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# **Japanese Environmental Policy**

## **– and approach to environmental technology**

Elin Vinger



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## Summary

The Japanese approach to environmental policy has been technological. Therefore, to Japan, global environmental problems have been so called “brown” issues; industrial pollution, energy use, waste use etc. The so called “green” issues; like species and habitat conservation, have not been priorities. This is something Japan has been criticized for by environmentalist, as well as for not demanding enough from industry, even though Japan at least in the short run made important strides in e.g. pollution reduction and the development of environmental technology.

The Japanese environmental policy started to develop in the 1960’s due to pollution problems. Industrial pollution control policy was soon integrated in traditional industrial policy, using the same policy tools, for example administrative guidance, low-interest loan programs and preferential tax treatments. Business interest being important, the policy was still a so called reduction-first policy however with a step-by-step approach. Such an approach allowed participation from businesses as well as prioritizing. Soon Japan became a leading country in reducing industrial pollution. Typically for Japan, emission standards were enforced by persuasion rather than by coercion, as enforcement of regulations was conducted primarily through administrative guidance rather than by punishing the polluter. Emphasis has been on public/private cooperation with government guidance, but with industry responsible for action and commercialization.

Long-term goals have been another characteristic of the Japanese approach, making also new innovative technologies interesting. To realize such technologies, government-industry-university joint research institutes were formed already in the early 1980’s.

The policy response to global warming has so far been to use carrots like financial incentives and soft, flexible instruments, rather than sticks like energy- and/or carbon taxes. Problems to meet the commitments to the Kyoto Protocol and international pressure make it harder for the Japanese government to keep from using market based incentives like emission trading schemes. In regard to this, it is interesting to follow the development even in the very near future.

# 1 Approach to Environment and Technology

In the 1960's and 1970's the one environmental problem recognized in Japan was industrial pollution. In the 1980's lifestyle pollution, e.g. from household sewage and garbage, was addressed. Technologies for waste treatment as well as consumer awareness were issues that gained a lot of attention. (WBI 2002) The first oil crises in 1973 spurred Japan to reduce oil dependence, mainly by energy conservation (efficiency being an important part) and by diversification of supply. In the late 1980's, when global warming started to get attention, Japan committed to the Kyoto protocol and a six percent reduction of green house gases compared to 1990 by the year 2012.

To Japan, environmental problems have been so called "brown" issues; industrial pollution, energy use, waste use etc. The so called "green" issues; like species and habitat conservation, have not been prioritized. While Japan has been criticized for this by environmentalists as well as for not demanding enough, Japan has made important strides in e.g. pollution reduction. (Wong 2001, Miller 2004)

The Japanese approach has hence been technological. However, Japan has lacked in creativity and not been that innovative. Before the 1980's Japan was lagging behind the western society; industrially, technically as well as scientifically. In the 1980's, Japan caught up. Since the catch up, the main emphasis for S&T<sup>1</sup> has been innovation as a means to maintain a globally strong position. (Stenberg 2007)

This document provides a brief overview of Japanese environmental policy, science and technology approach, R&D efforts and the role of different actors.

Environmental policy on a national level affects the use and development of environmental technology on both the domestic and the international market. What Japan prioritizes also influence the Japanese proposal for an international framework as well as the development of the national one. At the same time; changes at an international level will influence the environmental policy at a national level. Knowing the characteristics of Japanese environmental policy thus might give us an insight to future Japanese response to the international development and environmental incentives. Being the second largest economy<sup>2</sup>, Japanese actions matter a great deal to the rest of us.

## 1.1 The Market for Japanese Environmental Products

As stated above, the ability to compete in international environmental markets depends on the country's national environmental policy, both in regard to technological development and to exports. In 2004 Japan was estimated to have a 20 percent share of the world market for environmental technology (SOU 2004:84). These figures indicate that Japan is big on environmental technology but it's important to keep in mind is that there is no uniform definition<sup>3</sup> of environmental technology and, thus, no reliable statistics.

<sup>1</sup> Japan refer to Science & Technology rather than to Research & Development.

<sup>2</sup> Japan is the world's second largest economy by real GDP, nominal GDP and by market exchange rates, the world's third largest, adjusted to purchasing power parity (PPP), after the United States, and People's Republic of China.

<sup>3</sup> Japan uses a broad definition of Kankyou (Environment) Gijutsu (Technology), referring to traditional environmental technology as well as energy-efficient home-appliances and fuel-efficient cars.

There are no general export data for Japanese environmental technology to be found. Data from 2001 on traditional environmental technology such as pollution control equipment exist, revealing that especially air and water pollution control equipment are being exported to a great extent<sup>4</sup>. Still the total exports for the pollution control equipment only corresponds to 2.4 percent of the total sales. More than 80 percent of the exports go to other Asian countries. (IVA, 2006)

As for Japan's international environmental policies, the government reasoned already in the beginning of the 1990's that developing countries can achieve environmental conservation without sacrificing economic growth with the aid of Japanese technology transfer and experience. Japan's first major Official Development Assistance (ODA) Program pledge to the global environmental was made at a G7 summit in 1989, where the Japanese prime minister promised 300 billion yen (about 180 million SEK) in environmental related aid for the 1989–91 period. (Wong, 2001)

As for foreign companies selling environmental technology to the Japanese markets, no data has been found. The Japanese market is sometimes (depending on product) protected by regulation, making it hard for foreign companies to invest in the Japanese market. Another obstacle is that the initial costs are high as Japan is quite pricy compared to other countries.

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<sup>4</sup> *Approximately for 17 billion yen each, 1 yen being about 0,06 SEK.*

## 2 Policy & Technology as Factors for Development

### 2.1 Industrial Growth Resulting in Environmental Policy

Already in the 1950's industrial pollution caused different problems in Japan, for example deceases such as the methyl-mercury poisoning (the *Minimata decease*). In the 1960's and early 1970's industrial growth, mainly in heavy and petrochemical industries, was rapid and pollution became a growing concern. Japanese authorities recognized this but were slow to react. At the time the government prioritized growth over environmental concerns; given that only small efforts were made to address the problems and that the first environmental law from 1967 (*Basic Law for Environmental Pollution Control*) contained the clause "considering harmonization between the economy and environmental regulation". The clause was however deleted in 1970, a starting point of the development of a so called reduction-first policy. The standards were set using a step-by-step approach, making it possible for the most serious and urgent matters to be prioritized and at the same time allowing both the public and private sector to participate. Criticism was that the actions came too late and in some areas were too weak. (Wong 2001, WBI 2002, IDE-JETRO 2007)

Public awareness were at first very low but grew rapidly as the number of victims increased with the growing pollution. Health- and pollution-related lawsuits were filed in the late 1960's, courts ruling in favor of the victims. In 1970 the Polluters Pay Principle (PPP) was established, obligating polluters to pay for the damages. The environment protest movement that developed played an important part in the establishment of the reduction-first policy. (WBI 2002, IDE-JETRO 2007)

The reduction-first policy meant that reduction was prioritized over growth, taking no industrial concern, as one could state was the case with the automotive-sector and the NOx control (see 2.5). However, reduction before growth is a "truth" needed to be modified. Even though the *Nature Conservation Law* was implemented already in 1972, indicating a new recognition that nature protection is important and distinct from pollution control, the oil crises soon came to overshadow the new interest for environmental concern not related to the oil issue – in Japan as in most countries (Wong 2001). As for the reduction, the business lobby has influenced the policy processes a great deal and been allowed to negotiate the standards to meet, which is elaborated on below.

In the mid 1970's the industry, however, had to compensate for the government's slow response to the environmental situation by making large-scale investments. This was at the same time as rapid growth began to slow down. Low-interest loan programs and preferential tax treatments were available though, as industrial pollution control policy was formed and promoted as part of industrial development policy, using the same policy tools. (IDE-JETRO 2007)

The policy was oriented towards command and control, hence in that sense having a non-economic approach, and pipe-end-technology – which at the time was the technology seen as the solution to environmental problems, not only in Japan. In a very short time, Japan became a leading country in dealing with pollution, having rigorous environmental parameters and business obligations, compared to world standard. Typically for Japan, the emission standards were enforced by persuasion rather than by coercion, as enforcement of regulations was conducted primarily through administrative guidance rather than by punishing the polluter. OECD concluded in a study in 1977 that the administration used the

standards as weapons in negotiations rather than prescriptions that automatically applied. (Oshitani 2006, IDE-JETRO 2007)

The combination of preferential treatment (low-interest loans, tax relieves, etc.) and direct regulation, a kind of “carrot-and-stick” approach, was a typical measure of industrial policy. The decision-making process for industrial policy was organized industry by industry, where the bureaucrats of the responsible ministry (depending on sector and issue) and the representatives of each industry played dominant roles. (Oshitani 2006, IDE-JETRO 2007)

Local governments also played an important part in formulating the command and control system, a unique characteristic of Japan’s pollution control system. Since the pollution problem to a certain extent was local it can be seen as no surprise that local governments engaged in the issue and took countermeasures. The governments initiated various measures as pollution control ordinances, extensive monitoring networks and environmental impact assessment. However, at that time the local governments did not have the legal authority to implement regulations severer than those of the central government, resulting in the use of voluntary agreements between local governments and businesses, deciding emission levels factory-by-factory after discussions also with the residents. Japanese voluntary agreements are nothing more than “gentlemen’s agreements” but function as if they were legally binding. (WBI 2002, IDE-JETRO 2007)

## 2.2 The Role of Different Actors in Environmental Policymaking

To conclude; the role of the Japanese government has more often been expressed through informal guidance or cooperative interaction than through strict regulation and penalties. Japanese policymaking is a consensus process, in the case of industrial or environmental policy, involving industry directly and throughout the process.

Being part of the process is of course an opportunity to affect the outcome. The government is also able to offer support through financial incentives as well as opportunities to learn from cooperative R&D with competitors. The alternative could be penalties and competition with government-aided competitors. (Miller 1992, IDE-JETRO 1997, Oshitani 2006) To be noted though is that only about one fifth of the R&D expenditures are public spendings (ITPSc 2007).

Starting in the early 1960’s, the Ministry of International Trade and Industry (MITI)<sup>5</sup> was an important actor both in regard to direct regulation and preferential treatment. Legal revisions and the establishment of the Environment Agency (EA) in the early 1970’s, meant that MITI lost its direct regulative authority to the EA and local governments but kept working with preferential treatment through administrative guidance and allocation of low-interest loans and tax relieves. (IDE-JETRO 2007)

Above is mentioned that residents were a part of discussions when local governments and business made factory-to-factory agreements. Participation in the decision-making process for industrial policy, by those affected by industrial development (like residents or consumers) has not been the case on a national level. The process of negotiations between government and enterprise has been done behind closed doors, making the policy process non-transparent. In fact, the active environmental protest movement that played an impor-

<sup>5</sup> A major administrative reorganization took place in 2001, making MITI into Ministry of Economy, Trade and Industry (METI) instead and the agency EA into a ministry (Ministry of Environment; MOE).

tant role in reducing pollution and developing industrial pollution policy did not transform into national environmental NGOs. Instead, people believed the myth that environmental issues were almost conquered. Also, it is said that the government has enjoyed the public's trust to the extent that the need for national NGOs has been very small, but that this trust has been diminishing during the last decade. Also the regulations for NGOs have become more beneficial. The outcome, however, is that policy making in Japan has been not only a non-transparent but also a bureaucratic process, strongly influenced by the business lobby. (Wong 2001, IDE-JETRO 2007)

The business association Nippon Keidanren (Japan Business Federation) has been most important in the development of Japanese environmental policy. It represents about 100 industrial associations and virtually all major corporations. Keidanren has steered the Japanese business world in global environmental policy, having close ties with the ruling party LDP and ministries (the iron triangle). In 1991 the association issued the *Keidanren Global Environment Charter* with guidance for corporate activities, domestically and overseas, based on the viewpoint that the environment is the foundation of any business activity. In 1997, 36 industries including 137 industrial associations, formulated voluntary action plans as part of the *Keidanren Action Plan on the Environment*, the participants accounting for 80 percent of the total CO<sub>2</sub> emissions from the industry. According to a former councilor of Keidanren, the plan was a strategy to preempt government action in strengthening energy efficiency policy. (Keidanren 2008-01-07, Oshitani 2006)

Already in the late 1960's, privately-owned policy research organizations occurred, as Japanese companies established their own research institutes to follow their western counterparts. Quasi-governmental policy research institutes were also established, functioning as "subcontractors" to the ministries. As for the academia, it has not had any real or independent role in policy making. Mainly because the bureaucracy has not asked for it but also because Japanese academics do not have a tradition of being part of the policy process. (Wong 2001)

As mentioned earlier, MITI (today METI) has played an important role in the Japanese environmental policy making and does so continuously. As environment issues are cross-cutting, there are of course also others ministries involved in the process. In 2001 EA was made a ministry instead of an agency; the Ministry of Environment (MOE). The ministry has since then been a part of the policy making process. METI and MOE have very different views on future policy directions. MOE has for a long time proposed an environmental tax (or a carbon tax), something METI (together with a very strong lobby) opposes (see chapter 3) as well as an emission trading system. (Oshitani 2006, ITPS 2007a)

### 2.3 Research & Development (or S&T)

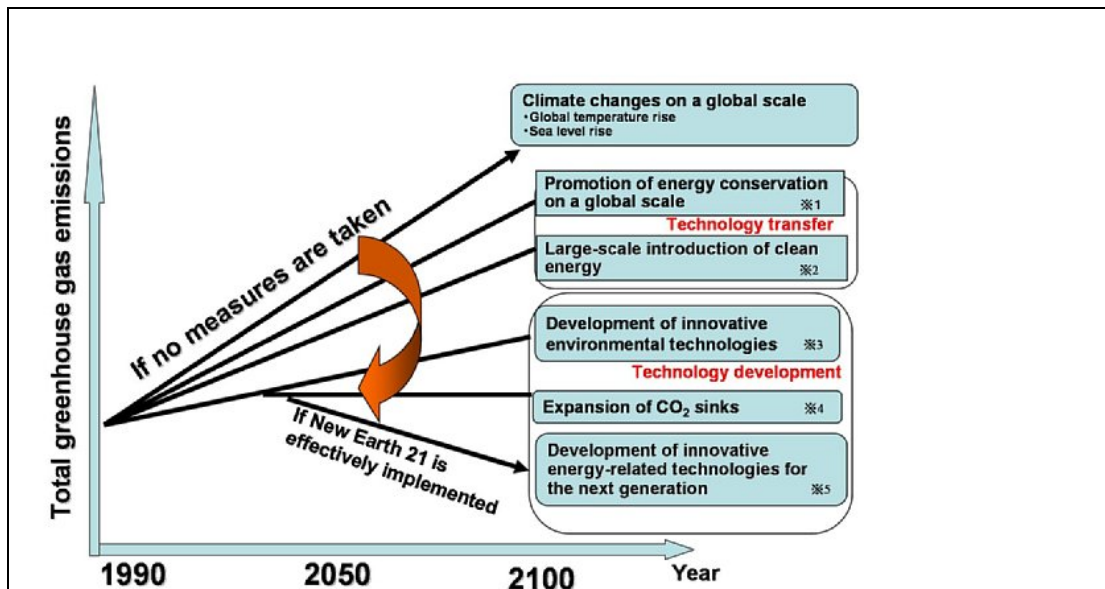
When pollution became an environmental issue, the small and medium sized enterprises had difficulties raising money for taking proper technical measures. Financial support for the diffusion of pollution control was given by the government. As for technical support, it has often been provided by local government research institutes (LGRIs). While national research institutes and universities mainly conduct basic research, LGRIs might conduct applied R&D and have played an important role as organizations for technology transfer to SMEs in different regions. (IDE-JETRO 2007)

At a national level the quasi-governmental agency the New Energy and Industrial Technology Development Organization (NEDO) was established in the early 1980's for commercial development of new energy technologies to free Japan of its dependence in

oil. The mission was expanded in 1990 to cover development of technologies for protection of the global environment. NEDO operates with governmental funding from METI and staff partly from other organizations. (Miller 1994, NEDO 07-12-11)

In 1990 MITI presented the *New Earth 21 initiative*; identifying which technologies needed to meet future challenges. The vision resulted in several quasi-governmental agencies being established in 1990 to, alongside NEDO, address growing global environmental problems. The mission of the Research Agency of Innovative Technology for the Earth (RITE) is to develop the innovative environmental technologies needed in the 21<sup>st</sup> century, as well as expansion of CO<sub>2</sub> sinks. (Miller 1992, 1994, RITE 2007-01-07)

Figure 1 New Earth 21 initiative.



1. Energy conservation movements in society, enhancement of energy efficiencies in equipments, enhancement of electric generation efficiencies at power stations, improvement of vehicle gas mileage, etc.
2. Solar batteries, fuel cells, nuclear energy, etc.
3. CO<sub>2</sub> capture and storage, biodegradable plastics, bioenergy, etc.
4. Forestation and forest preservation, greening of arid land by genetically engineered plants, etc.
5. Space photovoltaic power generation, nuclear fusion, etc.

Source: RITE

The New Earth 21 vision spurred the formation of new government-industry-university joint research institutes like RITE. (Miller 1992) A central theme since the mid 1990's has been to increase the collaboration between industry, governmental institutes and governmental R&D institutes. (Stenberg 2007)

In 1995 the *Basic Law for Science & Technology* was adopted. S&T plans covering five years are based on this law. Currently the third plan is valid, stretching to 2010. The four prioritized areas are: life sciences, ICT, **environmental sciences**, nanotechnology and material. Four more areas are prioritized, however not primarily, one of them being energy. One of the more prominent features of the third S&T plan is that efforts will be made, on ministerial level, to further develop international (Asian) cooperation in S&T.

The Japan Science and Technology Agency (JST) is responsible for implementing a broad range of activities based on the S&T basic plan. In 2003 JST established the Center for Research and Development Strategy (CRDS) in order to strengthen their planning capacity. CRDS makes bird's eye view maps, surveying all R&D areas in each field,

identifying areas of special interest. JST/CRDS is doing the strategy work for Ministry of Education, Culture, Sports, Science and Technology (MEXT), whose latest strategy proposal (within the environmental field) was biomass utilization, ecosystem and the Asian perspective. JST is not concerned specifically with environmental technology but this is about to change. (ITPS 2007b, Stenberg 2007, JST 2007-12-13)

The difference between JST and NEDO is not always obvious, but simplified it can be explained as NEDO having an industrial perspective, being affiliated to METI, whereas JST has a scientific focus. (Stenberg 2007)

METI formulated in 2004 the *Strategic Technology Roadmap*, concentrating on the following four areas: ICT, life Sciences, **environment and energy** and manufacturing.

## 2.4 Japanese Technology Policy

Japanese technology policy can be considered an extraordinary success. The success is, however, the outcome of many different strategies, rather than a single model, agency or ministry. The mechanisms of integrating environmental and industrial policy (partly explained above) can be summarized as incorporating the following:

- a goal-oriented approach, long-term in outlook and cooperative in nature;
- governmental agencies and programs being organized to obtain cooperation within government as well as with the industry;
- an emphasis on public/private cooperation with government guidance, but with industry responsible for action and commercialization, and
- promotion of technological solutions including “critical” technologies.

Technological solutions have been preferred over lifestyle changes. (Miller 1994) As green house gases emissions and global warming are getting more attention and being treated more seriously, this is changing. Having a hard time fulfilling their Kyoto commitment, the Japanese government has stressed the need for lifestyle changes through different campaigns like the *Team Minus 6 %* project initiated by former Prime Minister Abe, with the aim to promote large-scale civic campaigns that countermeasure climate change. The project was launched in 2005 and has quickly expanded to include 1.1 million individuals and about 11 000 companies and organizations (as of March 2007). The *Cool Biz* campaign is one of the activities, advising people to save energy by limiting the use of air conditioning during summer. (MOE 2007)

## 2.5 Making Business Out of Environmental Policy?

Whether regulations lead to improved competitiveness has been discussed by many; traditional (or conventional) economics saying no, environmental economists supporting Porter (1990) – and his hypotheses that environmental regulations improves the competitiveness – saying yes. The latter viewpoint has gained supporters in recent years. The Japanese success in realizing energy efficiency as well as cutting costs and making business out of it while having the command and control approach, makes Japan a suitable example for those supporting the Porter hypotheses. Today, most people agree that resource efficiency is good for business. However, whether regulations lead to improved competitiveness is difficult to answer. What can be said for certain is that it is one of several factors influencing the development. What also can be said is that Japanese business has had advan-

tages to their competitors in certain areas, like the automotive industry, when the demand for fuel efficient and green cars increased.

Looking at the automotive industry and the NO<sub>x</sub> control in the 1970's, it is in some sense clear that regulations affected the technological development. The Japanese automakers were about to expand their export to the US. In a way as a menace for the Japanese automakers, the *Clean Air Act* of 1970 was proposed by a Senator Muskie; the Muskie regulation. First thinking about how to refute the Muskie regulation, the automakers had to rethink when the EA proposed the same regulation for the Japanese market. Implementing looser regulations immediately, in 1974 EA held a hearing with Japanese automakers about the technological feasibility. Its final report concluded that the 1976 regulation was feasible, as suggested by both Mazda and Honda. The automakers saw a stricter standard as a good opportunity to expand their market shares because of technological advantages. The different motor (three-way catalyst) that met the 1976 regulation was already mainstream technology when it was time for the 1978 regulation. All Japanese automakers developed this type of engine successfully, enabling them to expand their exports. (IDE-JETRO 2007) Despite regulation and a reduce-first policy, the development was a consensus process – typically Japanese. Without trying to answer whether environmental regulations lead to improved competitiveness or not, it is interesting to note that Japanese industry considered stricter regulation as a business opportunity.

There is also the lead market approach theory, suggesting that early adoption and global diffusion is important to determine international competitiveness (for further information about the theoretical concept see e.g. Beise 2001). Japan designing products for lead markets is confirmed by the automotive example and the fact that Japanese consumers are very quick at adopting new technology. As for environmental friendly products, Japanese consumer demand is a growing force, however not a driver for the development – accounting for approximately one percent of the consumption. Some do argue that the typical Japanese response to international environment problems has been to see them as part of a larger strategy of designing products to meet the demands of world markets. However, others argue that Japan seems to be locked in a very heterogeneous environmental market from other countries, characterizes by expensive and decorative technology. The reason being a lack of interest for exports because of the enormous size of the domestic market. (IDE-JETRO 2007, Miller 1992) This implies that Japan adopts early but so far has not been that successful with the diffusion of the technology, probably because of a lacking interest for exports – which was not the case for the automakers.

The domestic market being important, environmental technology has still been closely linked to foreign aid and exports, maybe more than in any other countries. (Miller 1992, Wong 2001). Compared to many other Asian countries, Japan is technologically sophisticated. The interest for the Asian market might be one reason to why Japan is lagging behind in the development of technologies for environmental remediation such as soil remediation, hazardous waste management and water treatment. Difficulties in exporting to the Japanese market, resulting in less competition on the domestic market, might be another.

Sophisticated or not, there is a great potential in exporting Japanese environmental technology. The potential for the domestic market is also big. The demand for environmental technology has not been as expanding as expected. Regulation might be one reason, another local governments, companies and citizens lacking information about the benefits with environmental technology. In 2003 MOE launched the *Pilot Project of the*

*Environmental Technology Verification*, to verify objectively the performance of advanced environmental technologies. (MOE 2007-12-12)

### 3 Policy Direction – Where to go and When?

Japanese government has so far managed to support and/or coordinate intergovernmental cooperation, despite turf battles between ministries (Oshitani 2006). Recently, the battles have been even more intense and the situation more ambiguous than before.

#### 3.1 International Framework

As Japan will have a hard time fulfilling the Kyoto Protocol commitment, despite voluntary agreements with the industry and industrial actions plans, the government, through Ministry of Economy, Trade and Industry (METI) and Ministry of Environment (MOE), has sought additional cuts from industry circles. The industry has been asked to revise their action plans. However, even with additional cuts, Japan is not likely to fulfill their part of the commitment. In the end of November last year, METI and MOE, discussed a domestic emissions trading system (there is one on trial on a voluntary basis) and an environmental (or carbon) tax. MOE is in favor of both these measures, whereas METI (as well as a strong business lobby) is opposing both. As the two ministries are widely apart on how to address climate change, the interest was big on who would get to summarize the discussions as it could suggest the direction Japan will head for when dealing with global warming. Even though being MOE's turn to do the summing up, it ended with the both ministries doing it together. The sum up was criticized by business circles as ambiguous even though neither an environmental tax nor a domestic emission trading system was announced. (Asahi Shimbun 08-01-06)

Former Prime Minister Abe announced in 2007, before the G8 summit in Heiligendamm, the *Cool Earth 50* initiative. It proposes a long-term target of reducing emissions from green house gases by half from the current level by 2050, as a common goal for the entire world. Internationally, Japan proposed an expanded endeavor for improving energy efficiency. Nationally, the motto of reducing green house gases by “1 person, 1 day, 1 kilo” was launched and included in the Team Minus 6% project. The Cool Earth 50 initiative was launched to state that Japan had the ambition to take a leading role in the international climate work. The new Prime Minister Fukuda declared early that he was continuing the Cool Earth 50 initiative. However, proposing no new measures. Instead, the ministerial proposal Japan submitted to the Bali Conference (COP13) that took place in December last year, revealed the ministerial ambiguity and was criticized. The proposal was interpreted as Japan giving up the protocol. Japan, taking proud in producing the Kyoto protocol; featured by setting numerical reduction targets country by country, now refused to mention numerical targets for the post-Kyoto framework.

After being criticized, meetings on cabinet level have been held discussing Japan's international strategy against climate change. The Kantei (Official Resident of the prime minister) has suggested a mid-term goal and appointed former Keidanren Chairman Okudo and advisor to Toyota Motor a special advisor to the cabinet. The idea is that Okudo will urge other business leaders to change their minds. (Asahi Shimbun 08-01-06)

Whereas METI Minister Amari still strongly opposes numerical targets, Foreign Minister Koumura supports the idea. After Bali the Minister stated that:

*I think it would be fair to say that if we ultimately fulfilled this commitment despite our current state of increasing emissions, Japan's reputation would certainly move up a notch further. For this reason, there is an urgent need for us to implement creative*

*public policy, and with regard to this point I ask for your understanding. (Asahi Shimbun 08-01-06, MOFA 2008-01-08)*

In Davos in late January 2008, Fukuda launched the *Cool Earth Promotion Programme* to be implemented through the following three parts; post-Kyoto framework, international environment cooperation and innovation. As for the post-Kyoto, Japan agrees to, along with other major emitters, set a quantified national target for the greenhouse gas emissions reductions. The suggestion is sector-based targets, bottom-up approach and the establishment of a new base year as Japan is reluctant to the 1990 base year. The international environment cooperation suggests a new Japanese financial mechanism as one measure, the *Cool Earth Partnership*. 10 billion US\$ will be used during five years. The difference between the ordinary assistance funding of environmental technology is basically that the interest will be even lower than usually. The money is also to be used to guarantee investments mitigating climate change as well as environment technology transfer. NEDO will be used to implement projects. This financial mechanism is Japanese, but since then Japanese newspapers have reported that Japan, the US and the UK are preparing a joint proposal to establish an 'environment fund' aimed at proliferating energy-conservation technology in developing countries. (MOFA 2008-01-28, EU Environment Counsellors Meeting 2008-01-25)

Prime Minister Fukuda also emphases Africa:

*I aspire for Japan to contribute to the enhancement of peace around the world as a 'peace fostering nation.' Japan will be fostering peace by peaceful means. Providing assistance for the development efforts of developing countries is an important means to this end.*

An interesting outcome being Japanese diplomacy expanding in Africa. Since the Davos meeting, it has been announced that the first ones to receive measures under this mechanism are Nigeria, Madagascar, Senegal, and South Africa. Details of the measures will be discussed in February. (MOFA 2008-01-28, JICA 2008-01-17, Nikkei 2008-01-30)

### **3.2 Outcome on a National Level**

As for the third part; the innovation part, it includes the dual aspects of development of innovative technologies and a shift to a low carbon society. In Fukuda's words:

*In order to halve greenhouse gas emissions by 2050, it will be absolutely critical that there are breakthroughs in technological innovation. This is a very challenging task, and it will require a tremendous investment in technology.*

To do so Japan aims to accelerate the development of technology of zero CO<sub>2</sub> emission coal-fired power plants as well as low-cost, high-efficiency solar power generation technology and Green IT, among others. Investments in research and development in the fields of the environment and energy will be emphasized. Over the next five years, approximately 30 billion US\$ will be invested during a period of five years. Fukuda suggests using international agencies for collaboration, such as the IEA, to accelerate technology development and share the fruits of such efforts. (MOFA, 2008-01-28)

### **3.3 Concluding Remarks**

It is obvious that the command and control approach was effective at least in the short run, making Japan into a leader of environmental pollution control equipment. Whether today being technologically sophisticated or not, of course depends on the area. Japan is strong

on environmental technology and an important contributor of technology. As Japan has great potential for diffusion, activities on the domestic market as well as the international are of interest to follow.

As for the domestic market it is interesting to note that despite local governments being a part in formulating the command and control system, and business being part of formulating the environmental policy, the demand for environmental technology is not big. Hence, other efforts and measures need to be taken.

The Japanese approach to environmental policy has always been concentrating on industrial-related issues and it has been both business- and technology driven. Policy wise, Japan is likely to, to a certain extent, serve as a model for other Asian countries developing environmental policies.

Japan has started to agree to establish a numerical target for the post-Kyoto framework. It will be of great interest to see whether future discussions will make them change direction also when it comes to policy measures like a domestic emission trading system or a carbon tax.

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### **Further reading**

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The Swedish Institute for Growth Policy Studies (ITPS) is a Government Agency responsible for providing policy intelligence to strengthen growth policy in Sweden. ITPS primarily provides the Government Offices, Members of the Swedish Parliament, other state authorities and agencies with briefings based on statistical material, policy papers and key analyses. Business policy and regional development policy are areas given high priority.

Changes in policy should be based on:

- Statistic data and analyses of the structure and dynamics of industry – to obtain an up-to-date view of future challenges and opportunities.
- Evaluation of results and effects of policy measures and programmes – to provide benchmarks and learn from measures implemented earlier.
- Policy intelligence in order to look outwards and ahead – what issues are likely to come on the growth policy agenda in the future?

These represent the principal missions of ITPS.