All major emitters must participate, thus moving beyond the Kyoto Protocol, leading to a global reduction of emissions.
- 2) The framework must be flexible and diverse, taking into consideration the circumstances of each country.
- 3) The framework must achieve compatibility between environmental protection and economic growth by utilizing energy conservation and other technologies.

It is proposed to center the “sector-based approach” in the framework to embody above three principles; the approach being promoted by the Asia-Pacific Partnership for Clean Development and Climate (APP).¹¹

Seven countries (Japan, US, Australia, Republic of Korea, China, India, and Canada) emit about 50% of world total emissions, are in the APP. The APP organizes eight sectors by category of industry or product (steel, cement, power generation and transmission, buildings and electric appliances, and others). They are working on emissions reductions by reviewing the reduction potential and setting targets based on the circumstances of each sector.

The advantages of the sector-based approach include: high feasibility of emission reduction measures based on the reality of each category of industry or product; setting equitable targets based on the reality of industrial activities; and elimination of the so-called carbon-leakage problem¹². India also participates in the APP, as well as the two current major emitters, US and China. Exploiting these advantages, Japan should adopt a stance of propagating this scheme throughout the world.

Figure 5 shows a schematic view of our proposal.

First, agreement needs to be reached regarding what is meant by a desirable earth in the long-term, stated in 2. (1); for example the atmospheric concentration of CO₂ in 2050, and through scientific and economic validation. A target date for getting an agreement is provisionally summer 2008. This was proposed at the Major Economies Meeting on Energy Security and Climate Change¹³ sponsored by US in September 2007.

Action plans and autonomous commitments should be made based on international agreement regarding each target for energy efficiency improvements within the same industry or product sector such as steel, power, and cement. Each nation aggregates the anticipated emissions reductions attained by each sector (bottom-up method), then makes a declaration.

A cycle of “Plan-Do-Check-Action”, which includes following periodic reviews by an international authority, is proposed. (1) Is the action plan reasonable for the nation? (2) What gap exists between the agreed-upon long-term goal and the global emissions reductions estimated from action plans? What additional measures are required? The progress by each nation shall be annually reported to the international authority and disclosed. The appropriate reviewing interval will be 3 to 5 years.

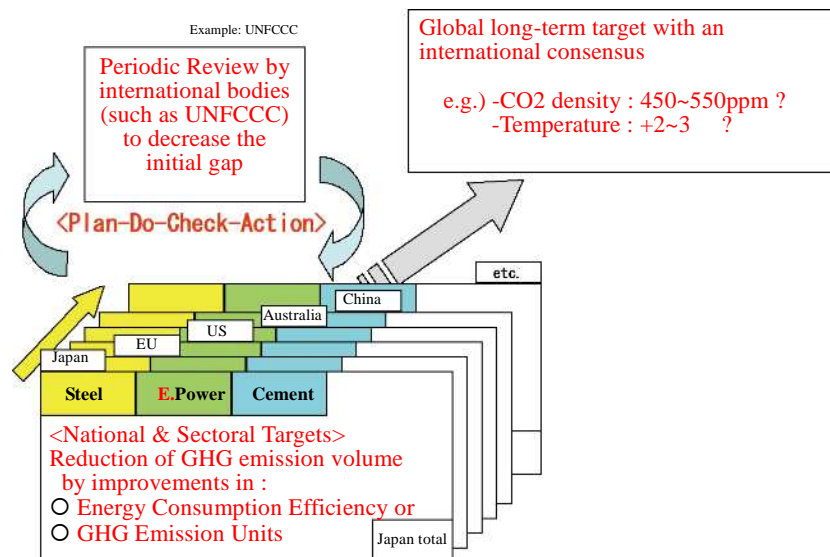


Figure 5 Proposed method for establishing new framework

We are aware of the following arguments against the concept of the sector-based approach and energy efficiency improvements. (i) Discussions on target indicators and calculation methods inside the industry group are not apparent to outsiders. (ii) Targeting efficiency improvements will not ensure gross emissions reductions. As for (i), to be solved by disclosure of indicators by the International Energy Agency (IEA),¹⁴ and also by supervision by third parties. As for (ii), can be solved by an international authority that discloses the gaps with long-term goals through the “Plan-Do-Check-Action” cycle and periodically reviews the appropriateness and equality of nations' activities.

It may be natural to make the secretariat of United Nations Framework Convention on Climate Change (UNFCCC) the major reviewing authority. At the same time, the re-positioning of an organization for implementing intensive reviews, and the reinforcement of teams of scientists along in cooperation with the IPCC and IEA, will be required.¹⁵

The transportation sector or the office & home sector may find difficulty holding global and lateral discussions by category of industry or product. In this case they can be dealt with as industrial sectors shown in **Figure 5**, based on international commitments made by nations in accordance with their individual circumstances. Moreover, depending national self-initiatives, it may be possible to add a reduction methodology as a separate factor. This could be a local rule for specific nations or communities.

We believe our proposal will provide a truly effective framework for emissions reductions, as well as providing the best way for the US, China, and India to participate, rather than to pursuing agreements on numerical targets without fundamental technologies.

However, even the above sector-based approach does not completely cover global emissions from the beginning. It will be necessary to expand the global coverage by enhancing international activities and adding new sectors in future.

(3) Supporting the Developing Nations through Technology Transfer, and Establishment of Breakthrough Technology Development Mechanism

One of the key factors for achieving quick-acting measures for globally effective emissions reductions is the spread of Japanese high efficiency equipment and technology transfer from Japan. Some provisional calculations¹⁶ show that if three major sectors (power generation, steel, and cement) in the seven APP nations improve their energy efficiency to a 95 to 120% level compared to the current Japanese level by 2020, 3.1 billion tons of CO₂ can be reduced in 2020 (Ref: 20% improvement by single EU in 2020 corresponds to reduction of 0.9 billion tons). In Japan, industries are further improving the efficiency of production and equipment including automobiles and appliances, on the basis of the results from the top runner program. Introducing such equipment and technology around the world will greatly contribute to global emissions reductions.

In addition, Japan has significantly contributed¹⁷ in the environmental field among developing nations including China, through the Official Development Assistance (ODA) related to the environment. The total value of the ODA is decreasing. However, it should be reexamined how to provide effective support in the environmental field including global warming countermeasures. Special reserves in the budget for

environmental items and cooperation with other countries or the World Bank should be also considered. Support will have to be limited to developing nations that will agree with the Japanese proposals and jointly participate in the sector-based approach. This is because of the need to effectively utilize limited financial resources and to prevent easy technical diffusion.

Moreover, it will be essential to develop innovative technologies -- so-called ‘breakthrough technologies’ but not the extension of conventional ones -- to achieve drastic emissions reductions in the long term. Examples are efficiency improvements in Coal Gasification Generation and the innovative zero-emission Coal Thermal Generation created by the combination of CO₂ capture and storage technologies. It is important that we steadily work on themes of technology development in the energy field incorporated in the New National Energy Strategy¹⁸ (planned in 2006) and Technology Strategy Map 2007¹⁹, including the “Cool Earth -- Innovative Energy Technology Program”²⁰ now being facilitated by Japanese Government. **Figure 6** shows the concept of energy technology strategy per New National Energy Strategy. **Figure 7** shows examples of technological themes on Technology Strategy Map 2007. We must also work with each nation in Europe and America to build international mechanisms for accelerating technology developments.

We must enhance discussions to build two mechanisms, technology transfer and technology development - fields where Japan, as a technology-oriented nation, can contribute to the world. Japan should then take initiatives to discuss international activities, especially in these fields, at the Lake Toya-ko Summit.

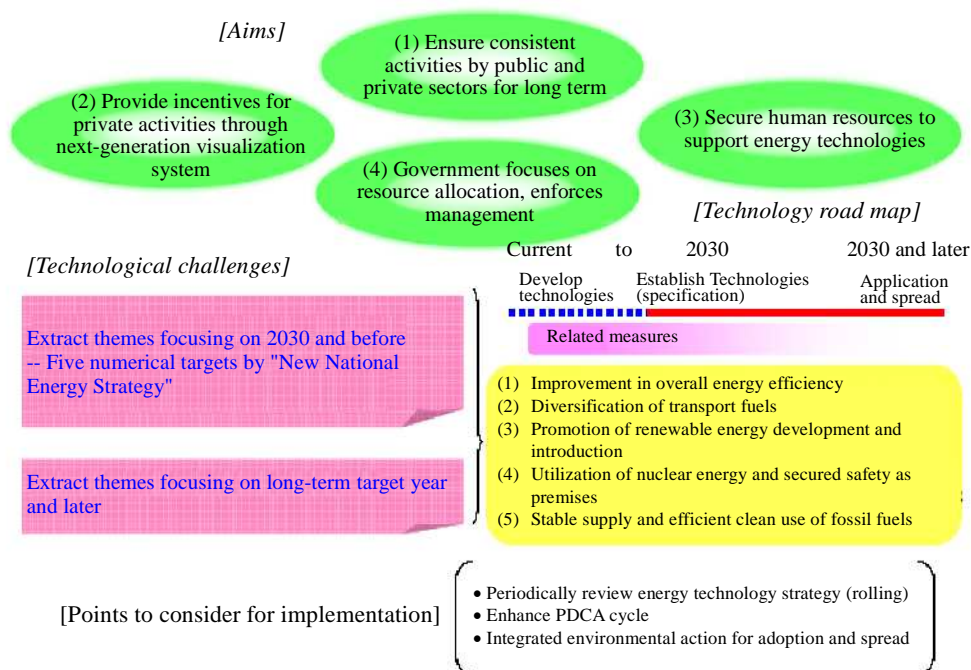


Figure 6 Concept of the energy technology strategy (source: New National Energy Strategy)

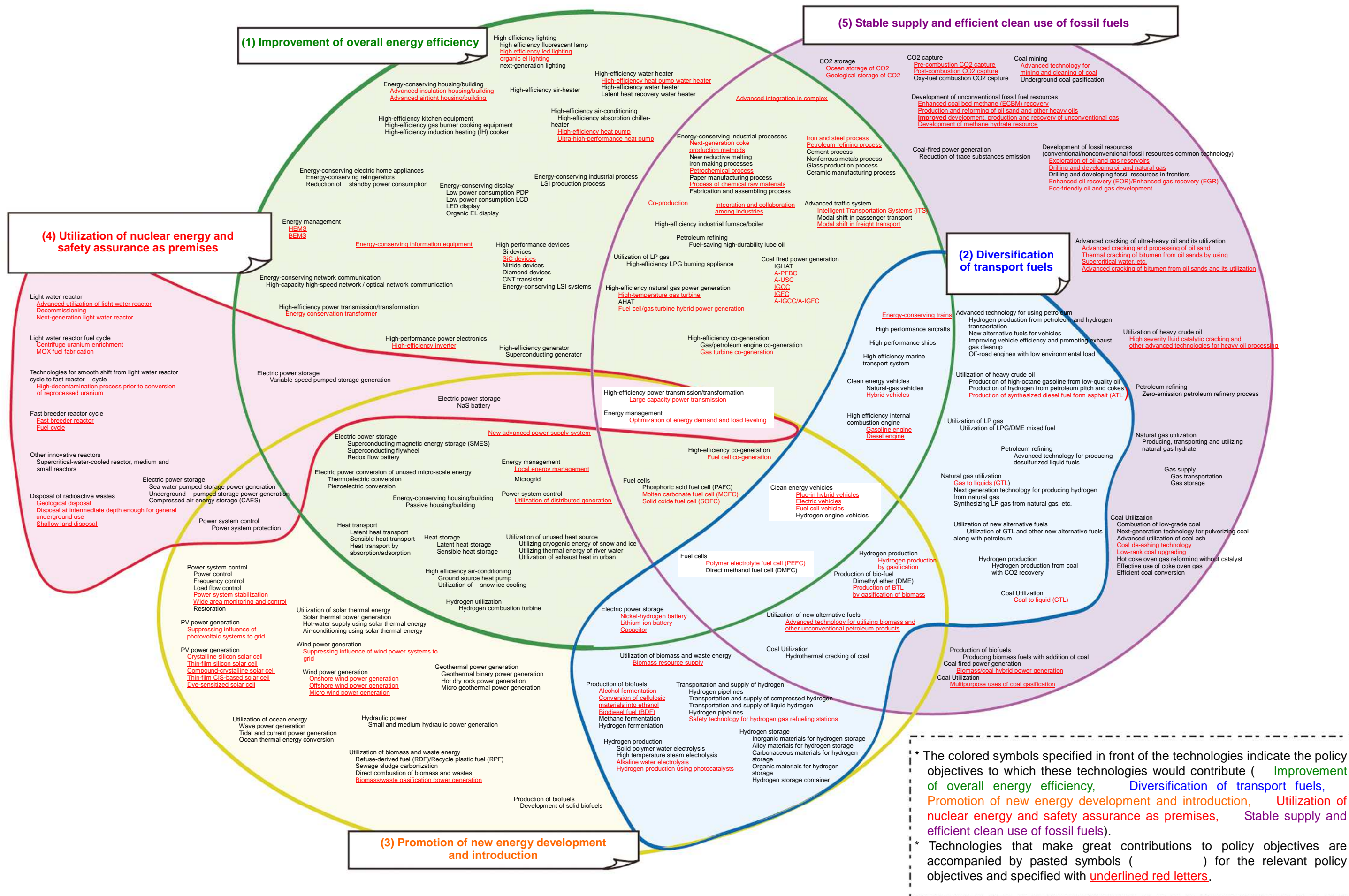


Figure 7 Technology Strategy Map 2007 (energy technology overhead view)

3. Critical Concerns regarding the Cap-and-trade System

This chapter describes our comments on the cap setting system, which is the basis of the Kyoto Protocol, and which is being cited by the EU as a new framework, and the accompanying emissions trading system (cap-and-trade system).

Figure 8 shows positive and negative views on the cap-and-trade system from a domestic standpoint. The source is the document for the joint meeting of the Industrial Structure Council (ISC) and the Central Environment Council (CEC). The evaluations for the system itself are simply what is described in the document. In addition, we must carefully deal with the movement to incorporate the system as a basis and increasing participating nations. We have strong concerns about the system for the following reasons:

- 1) Because the new framework will be effective over a long period after 2013, it is essential to ask China (one of the superpowers of our age) to undertake its obligation regarding emissions reductions (or suppression). However, the possibility of China accepting the system is low.
- 2) The results of the emissions reductions based on the system depends on how the caps are initially set. Severe caps aiming for higher results would certainly lead to steep rises in emissions prices, and could result in the inflow or the excessive movement of speculative money. However, there are no effective countermeasures so far. Some involved parties point out that the system could obviously check healthy economic growth. New factors that disturb the world economy should not be introduced.

It is most disturbing to note that there are many opinions: some say that Japan should not be left behind in such movements; or cap-and-trade itself leading to emissions reductions without showing how to set equitable caps. We cannot approve introducing the cap-and-trade system in the aggressive manner presently discussed. Japan may face the criticism that we are going to forget any meaningful Kyoto Protocol. Nonetheless, because of the situation that arose as a result of Kyoto (COP3), is it not necessary for Japan, as the presidency holder, to exercise its responsibility for improvements?

Comments on cap-and-trade system: from a domestic standpoint

(Extracted from interim report of joint meeting, ISC and CEC, held on 26 Sept, 2007)

[Positive views]

- ◆ The system helps to ensure the achievement of emission reduction target at minimum cost.
- ◆ The system encourages private initiatives by setting the carbon price.
- ◆ We should study the introduction of a system which will mean Japan is not left behind, while watching the introduction progress in Europe and the US. The system should be reviewed from the financial standpoint as a global carbon market is developed.
- ◆ The system has been introduced to encourage technology development and provide flexibility for economic activities.
- ◆ It is not appropriate to discuss the effect of emissions reductions because emissions reductions depend on cap setting, and EU-ETS is still a trial stage.

[Negative views]

- ◆ The system is a strong regulatory action that postulates an emission quota for each emitter.
- ◆ Equitable emission quotas are difficult, and the system may cause outward flows of industry (carbon leakage).
- ◆ When actual business actions are looked into, it seems that the emissions reductions cannot always be performed at minimum cost.
- ◆ EU-ETS does not always lead to substantial emission reductions.
- ◆ The system lacks effectiveness for business and household sectors where remarkable increases in emissions are occurring.
- ◆ The short-term target does not work to promote incentives for additional investment or long-term technology development by firms.
- ◆ If emissions quotas are based on past emissions results, firms that have not improved their emissions will remain as they are.

In any event, a comprehensive study of the subject is necessary. It should include comparisons with other methods and their validity, impacts on industrial activities and national economies, and embody our nation's medium-term strategies for dealing with global warming issues.

Figure 8 Positive and negative views on cap-and-trade system²¹

4. Discussions on Effective Policies Along with Establishment of Framework

The peculiarity of diplomatic negotiations related to climate change issues is that negotiation results have a comprehensive impact on the future situation of each nation, in comparison with general diplomatic negotiations concerning, for example, trade issues. In that respect, rather than stating it officially, nations using negotiating tactics, placing the highest priority on domestic interests, may be unavoidable. However, it is necessary to discuss truly effective policies from another angle at the same time, and not to limit discussions to power games regarding methodologies, so that we can focus on establishing a new and effective framework. It is important to remember ‘adaptation’ - international support for nations (such as island nations) damaged by global warming. Sometimes these issues are hidden behind the discussions about ‘mitigation’ of the global warming by setting reduction targets. In this respect, the attitude of the Japanese Government that expressed support for Tuvalu is well appreciated²².

In addition to establishing mechanisms for technology transfer and technology development as stated in Chapter 2, environmental energy policies that Japan should take, are proposed as follows.

(1) Seeking a Way to Being Involved with World Population Growth Issues

Besides the problem of global warming and the problems of water, food, and energy resources, there is also the underlying problem of our capacity to support the global population. Increases in population threaten the foundation of human existence, so controlling population increases must be addressed as an urgent matter.

Estimations by the United Nations²³ indicate that population will grow from 6 billion in 2000 (6.6 billion in 2007) to 9 billion in 2050, mainly in the developing nations (**Figure 9**). Even if the long-term goal, “to halve greenhouse gases 50% by 2050,” is agreed on, achieving this will be difficult given a population of 9 billion, about 1.5 times the present population, must be taken into account.

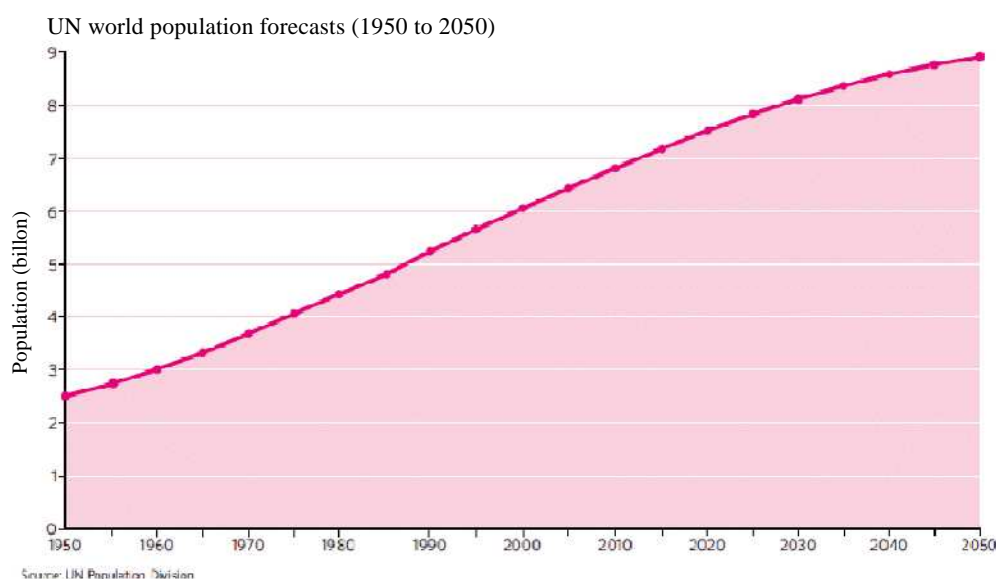


Figure 9 UN world population forecasts

Efforts aimed at the stabilization of the global population continue to be sponsored by the United Nations. A consensus among nations including developing nations was built for the first time at the International Population Conference (Mexico City) in 1984. The growth rate is being lowered owing to results of the International Conference on Population and Development (Cairo) in 1994 and the International Conference on Population and Development, Special Session of General Assembly in 1999 (New York). However, in view of the current growing issues of global warming and the water/food/energy shortages, it is necessary to enhance efforts to control the population growth.

Population control sponsored by the United Nations includes direct items (family planning, maternal care, upgrading population statistics) and indirect items (basic health care, elementary education, job training for women). Cooperation with population control, which seems marginal when viewed strictly from the point of view of global warming countermeasures, will be one effective measure in the long term. Population decrease problems for advanced nations, including Japan, should be dealt with separately. Developing nations may mistakenly believe that advanced nations are acting selfishly, so some effort will be required to avoid such misunderstandings.

The difference stance between advanced nations and developing nations regarding the so-called North-South issues, including the population problem, and conflicts between the advanced nations and developing nations over climate change issues, have some common features. It is difficult to establish a consensus on these subjects. However, a way to achieve some sort of link between population problems and climate change problems, should be studied.

There is an example of goals that have been agreed: delegates from 189 nations have agreed with the Millennium Development Goals (MDGs: **Figure 10**)²⁴ arranged by the United Nations. This includes eight goals to be achieved by 2015. The eight goals include plural themes which, when achieved, will lead to a better understanding of “a low birth rate and careful nursing,” and this will contribute to population control. Focusing on the MDGs, which many nations agreed with, and encouraging the efforts of these nations towards achieving the goals, would seem to be an effective measure.

MDGs and climate change issues will be important agendas at the 4th Tokyo International Conference on African Development (TICAD IV)²⁵ to be held in Yokohama in May this year. Japan’s ODA is decreasing, but we think that positive support for Africa will prove to be a climate change countermeasure through population growth control.

<p>1</p> <p>Eradicate extreme poverty and hunger</p> <p>Target 1 Between 1990 and 2015, halve the proportion of people whose income is less than one dollar a day.</p> <p>Target 2 Between 1990 and 2015, halve the proportion of people who suffer from hunger.</p>	<p>5</p> <p>Improve maternal health</p> <p>Target 6 Between 1990 and 2015, reduce the maternal mortality ratio by three quarters.</p>	<p>8</p> <p>Develop a global partnership for development.</p> <p>Target 12 Develop further an open trading and financial system that is rule-based, predictable and non-discriminatory. Includes a commitment to good governance, development and poverty reduction - nationally and internationally.</p>
<p>2</p> <p>Achieve universal primary education</p> <p>Target 3 Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.</p>	<p>6</p> <p>Combat HIV and AIDS, malaria and other diseases</p> <p>Target 7 Have halted by 2015 and begun to reverse the spread of HIV/AIDS.</p> <p>Target 8 Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.</p>	<p>Target 13 Address the special needs of the least developed nations. This includes: (1) tariff and quota free access for their exports; (2) enhanced program of debt relief for heavily indebted poor nations, and cancellation of official bilateral debt; and (3) more generous ODA for nations committed to poverty reduction.</p> <p>Target 14 Address the special needs of landlocked and small island developing nations (Barbados program and No. 22 UN General Assembly).</p>
<p>3</p> <p>Promote gender equality and empower women</p> <p>Target 4 Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015.</p>	<p>7</p> <p>Ensure environmental sustainability</p> <p>Target 9 Integrate the principles of sustainable development into national policies and programs; reverse loss of environmental resources.</p> <p>Target 10 By 2015, halve the proportion of people without sustainable access to safe drinking water and basic sanitation.</p>	<p>Target 15 Deal comprehensively with the debt problems of developing nations through national and international measures in order to make debt sustainable in the long term.</p> <p>Target 16 In cooperation with the developing nations, develop decent and productive work for youth.</p> <p>Target 17 In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing nations.</p>
<p>4</p> <p>Reduce child mortality</p> <p>Target 5 Between 1990 and 2015, reduce the under-five mortality rate by two-thirds.</p>	<p>Target 11 By 2020, to have achieved a significant improvement in the lives of at least 100 million slum-dwellers.</p>	<p>Target 18 In cooperation with the private sector, make available the benefits of new technologies, especially information and communications.</p>

Figure 10 UN Millennium Development Goals (MDGs)

(2) Continuing Consistent Policies on Nuclear Energy²⁶ and Renewable Energies

The global warming issue is inextricably linked to the energy supply-demand issue. In the long term, it is necessary to realize an energy supply-demand structure that best allows the global environment and economy to coexist. For that purpose, themes such as the increasing use of nuclear energy and renewable energy, and the advanced utilization of fossil fuels, should be addressed in parallel with discussions on the future framework. These activities, through the formation of an international cooperative system, will contribute to global CO₂ emission reductions, while contributing to the stable equilibrium between energy supply and demand in Japan.

In particular, as nuclear power generation -- including the nuclear fuel cycle -- contributes to energy security and environmental conservation, it must be steadily promoted. It is important to pursue a consistent nuclear energy policy in the light of the damage caused by and lessons learned from the Niigataken Chuetsu-oki earthquakes. Promoting the use of nuclear energy requires the positive understanding of the people. It is therefore essential for the government and businesses to recover the trust of the people. It must be done by guaranteeing safety and disclosing information, including taking measures to prevent the recurrence of the series of accidents that occurred. Moreover, it will be necessary to clarify the roles of the central government and local governments related to the nuclear energy policy. The maximum utilization of existing nuclear power plants premised on security and safety are also important.

If the demand for the construction of new domestic nuclear plants decreases, it may be necessary to study ways to improve the nuclear environment in the long-term. This is for maintaining nuclear skills through the active international deployment or maintenance of existing furnaces, and for building replacement furnaces smoothly. It is also necessary to discuss the significance of nuclear power generation bearing in mind the

trend toward international energy liberalization. To introduce the fast breeder reactor, a dream reactor, by around 2050, it is important for the government and private sectors to steadily develop the technologies playing their own roles. For that purpose, it is recommended to foster nuclear engineers at higher education institutions such as colleges or universities. With nuclear energy policy, placing the brunt of the burden solely on electric power suppliers must be avoided. It is necessary to create an environment in which the power suppliers are supported by the entire nation based on the awareness of every individual as to its importance.

The mass media have immense influence on public opinion and the social acceptability of nuclear energy. Therefore, we expected news agencies to: actively gather information about nuclear industry; report events concerning the nuclear energy accurately and appropriately; and to communicate the importance of the nuclear energy, which will support our nation's future, to society.

The policy for increasing the use of renewable energies, including photovoltaic power and wind power, is also important. In Japan, even now, the entire usage of renewable energies (electric power area) including hydraulic power is comparable to that of Europe or the US. Nations mainly in Europe are promoting the use of renewable energies setting ambitious targets, and Japan may be left far behind them in future.

Japan should not rely on only RPS law (special law to oblige electric power suppliers to use renewable energies)²⁷ to increase the use of renewable energies. It is advisable that we exploit the synergy generated by: autonomous activities by private businesses to introduce renewable energies; government policies to encourage general public efforts; and cost reduction by continuous technology development.

Furthermore, focusing on the advanced utilization of fossil fuels, including petroleum, will become important. This is because a forecast shows Japan will have to rely on petroleum for 40% of its energy supply, even in 2030, although oil dependence will decrease owing to past energy policies. Other effective ways to reduce CO₂ emissions are encouraging the development of advanced technologies for utilizing fossil fuels and the spreading of related facilities -- fossil fuels include unused or little-used petroleum-origin energies used in ways other than the conventional general applications.²⁸

Realizing a best-mix structure of energies by promoting the advanced utilization of every energy resource including nuclear energy is regarded as important in our country.

(3) Enhancing Energy and Environmental Education²⁹

When the focus is on longer term policies that cover several decades, and whilst they are low-profile, national education and awareness are important. A particularly important theme is energy and environmental education to Elementary school - High school students responsible for the next generation.

Although some environmental education based on pollution education is provided in Japan, education focused on "energy issues" has been inadequate, despite the experience of the oil shock. It has been noted that teaching children about the nuclear power generation is a delicate issue peculiar to Japan, but it is unavoidable in energy education. Again, energy issues are inextricably linked to environmental issues. It is essential to provide education about both subjects in a balanced manner, and to foster children capable of acting on their own judgement.

In the light of other examples of energy and environmental education in advanced nations in Europe and the US – including France, Germany, and the UK - we must acknowledge that they are far ahead of Japan in their education levels. **Table 2** shows topics and subjects in environmental education under the UK national curriculum.

There is much to do in establishing specific curriculum content, securing time in the curriculum, and training teachers. Government and educational experts focusing on these subject areas is eagerly anticipated.

Table 2 Topics and subjects in environmental education under the UK national curriculum

Topics	Subjects		
Climates	<ul style="list-style-type: none">* Influence of climate on plants* Influence of pollution on climates	Plants and animals	<ul style="list-style-type: none">* Concern for other creatures* Conservation of species at risk* Development of wild plant and animal populations* Destruction of natural media and self-seeded areas
Soils Rocks Minerals	<ul style="list-style-type: none">* Finite nature of resources* Management of resources* Soil erosion, fecundity, and conservation* Primary industry		
Water	<ul style="list-style-type: none">* Causes of water pollution* Water conservation* Water supply issues* Influence of human activity on aqueous environment	People and local communities	<ul style="list-style-type: none">* People and their similarities and differences on environmental uses* Population patterns and changes* Aspect of culture of environment* How have past societies influenced, or been influenced by, the environment?
Energies	<ul style="list-style-type: none">* Fossil fuels as limited resources* Energy conservation* Pollution by use of energy* Concern for other creatures		
Buildings Industrialization Wastes	<ul style="list-style-type: none">* Influence of industrialization on the environment* Why and how have building environments varied over time?* Plan and design* Waste and managing the use of waste* Appropriate technologies under various conditions* Influence of new technology on local communities		

(4) Encouraging Homes and Offices to Promote Effective Energy Conservation

In industrial sectors in Japan, the quantity of CO₂ emissions decreased, between 1990 to 2006, by 5.6%, in spite of increases in GDP. On the other hand, the amount of CO₂ emissions in offices and homes increased by 41.7% and 30.4% respectively (**Table 3**)³⁰. Given this situation, it seems important to continuously approach these sectors from systems and the technology aspects in order to reduce emissions of greenhouse gases in future.

For example, energy-saving laws are applied to large-scale newly constructed buildings. The buildings receive environment assessment according to Comprehensive Assessment System for Building Environmental Efficiency (CASBEE)³¹, and they adopt effective energy saving facilities. However, this is not ensured for existing buildings or small and medium-sized buildings. All businesses should make efforts to comply with energy-saving laws to promote the reduction of greenhouse gases reduction still further. For that purpose, exploiting the synergy created by laws and economic incentives - such as providing subsidies or tax breaks for the businesses that take appropriate measure – is vital.

Most important will be developing and spreading the high-efficiency energy-saving equipment in line with the Top Runner Program. It will be necessary to enhance related systems and subsidiary systems to support households in adopting high-efficiency energy-saving equipment, while asking manufacturers to develop technologies. Spreading energy-saving houses, heat pumps, and fuel cells also contributes to greenhouse











gases reduction. Therefore, tax breaks for promoting these spreads will be required.

Furthermore, the important thing with homes and offices is heightening everyone's consciousness of global warming issues. In that regard, enhancing energy and environmental education at schools as described in the foregoing section; using Environment Household Account Books; the visualization of CO₂ emission and energy consumption; and public relation activities through mass media, will all be effective.

In addition, the introduction of daylight-saving time is expected to motivate everyone to think and act taking the environment and energy conservation into consideration. Activities in which many of citizens can participate to do with energy conservation and global environmental protection also need to be implemented. Activities might include the proper control of air-conditioning temperatures, improvements in using electric appliances, and lifestyle improvements such as adhering to economic driving.

Table 3 Changes in sector-base CO₂ produced by energy consumption
and Targets for FY2010 (Ministry of the Environment)

Unit: million-tons of CO₂

	FY1990	% change	FY2006	Reduction % at goal	Rough target for FY2010
Industry (factories)	482	-5.6% 	455	-4.1% 	435
Transportation (automobiles, ships)	217	+17.0% 	254	-2.0% 	250
Office etc (office building)	164	+41.7% 	233	-41.3% 	165
Home	127	+30.4% 	166	-22.9% 	137
Energy conversion	68	+11.3% 	76	-9.6% 	69

5. Conclusion

Up to this point we have mentioned our proposals for the post-Kyoto Protocol framework focusing on a desirable global condition. Japan, in line with COP13, should make its intention clear domestically and internationally by continuing to adhere to the belief that "Japan thinks that challenging an aggressive goal in an effective way, getting participation of nations around the world including developing nations, is of utmost importance." We must at all costs avoid the dropping out of major emitters, something which could happen if discussions on medium-term numerical targets are made in a rough-and-ready manner rather than being based on scientific and economics studies.

However, it may be possible to face the sort of unfortunate situations where major emitters, including the US and China, drop out of the new framework, depending on the progress of further discussions. Some experts comment that the worst scenario should not be considered at present. However, preparations for every scenario will be necessary because these are extremely critical negotiations and ones that will have an impact on the future of Japan.

If, in spite of efforts by Japan and other nations, major emitters drop out in the process of discussions, we should not launch a framework without considering the objections. In that case, the nations of the world should again seek for a way to make an agreement through serious discussions. Japan should use its unique leadership persistently aiming to achieve the truly global and effective policies stated in this proposal.

As described above, movements by China and India, as well as US, hold the key to the coming negotiations. Having leaders from China and India participate in Lake Toya-ko Summit will be effective for creating a common view with both nations at an early date.

It will be necessary to build a national consensus on the disadvantages of participation in a new framework, wherever possible, before starting international negotiations concerning the way things should be. This is because the disadvantages will include economic burdens on people, patience that will be needed in people's daily lives (it could mean reducing the levels of convenience people are used to), difficulty in developing innovative technology, and the increased cost required for the development. We think the most regrettable point about the Kyoto Protocol is that above process was neglected. An important domestic theme is for us to have sufficient discussion on this matter over one or two years before COP15 in 2009. We must not repeat mistakes such as not having the sort of discussions that should have been held before ratification of the Kyoto Protocol.

We must establish an integrated national strategy on the basis of close coordination between the ministries and agencies for the coming international negotiations and domestic discussions. The efforts of the Japanese government in COP13 are noteworthy, and we hope that the government will exercise full leadership at Lake Toya-ko Summit, COP14, and COP15.

A range of comments on the issues in this report were made at the major meetings within the Keizai Doyukai. Major comments are listed in the last page of the footnote section.

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- ¹ The actual share of CO₂ emissions in 2004 were: the US 22.1%, China 18.1%, India 4.3%, and Japan 4.8% (calculated according to “Handbook of Energy & Economic Statistics in Japan 2007” by the Institute of Energy Economics, Japan).
 - ² Provisional calculations by the US Department of Energy.
 - ³ IEA, *World Energy Outlook 2006*: According to the reference scenario, the world energy-related CO₂ increases by 55% from 2004 to 2030 (annual rate: 1.7%). The increase is 39% (annual rate: 1.3%) according to an alternative policy scenario -- assumes policies and actions for CO₂ emission reduction are implemented.
 - ⁴ Mitsutsune Yamaguchi, *Environmental Management (Revised Edition), Measures to Global Environmental Issues*, 2006, was consulted.
 - ⁵ Intergovernmental Panel on Climate Change (IPCC), *Third Assessment Report* (2001).
 - ⁶ “Invitation to Cool Earth 50,” published on May 24, 2007.
 - ⁷ United Nations Framework Convention on Climate Change (UNFCCC): The treaty was signed by 155 nations at the Earth Summit held in Rio de Janeiro in 1992, and came into effect in 1994. The ultimate goal of UNFCCC is to achieve stabilization of concentrations of greenhouse gases in the atmosphere at a level that would prevent “dangerous anthropogenic interference” with climate system. The following requirements are included in the treaty: Under the principle of “common but differentiated,” parties included in Annex proactively work to reduce greenhouse gas emissions; the parties establish policies and take measures to correct the longer-term trend of anthropogenic emissions of greenhouse gases; and advanced nations (Annex I nations) provide financial supports and/or technology transfers on the climate change for developing nations.
 - ⁸ IPCC Fourth Assessment Report: Synthesis Report (SYR) was finalized at the IPCC general meeting in November, then published through the steps of: Working Group I (natural scientific aspects) in February 2007; Working Group II (consequences, vulnerability, and adapting); in April; and Working Group III (mitigation) in May.
 - ⁹ Research Institute of Innovative Technology for the Earth (RITE) System Analysis Group, *Goal of CO₂ Concentration Stabilization*, August 31, 2007.
 - ¹⁰ The basic unit is an indicator determined by emissions of greenhouse gases (including CO₂) divided by the production volume or primary energy consumption divided by the production volume. It represents the production efficiency. For example, “based on energy basic unit for steel products” for steels, “based on heat efficiency at new fired-power generation plants” for electric power, and “based on fuel economy and exhaust emissions” for automobiles.
 - ¹¹ Asia-Pacific Partnership for Clean Development and Climate (APP): A partnership of regional cooperation launched in July 2005, sponsored by the US. It was officially established at Ministerial Conference in January 2006. Participants are 7 nations (Japan, Australia, China, India, Republic of Korea, the US, and Canada); the major emitters in the Asia-Pacific region are included. APP intends to supplement the Framework Convention on Climate Change and Kyoto Protocol by addressing the issues of increasing energy demand, energy security, and climate change. Specifically it intends to promote regional cooperation for developing, spreading, and transferring the technologies that are effective and help the clean use of energies.
 - ¹² The carbon-leakage problem is a phenomena whereby countermeasures to reduce CO₂ emissions by certain nation or sectors affect other nations or sectors through the market. A typical example: The advanced nation's measures to reduce CO₂ emissions trigger production shifts to developing nations, increasing the CO₂ emissions in developing nations that are not obliged to reduce emissions.
 - ¹³ Major Economies Meeting on Energy Security and Climate Change held on September 27 and 28, 2007, sponsored by the US. Participants were Japan, the US, China, EU (presidency holder Portugal and EC), Russia, India, Germany, Canada, the UK, Italy, Republic of Korea, France, Mexico, Australia, South Africa, Indonesia, and Brazil. Attendants from our country were: Foreign Minister, Takamura (Sept 27 only); Special Advisor to the Cabinet, Nishimura (top-level personal representative); Ministry of Foreign Affairs, Global Issues Councilor, Tsuruoka; Ministry of Economy, Trade, and Industry, Councilor, Ito; Ministry of the Environment, Councilor, Yatsu; and the members from “Ministry of Foreign Affairs”, “Ministry of Finance”, “Ministry of Agriculture, Forestry and Fisheries”, “Ministry of Economy, Trade and Industry”, “Ministry of Land, Infrastructure and Transport,” and “Ministry of the Environment.”

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- ¹⁴ At G8 Gleneagles Summit held in July 2005, G8 requested the IEA to establish energy efficiency indicators, identify the best practice, and create an alternative policy scenario, as part of the action plans on climate change. The study results will be reported at Summit in Japan in 2008. The study results by IEA are expected to initiate activities to improve energy efficiency at each sector, having a great significance in discussing the next framework to address the climate change.
- ¹⁵ The 21st Century Public Policy Institute, Akihiro Sawa, *Proposal for a Post-Kyoto Framework* (interim report of the research project “Japan's Strategy and International Cooperation for a Post-Kyoto Framework”), October 15, 2007.
- ¹⁶ Provisional calculations by Research Institute of Innovative Technology for the Earth (RITE). The amount of reduction is the difference from the BAU (Business As Usual) case.
- ¹⁷ ODA: ODA is an international cooperation system to help developing nations in their economic and social development or welfare improvements through financial and technical assistance. It is provided for developing nations or international organizations by certain governments or implementing agencies. As for the bilateral environment ODA, the assistance implemented in FY2001 to 2005 were 2,700 to 4,300 hundred million yen for every year (Ministry of Foreign Affairs, Japan's Official Development Assistance, white paper 2006).
- ¹⁸ Published by Ministry of Economy, Trade and Industry, *New National Energy Strategy*, May 31, 2006.
- ¹⁹ Published by Ministry of Economy, Trade and Industry, *Technology Strategy Map 2007*, April 23, 2007.
- ²⁰ The document published by Ministry of Economy, Trade and Industry, Starting to Study “Cool Earth -- Innovative Energy Technology Program,” August 15, 2007.
- ²¹ The document distributed for the No. 27 joint meeting of the “Industrial Structure Council, Environmental Division, Global Environment Subcommittee” and the “Central Environment Council, Global Environment Division” on November 30, 2007.
- ²² Some experts point out that global warming is unrelated to the cause of the sea level rise in Tuvalu, but it is often cited as a case that requires an emergency countermeasure.
- ²³ Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2006 Revision*. “Medium variant” is used for this proposal.
- ²⁴ Delegates, from 189 member nations including 147 heads of states, participated in the UN millennium Summit held at New York in September 2000. They adopted the UN Millennium Declaration as the international goal for the 21st century. This Millennium Declaration focused on the themes of peace and security, development and poverty, environment, human rights and good governance, and African special needs. It presented a clear direction of the roles of the UN for the 21st century. The Millennium Development Goals (MDGs) were established by integrating above UN Millennium Declaration and international development targets that were adopted by the main international conventions and the Summits held in 1990's. They were then summarized as a common framework.
- ²⁵ TICAD: An international convention started in 1993, with the theme of African development. The purpose is to rekindle international concerns about Africa, taking advantages of end of the Cold War. It was proposed by Japan, and is cosponsored by the UN and the World Bank. The summit conference is held in Japan once every five years.
- ²⁶ Proposals by Japan Association of Corporate Executives, *Our Country's Energy Strategy Focused on 2030*, February 2006.
- ²⁷ RPS law: The law for promoting the use of new energies. The law obliges electric power suppliers to use electricity provided by using a certain amount of new energies to spread new energies furthermore. The law was officially announced in June 2002, and came into effect on April 1, 2003. The new energies specified include: (1) wind energy, (2) photovoltaic energy, (3) geothermal energy (excluded when the hydrothermal resource is remarkably decreased), (4) hydraulic energy (dam and conduit type subordinative power generation of 1,000 kW or less), and (5) biomass energy (including the biomass component in the power generation with wastes or fuel cells).
- ²⁸ Petroleum Association of Japan, *Study of Law for Promotion of Advanced Utilization of Energies*, November 2006.
- ²⁹ Japan Productivity Center for Socio-economic Development, Information Center for Energy and Environment Education, *Proposals for Energy and Environment Education*, (Kansai edition, 2005) Chapter 2.
- ³⁰ Documents by Ministry of the Environment.

³¹ The Comprehensive Assessment System for Building Environmental Efficiency (CASBEE) is a method to evaluate and rate a building according to its environmental performance. This is a system to comprehensively evaluate the environmental performance of a building. The viewpoints are environmental quality and performance upgrading as well as the capabilities to reduce the environmental impact. The evaluations include aspects of the room comfort and landscape for quality and performance upgrading, and energy saving, resource saving, and recycle capabilities for reducing the environmental impact.

*** Other Comments within the Keizai Doyukai on the Issues in This Report**

- a) Setting the goal and the framework for post-Kyoto
 - The emission reduction claimed in the framework for the post-Kyoto Protocol is far beyond the level of the Kyoto Protocol. Therefore, setting a medium-term goal as well as a long-term goal is necessary. Setting medium-term emission quotas for each nation and region is also required.
 - It is questionable whether a high-level medium-term goal can be achieved with the sector base declaration system. The medium-term goal (obligatory numerical target) must be set by all means. The following steps seem to be important to set equitable and diverse medium-term goals. (1) Calculate the basic unit by sector. (2) Multiply each basic unit by GDP. (3) Calculate the total amount by accumulating values from (2). (4) Compare the result of (3) to the medium-term goal that is estimated from the long-term goal. (5) Provide additional correction to eliminate the gap, and determine the medium-term goal. The first review for eliminating above gap should be made before COP15.
 - It is necessary to specifically demonstrate that “halving emissions by 2050 sounds like a scenario about a world that cannot be imagined given current lifestyles.” A plan should then be made.
- b) Emissions trading system (cap-and-trade system)
 - The purposes are the exchange potential reduction capacities between nations and the reduction of emissions with at minimum cost utilizing market mechanisms. This system will be an additional means for reducing emissions, enabling high-level goal setting.
 - In reality, actions under the cap-and-trade system will go ahead regardless of Japan's policies. The key point, therefore, is who will establish the standard procedure of the system? Japan should participate in the system positively.
 - The reason for sluggish technology transfer is the absence of sound international rule. Japan should positively participate in the international rulemaking and international bodies.
 - It is proposed that the government take an initiative to set caps for offices and homes, and transport, and to establish a domestic cap-and-trade system.
 - It seems that a system combining the sector-based approach and cap-and-trade system is required.
 - The cap-and-trade system is not an essential one. Transferring the energy-saving technologies of Japan to the world will have a considerable effect on emissions reductions. Japan needs to show

good examples of technologies and life-styles to the world and thereby take a lead.

c) Others

We received many positive and interesting comments regarding nuclear energy policy and energy & environmental education described in this proposal.