

# 5. JAPAN

## 5.1 Introduction

*Japan's total GHG emissions in 2003 were 1339 MMt CO<sub>2</sub> eq, an increase of 12.8% over emissions in 1990.*

Japan is the world's second largest economy following the USA and the fourth largest energy consumer and GHG emitter following the USA, China and Russia. Being the only Annex I Party in Asia, its interests often differed from those of other Asian countries in the past and such differences are likely to continue in future. On the other hand, Japan established close relationships with Asian countries on economic, energy, and foreign affairs. Such relationships work in both ways – to exert influence on, and to be influenced by, other Asian countries.

It must be noted that the approach for our consultations in Japan was different from the one we adopted in other countries, as we could not organize a formal dialogue due to time constraints. Instead, we prepared this report based on literature reviews, and interviews with twenty representative stakeholders (four each from the government and the private sector, two from environmental NGOs, and ten from research institutes).

Japan's total GHG emissions in 2003 were 1,339MMt CO<sub>2</sub> eq, an increase of 12.8% over emissions 1990 (Table 5.1 and Fig. 5.1). Compared to emissions in the base year under the Kyoto Protocol (1990 for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O; 1995 for HFCs, PFCs, and SF<sub>6</sub>), however, the increase was 8.3% (MoE 2005b). The increase in total and per capita CO<sub>2</sub> emissions over the 1990 levels was 12.2% and 8.7% respectively. On the other hand, CO<sub>2</sub> emissions per unit of GDP decreased by 5.2% since 1990 (MoE 2005b). Of all gases, emissions of CO<sub>2</sub> were the largest. The energy sector accounted for the most emissions (89.5%), followed by industrial processes (5.6%), agriculture (2.5%) and waste (2.4%) (Fig. 5.2).

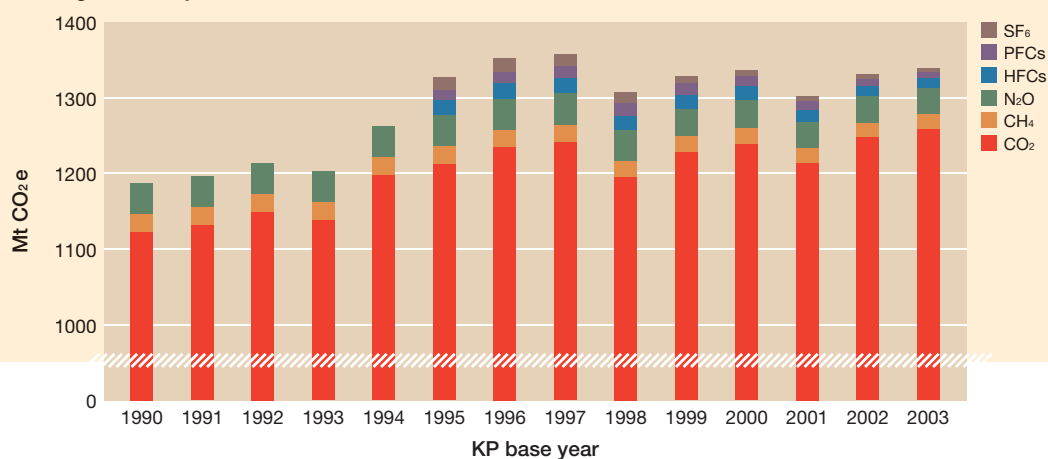
Current projections indicate that total GHG emissions in Japan will decrease by 1.6% in 2010 relative to 2002, still a 6.0% increase compared to 1990 level (GWPH2005) (Table 5.2).

**Table 5.1 Key statistics for Japan**

Population (2004)	127.8 million	
Annual Population Growth (2004)	0.15%	
GDP (Current US\$) (2004)	US\$ 4,623.4 billion	
GDP per capita (2004)		
Current US\$ (2004)	US\$36,177	
Purchasing Power Parity (2004)	US\$29,539	
GNI per capita (Atlas Method) (2004)		
Current US\$ (2004)	US\$37,180	
Purchasing Power Parity (2004)	US\$30,040	
Annual GDP growth (2004)	2.70%	
Energy demand (2002)	517 million Mtoe	
Per capita energy consumption (2002)	4,057.54 kgoe	
Per capita electricity consumption (2002)	7,718.45 kWh	
Energy mix (2002)	Oil	52%
	Coal	17%
	Natural Gas	13%
	Nuclear	13%
	Others	5%
GHG Emissions (2003)	1,339 million MtCO <sub>2</sub> e	
GHG Emissions per capita (2000)	10.51 MtCO <sub>2</sub> e	
CO <sub>2</sub> Emissions (2003)	1,259 million MtCO <sub>2</sub>	
CO <sub>2</sub> Emissions per capita (2000)	9.34 MtCO <sub>2</sub>	
CO <sub>2</sub> Emissions per GDP (2000)	0.25 kg/US\$	

Sources: IEA (2005), MOE (2005b), UNFCCC (2005g), World Bank (2005)

**Figure 5.1 Japan's GHG emissions trend (1990–2003)**



Note: SF<sub>6</sub> = sulphur hexafluoride; PFCs = perfluorocarbons; HFCs = hydrofluorocarbons; N<sub>2</sub>O = nitrous oxide; CH<sub>4</sub> = methane; CO<sub>2</sub> = carbon dioxide

Figure 5.2 Distribution of GHG from Japan in 2003

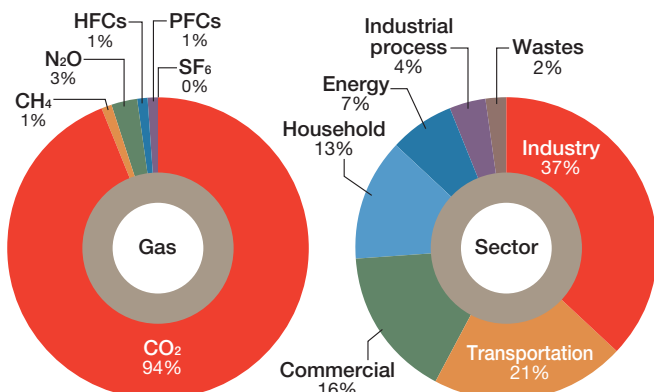


Table 5.2 Projection of Japan's energy-related CO<sub>2</sub> emissions in 2010 compared to the 2002 level (%)

Emissions	Per cent
Total GHG emissions	+ 6.0
Energy-related CO <sub>2</sub>	+ 5.4
HFCs, PFCs, and SF <sub>6</sub>	+ 1.4
Non-energy-related CO <sub>2</sub> , methane, N <sub>2</sub> O	- 0.8

Source: GWPH 2005.

## 5.2 Major Domestic Climate Policies and International Contributions

### 5.2.1 GHG mitigation policies

The establishment of the Global Warming Prevention Headquarters (GWPH) in December 1997 soon after the adoption of the Kyoto Protocol, was the first formal initiative to institutionalise the process of controlling GHG emissions in Japan on a national basis. The guidelines for measures to prevent global warming were drafted initially in June 1998 and then revised in March 2002. More than 100 policy measures, including energy efficiency improvement, voluntary declaration by industries, R&D for new energies, were drawn up to achieve the six per cent reduction target of the Kyoto Protocol (GWPH 2002). Japan conducted a review of policies and measures to achieve its Kyoto target in 2004 with the aim of introducing additional measures from 2005 if the revised guidelines are found to be inadequate to achieve the target. The review will not end with a mere revision of the guidelines, however. The entry into force of the Kyoto Protocol on 16 February 2005 requires drafting of the Kyoto target achievement plan as per article 8 of the Climate Change Policy Law (CCPL). In view of the projections that the GHG emissions in 2010 will be 1.6% lower than the 2002 level, but still 6% higher than the 1990 level, the following reduction targets were set for each sector (Table 5.3). The expected contributions of various policy measures to GHG reduction in industrial, household, transportation and energy supply sectors were also outlined (Table 5.4).

Regarding the additional policies and measures to achieve the required reductions, discussions during the review process focussed on the introduction of environmental tax, emissions trading scheme and GHG reporting scheme. It was decided that the introduction of an environmental tax was set to be discussed in the framework of the revision of the whole tax system in the autumn of 2005. A Japanese Voluntary Emissions Trading Scheme (JVETS) was launched with the participation of thirty-four companies, which covers the trading of only 27 MMt CO<sub>2</sub>. The GHG emissions reporting scheme was also introduced as a revision to the CCPL. The above overview of Japan's climate policy revealed that the policies and measures implemented so far are inadequate to bring enough emission reductions to achieve the Kyoto target (Watanabe, R. 2005). Whether Japan can ultimately achieve its target depends on measures taken following the second review to be conducted in 2007.

**GHG emissions in 2010 are projected to be 1.6% lower than the 2002 level, but still 6% higher than the 1990.**

Table 5.3 Targeted GHG reductions (%) in various sectors by 2010 compared to from 2002

Category	%
Difference between emissions in 2002 and the projected emissions in 2010	- 1.6
Reductions from Policies and Measures	- 6.5
CO <sub>2</sub>	- 4.8
Methane, N <sub>2</sub> O	- 0.4
HFCs, SFCs, SF <sub>6</sub>	- 1.3
Sinks	- 3.9
Kyoto Mechanisms	- 1.6
<b>Total</b>	<b>- 12.6</b>

Source: GWPH 2005.

**Table 5.4 The Kyoto Target Achievement Plan's measures for sectors and reduction targets**

Sector	Policies and Measures	Reduction targets (thousand tonnes)
Industry	Keidanren's voluntary action plan	4,240
	R&D on fuel switching of high-efficiency boilers and lasers	200
	Promotion of high-efficiency industrial furnaces	130
	Energy management as set out in the revised ALRUE (Amended Law concerning Rational Use of Energy)	170
Households	Diffusion of efficient air conditioners for commercial buildings	60
	Improvement of energy efficiency in homes	850
	Promotion to replace old electric appliances with more efficient ones	560
	Promotion of high-efficiency water heating	340
	Promotion of home and business energy management systems	1,120
Transportation	Accelerated introduction of vehicles achieving top-runner programmes	2,100
	Acceleration of R&D and dissemination of low-emission vehicles, including clean energy vehicles	300
	Promotion of efficiency logistics systems, including shift of transport modes from trucking to shipping	120
	Introduction of sulphur-free fuel, and vehicles to use such a fuel	760
Energy supply	Promotion of new energy	1,700
	Fuel switching and nuclear power	4,690

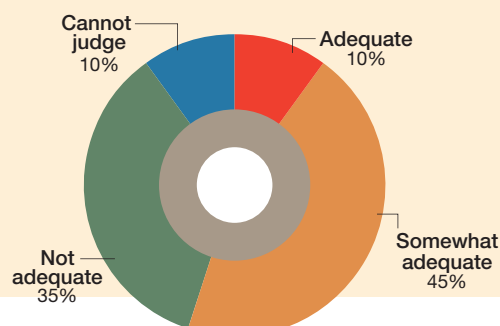
Source: GWPH 2005.

### 5.2.2 An assessment of stakeholders' views on Japan's climate policies and measures

**Current policies and measure are inadequate to bring enough emission reductions to achieve the Kyoto target.**

All interviewees, except two government officers, regarded that Japan's current climate policies and measures are not adequate to achieve the Kyoto target, although some of them admitted the positive role of such efforts (Fig. 5.3). Most of the interviewees shared the view that R&D should be strengthened and that the Kyoto mechanisms should be utilised more fully. The views on the introduction of an environmental tax and an emissions trading scheme were both positive and negative.

**Figure 5.3 Diversity of views of different stakeholders on adequacy of Japan's policies and measures to reach the Kyoto emissions reduction target**



### 5.2.3 Adaptation initiatives

Japan has conducted many studies on the impacts and risks of global warming since 1990s, in a wide range of areas, including water resources, terrestrial ecosystems, agriculture, forestry and fisheries, marine environment, coastal zones, land preservation, disaster prevention, lifestyles, industry and energy, and human health (Harasawa et al. 2003). The impact of global warming is seen in the form of a rising trend of the mean annual temperature by about 1°C over the past 100 years. This rise in temperature began accelerating in the mid-1980s. Of the ten hottest years in the past century, eight were in the past decade, coinciding with the global trend. The rise in temperature in urban areas over the past 100 years has been more than 2°C, and in Tokyo nearly 3°C. This large rise in the urban areas was partly due to the heat island phenomenon peculiar to cities. Even after excluding this phenomenon, Japan is certainly warming (Harasawa et al. 2003, Harasawa 2005, Watanabe, N. 2005).

Despite the observed impacts, Japan has not implemented specific adaptation plans. One of the reasons for this may be that Japan, being a natural disaster-prone country, has already established a sound infrastructure that will be utilised for the adaptation to the impacts. Nevertheless, considering that Japan is surrounded on all sides by the sea, and its population and social capital are highly centralised in narrow plains near the coast, strengthening mitigation policies in order to avoid an extreme climate change and developing adaptation plans in order to prepare for a possible extreme climate change are crucial (Harasawa 2005).

### 5.3 Assessment of the Current Climate Regime from Japan’s Perspective

There are both positive and negative assessments of the Kyoto Protocol. All interviewees agreed that the Protocol is the first important step to addressing climate change and admitted that many policies and measures were developed in Japan, although they are inadequate to achieve the Kyoto target. Secondly, it is the only major multilateral environmental agreement adopted in Japan which stimulated a tremendous level of public interest (Kameyama 2004a).

On the negative side, interviewees admitted that the Kyoto Protocol makes very limited contribution to stabilising the GHG concentrations. The main reasons for the negative assessment were as follows: Agreement to bring about only a small percentage of GHG reductions by Annex I Parties (5.2%), and, the lack of participation of major emitters, especially the USA.

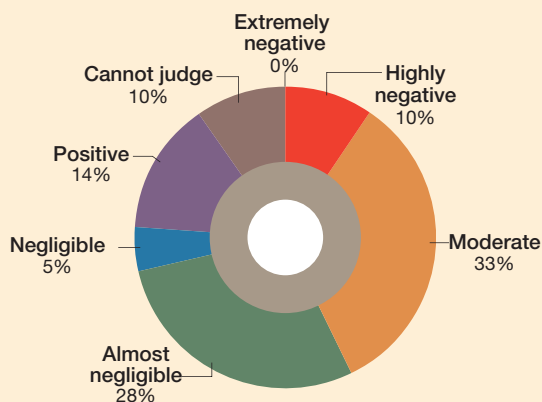
*All interviewees agreed that the Protocol is the first important step to address climate change and admitted that many policies and measures were currently developed in Japan, although they are inadequate to achieve the Kyoto target.*

### 5.4 Major Concerns on Current Climate Regime

#### 5.4.1 Development and economic concerns

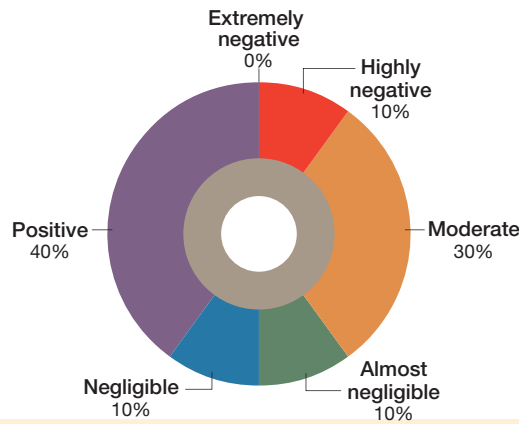
Japan’s marginal cost to achieve the Kyoto target is the highest, with the median at US\$ 300/tC, while its GDP loss is relatively small at 0.7% (IPCC 2001a). Japan’s lack of energy industries, such as crude oil production, is the main reason for this (Morita et al. 2003). The cost and benefit to achieve further reductions depends on the future progress of technological innovations and new information concerning the carbon cycle. (Morita et al. 2003).

Figure 5.4 Diversity of responses to the potential impact of mitigation measures on economic growth of Japan.



The interviews confirmed that Japanese concerns regarding the impact of climate mitigation measures on both economic growth and industrial competitiveness are not so large, with only 10% and 10% marked “highly negative” respectively (Figs. 5.4 and 5.5).

**Figure 5.5 Diversity of responses to the potential impact of mitigation measures on industrial competitiveness of Japan.**



The result shows that development and economic concerns are not one of major obstacles for Japan to take actions to address climate change issues.

#### 5.4.2 Equity concerns

In the absence of a supra-national enforcement institution for an international agreement, any solution of agreement must be considered equitable by all participants. Probably, the most inequitable outcome of all would be reaching no agreement at all (Hoehne et al. 2003).

Equity regarding the target setting is considered as one of the biggest problems in Japan. In the negotiations of the Kyoto Protocol, the Ministry of Economic Trade and Industry (METI), reflecting the opinion of industries, argued that stabilisation of emissions would be the most that Japan could hope to achieve, considering that Japan made a lot of efforts to raise its energy efficiency during past two decades. This argument was in a way rational because energy consumption per GDP was the lowest in Japan (Table 5.5). A 6% reduction target set in the Kyoto Protocol was more ambitious than what Japan had originally planned for. Even compared to 7% for the USA and 8% for the EU, 6% was considered a tough target for Japan.

**Table 5.5 International comparison of energy consumption per GDP in 2000**

Basis for comparison	China	Japan	Korea	India	USA	UK	Germany
Exchange rates	100	10	40	102	22	16	17
PPP	100	68	104	92	105	73	73

Source: SHEN (2003)

***Development and economic concerns are not major obstacles for Japan to take actions to address climate change issues.***

Before and during the Kyoto negotiations, the participation of the USA and differentiation of emissions reduction targets among Annex I countries were the most sought-after points for Japan (Kameyama 2004a). The Protocol was accepted in Japan with the understanding that the USA would be involved. An ambitious target without any rationale in terms of equity became a problem after the USA withdrew from the Kyoto Protocol. In our consultations, 90% of interviewees considered that the 6% emissions reduction target of the Kyoto Protocol is not equitable for Japan. However, the interviews noted that Japanese stakeholders do not link the criteria of “equity” with their preferences of the way to set the target. While researchers have a tendency to select “egalitarian,” others select “basic needs,” “capability,” and “responsibility”, which are largely based on moral principles (den Elzen et al. 2003). While one of the government representatives mentioned that “equity” is defined by the mixture of all of them, another representative mentioned that any internationally agreed decision is always equitable since parties agree with only “equitable” text as “equity” is necessary for domestic constituencies’ acceptance of the negotiation results.

One of the reasons for no linkages between the criteria of “equity” and the preferences for the way to set the targets is perhaps that there is no acceptable criterion which is beneficial for Japan. Some interviewees clearly expressed preference for a GHG intensity target, which is beneficial for Japan. It may be worth considering the inclusion of an element of reduction potential if we wish to build on the equity principle (Ott et al. 2004).

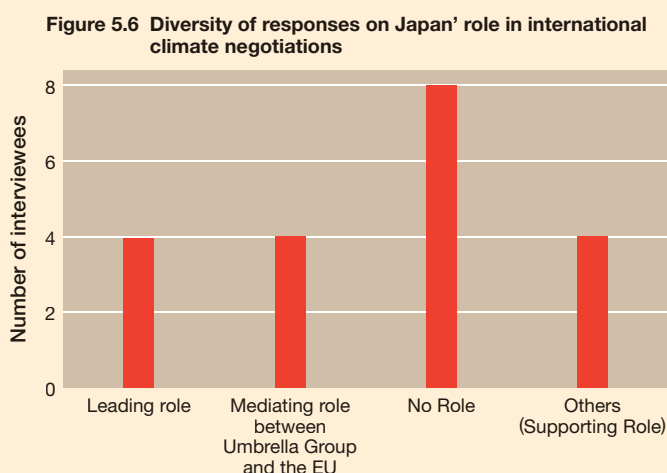
### 5.4.3 Negotiation-related concerns

The climate negotiations were regarded as a big problem for Japan. Empirical studies showed that Japan had difficulty in forming a unified position at the Kyoto negotiations (Kameyama 2004a, Tanabe 1999, Schreurs 2002, Schroeder 2001). The imbalance between the time necessary for the negotiation and the short term of administrative policy changes is also considered a major problem (Aiba and Saijo 2003).

In our interviews, in line with empirical studies, some of the non-governmental interviewees argued that Japan neither played a significant role in international negotiations nor succeeded in reflecting its interests in the negotiation, while governmental stakeholders noted that Japan played a leading role in international negotiations. Some non-governmental representatives had the opinion that Japan was a mediator between the EU and the USA or was just supporting either of them. Indeed, there was not a single issue discussed at Kyoto on which Japan held a view opposing both the EU and the USA positions at the same time (Schroeder 2001). As such, a discrepancy in views of governmental and non-governmental stakeholders was observed. As for the reasons why Japan did not play a significant role in the international negotiations, most of interviewees identified the lack of (a) a unified position among its internal stakeholders (or governments), (b) experienced negotiators (working level and high-level), and (c) communication skills. Indeed, the Japanese negotiators who attended the COP less than twice by the COP8 accounted for 73%, against 53% from the EU and 52% from the USA (UNFCCC 1995- 2002).

*A discrepancy in views of governmental and non-governmental stakeholders on Japan’s role in international climate negotiations was observed.*

*The lack of unified position among internal stakeholders, experienced negotiators, and communication skills are major reasons for Japan’s limited role in international climate negotiations.*



#### 5.4.4 Market-based mechanisms-related concerns

The Kyoto mechanisms are one of the main achievements of the Kyoto Protocol for reducing GHG mitigation costs. The marginal cost of emissions reduction in Annex I countries was projected to be between US\$15 and 150/t C with the GDP loss ranging from 0.1% to 1% (IPCC 2001a). Since Japan has the highest marginal cost, however, it was expected to receive the largest cost-reduction benefit due to the Kyoto Mechanisms.

Despite high expectations of a positive effect on mitigation, the Kyoto mechanisms did not work as they were originally planned. One of the reasons was the delay of entry into force of the Kyoto Protocol. This affected the establishment of an infrastructure by the Parties, including registry, inventory, etc., necessary for fulfilling the eligibility requirements to utilise the Kyoto Mechanisms. Because of this, it is likely that Russia and Ukraine, two large sellers, will not transact their surpluses at least at the beginning of the first commitment period (Watanabe et al. 2005). There is also a possibility that both countries will control the carbon market and price, which can have a negative impact on the market function (Watanabe et al. 2005). Another much bigger issue is concerning the CDM. Various issues, including a strict definition of additionality, delays in approval process at the CDM Executive Board, a lengthy project approval process in both host countries and at the Executive Board, and high transaction costs hamper the CDM to function as originally planned (Ellis et al. 2004, Sterk and Wittneben 2005).

Our consultations confirmed that all interviewees were not satisfied with the pace of current implementation of the Kyoto mechanisms due to the aforementioned reasons.

**Our consultations confirmed that all interviewees were not satisfied with the pace of current implementation of the Kyoto mechanisms.**

#### 5.4.5 Technology development and transfer-related concerns

Technology development and transfer is another promising means of reducing mitigation costs. An overview of the technological potential for reducing GHG emissions in 2010 and 2020 is presented in Table 5.6.

**Table 5.6 Potential for emissions reduction by 2020**

Category	Potential emissions reduction in 2010 (Mt Ce/year)	Potential emissions reduction in 2020 (Mt Ce/year)
Buildings	700~750	1000~1100
Transportation and Mobility	100~300	300~700
Industry		
-Energy efficiency improvement	300~500	700~900
-Material efficiency improvement	~200	~600
Gases other than CO <sub>2</sub>	~100	~100
Agriculture	150~300	350~750
Waste	~200	~200
Use of alternatives under the Montreal Protocol	~100	n.a.
Energy supply and source switchover	50~150	350~700
<b>Total</b>	<b>1900~2600</b>	<b>3600~5050</b>

Note: Reduction potentials are calculated on the basis of technologies to be introduced in the market with a direct cost of US\$100 or less per ton carbon equivalent.  
Source: Morita et al. (2003).

Despite the high potential of various technologies to reduce GHG emissions, transfer of technologies has not been progressing due to various obstacles, including the inadequate dissemination of information on new technologies, a cautious attitude of the management to introduce new technologies, a negative tendency among banks and other financial institutions toward investment in new technologies, and the lack of progress in new technology transfers to developing countries due to concerns over intellectual property rights (Morita et al. 2003).

In our consultations, interviewees agreed that technologies are very important to address climate change. They considered that this is an area that Japan could contribute greatly. However, the lack of an appropriate system in the current regime to enhance the development and transfer of technologies hampers Japanese companies to take proactive actions to transfer advanced technologies to developing countries.

## **5.5 Priorities for Restructuring the Climate Regime**

### **5.5.1 Market mechanisms**

Although several interviewees expressed concern on the current pace of implementation of the Kyoto mechanisms, they noted that flexible mechanisms should be continuously used after suitable modifications in the future climate regime. Stakeholders recommended streamlining of the CDM procedures, including the simplification of methodological processes and reform of the CDM-EB. Some stakeholders noted that the establishment of a scheme similar to the CDM, which combines technology transfer with credits, is perhaps necessary to give incentives to industries for technology transfer and to ultimately address the climate change issue in the most efficient way. In addition to the CDM reform, most of the interviewees noted the need to reconsider the supplementarity requirement, because of the current difficult situation of Japan to achieving its targets with domestic policies and measures alone.

### **5.5.2 Technology issues**

All interviewees regarded that more focus on climate-friendly technologies is necessary for addressing this issue. However, they recommended that the future regime should provide incentives to technology development and transfer, perhaps through enabling technology transfer in exchange of carbon credits.

*The establishment of a scheme similar to CDM, which combines technology transfer with credits, is necessary to give incentives to industries for technology transfer and to ultimately address climate change issue in the most efficient way.*



*Japanese views on the future climate regime are two-fold, one supporting the continuation of the Kyoto-type regime with numerical targets, another supporting more flexible targets such as the pledge and review.*

## 5.6 Epilogue

Japanese views on the future climate regime are two-fold: one supporting the continuation of the Kyoto-type regime with numerical targets, and another supporting more flexible targets, such as the pledge and review. Such divergence of views was often evident even at the international arena, like COP and SB side-events, where the MoE and the METI often presented different reports (MoE 2005a, METI 2004). Our consultations with selected people confirmed the above. All interviewees agreed that the international regime is necessary to address the climate change issue but their views differed regarding the form, elements to be included, duration of the commitment period, the continuity, and the participation of Non-Annex I Parties.

**Form:** All interviewees agreed on the necessity of the UNFCCC and most of them saw the need for a Protocol or similar kind of legal agreement. However, different views prevailed on the elements to be included in the Protocol or legal agreement.

**Elements to be included:** The most contentious point is the necessity of a legally-binding numerical target. Some experts supported the continuation of the Kyoto-type numerical target while others supported the pledge and review type agreement, including all industrialised countries and large GHG emitters. Industrial stakeholders showed their preference to sector-based targets, but most of them admitted that the national government can only take the final responsibility on reduction commitment. One stakeholder suggested that the combination of multi-level targets, such as a regional-level target like the EU bubble with sector-based targets, which might be flexible in terms of achieving targets and efficient in terms of negotiation, rather than allocating commitments to the Parties. Industry representatives preferred the pledge and review with “agreement on technology development” and “coordination of policies and measures on energy efficiency standards or technology standards,” regardless of whether it is contained in the international agreement for climate change or not. Other interviewees who emphasised the need for a legally-binding numerical target also chose the above two elements, besides “the establishment of emissions trading and linking it with other countries”.

**Duration of the commitment period:** Interviewees who felt that numerical targets were unnecessary, mentioned that five years is too short and preferred to have a longer term from ten to thirty years. The other group, advocating the need for numerical targets, noted that a short term is necessary to review the achievement of targets.

**Continuity:** The interviews revealed the difficulty in keeping the balance among the participation of the major GHG emitters, the continuity, and the strictness of commitments. Most of the interviewees opined that the post-Kyoto regime must be started immediately after 2012, but the opinion was diverse in preference regarding continuity versus the strictness of commitments. Several interviewees, especially from the industrial sector, preferred the continuity in order to give a right signal to the market, while one stakeholder explicitly mentioned that the strictness of commitments should not be sacrificed for the continuity.

**The participation of non-Annex I parties:** All interviewees who advocated “the pledge and review” noted that at least the large GHG emitters should and can have the same type of commitment as Annex I Parties. On the other hand, interviewees who

selected “legally- binding numerical target” noted that the differentiation of commitments is necessary between the Annex I and the Non-Annex I Parties but it is desirable that large GHG emitting Non-Annex I Parties participate in the regime with a softened form of commitments, such as the pledge and review.

All interviewees agreed that participation of the other large GHG emitters and enhancing technology development and transfer are necessary to stabilise GHG concentrations and that the CDM should be reformed to provide further incentives for technology development and transfer. The need for technology development and transfer, and the reform of the CDM were recognised by other Asian countries as well and these areas could be suitable for more effective involvement of the developing countries. Therefore, these two issues could be a basis for strengthening collaboration between Japan and the rest of Asia.

In our consultations, several interviewees noted that the views of Japanese stakeholders are not adequately represented at international negotiations, partly because of the lack of negotiating ability, which, in turn, is attributed to the frequent transfers of personnel involved in such negotiations. In order to build a consensus and represent a unified view to the global community, it would be worthwhile to retain key senior negotiators at the same position for a longer time, especially because such negotiations require considerable technical knowledge. Efforts in this direction are vital to further enhance the Japan’s role in climate discussions for the benefit of the world in general and the Asia-Pacific region in particular.

## **Acknowledgement**

The author would like to express sincere gratitude to Jusen Asuka, Hideo Fukushima, Hironori Hamanaka, Taisuke Hamaoka, Takashi Hattori, Takahiko Hiraishi, Yasuko Kameyama, Izumi Kubota, Takuya Kudo, Teruo Okazaki, Osamu Mizuno, Masaaki Nakajima, Kiyoshi Saito, Toshiyuki Sakamoto, Masayuki Sasanouchi, Koji Shimada, Kunihiro Shimada, Tomonori Sudo, Kiyoshi Takahashi, and Kiyoto Tanabe for their consent to be interviewed and for their cooperation in responding to the questionnaire.

*The interviews revealed the difficulty to keep the balance among the participation of major GHG emitters, the continuity, and the strictness of commitments.*

*In order to build a consensus and represent a unified view to the global community, it would be worthwhile to retain key senior negotiators at the same position for a longer time.*