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JAPAN

The Success and Limitations of Technocratic
Environmental Policy

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O. Introduction

The recent prediction that Japan could not be prevented from committing "ecological hari-kari" (Gunnarsson, 1974) was not fulfilled although, on the other hand, Japan is still far from being an ecological paragon. The Japanese people had to suffer terrible experiences owing to the effects of environmental disruption and have still to cope with many unsolved problems. In a tremendous effort to mitigate damage to health and the environment in the wake of uncontrolled industrial growth, the Japanese have, however, developed some internationally unparalleled, and, more importantly, feasible and successful political and technical measures that deserve our full attention.

The Japanese have, particularly in the field of air pollution, demonstrated that a drastic reduction in sulphur dioxide (SO_2) air pollution is achievable within a relatively short period of time and without any appreciable negative economic repercussions. The commonplace excuse "this may be good for the environment but will not work for the economy" has been clearly refuted. In view of the alarming scale of premature tree deaths in European forests and the acidification of lakes and rivers resulting from long years of an

environmental policy which yielded numerous laws and international treaties and conventions but little effective action, it would perhaps be more appropriate to take a good look at the successful strategies and their political setting in Japan instead of pointing to the European countries with the worst accounts in environmental policy (cf. Wetstone/Rosencranz, 1983; Knoepfel/Weidner, 1985).

It would, however, not suffice just to look at Japan's achievements. The tragic experiences and sufferings of the Japanese people resulting from large-scale environmental damage should never be forgotten and should also act as lessons from which other nations can learn. This also applies to the new ecological problems taking shape in Japan. They should serve to bring about a more speedy recognition of dormant dangers in countries with less intense economic growth and help to evolve a more anticipatory and preventative environmental policy. For Japan, with its advanced pollution control measures and persistent economic expansion, can be seen as a living "research centre" for other industrial countries--or, as Paul R. Ehrlich once put it: "Knowledgeable people in other industrial countries will be watching Japan closely, much as old-time coal miners once watched the canary in the cage" (in Huddle et al., 1975: 14).

This article¹ will mainly concentrate on Japanese air pollution control policy (stationary and mobile sources) since it is in this field that Japan--compared to other countries--has developed the most advanced abatement technologies and some unique policy instruments whereas

most industrialized countries have failed to reach a level of air quality not harming nature or human health. Yet at the same time air pollution has become the environmental sector enjoying highest political priority in many western countries (e.g. the Federal Republic of Germany, the Netherlands, Austria, and Scandinavian countries) as is reflected in the numerous new and costly air pollution programmes (cf. International Environment Reporter, Vols. 7 and 3). In this respect, the Japanese experience with air pollution control may not only serve practice-oriented needs but may also stimulate the theoretical discussion on how environmental issues could receive due consideration in the policy-making arena and what criteria should be considered when both a short-term effective and a long-term sound environmental policy is aimed at.

The article will start out with a brief historical review of environmental policy-making² in Japan, followed by a description of the basic strategies and instruments of environmental policy. These instruments will be evaluated according to some selected criteria including the aspect of problem shifts. Especially with respect to shifted problems it shall be examined whether the Japanese have succeeded in integrating short-term effective strategies into a concept of environmental policy which systematically and on a long-term basis prevents pollution burdens on human beings and the environment. The basic hypothesis to be examined here is that the obviously very effective environmental policies in Japan have lost over time not only their positive impacts but, and more seriously so,

have begun to induce new pollution problems.

The subsequent section gives a necessarily short overview on air pollution control policies in European countries followed by a comparison of these with their Japanese counterparts. Finally, the question of what other industrial nations could learn from Japan will be discussed briefly.

1. Stages of development in environmental policy: from ecological ignorance to technocratic environmental policy

Japan's progress from ecological ignorance to an active technocratic environmental policy was tortuous, particularly for the Japanese people. There is no other country in which so many diseases and deaths were so obviously attributable to environmental pollution. Many victims underwent acute suffering. A world-wide scandal was provoked by the so-called Minatama and Itai-Itai diseases which were caused by toxic compounds (i.e., methylmercury and cadmium) present in industrial waste water and contaminating water bodies and soil. Via the food-chain these toxic substances accumulated in the human body causing severe and often incurable disorders, such as skeletal deformation, an extreme susceptibility to fractures, cerebral damage, spasms, or hearing and speaking disorders. Pollution through arsenic, PCB (polychlorinated biphenyls), and various other pollutants also had dire health effects which were often lethal (Iijama, 1979). PCBs which are widely used industrially because of their favourable chemical and physical properties (e.g. as insulators in

condensers, transformers, etc.) are toxic substances causing liver injuries, chloracne, deformities of bones, etc. By 1973, several thousand victims suffered from these diseases induced by PCB-contaminated cooking oil. The subacute and chronic arsenic poisonings were caused by contaminated milk powder (more than 12,000 infants were affected, 130 of whom died) and emissions of arsenic into the environment by mines. Even breathing became more and more hazardous: the big cities were enveloped in noxious clouds of factory and car exhausts so that respiratory diseases increased rapidly. Nature too fell victim to the relentless steamroller of industrial expansion: rivers, coastal waters and lakes were transfigured into sewers and whole areas once praised for their natural beauty disappeared under concrete or were mutilated by highways.

To cut a long story short, the impetus for Japan's environmental policy was an ecological crisis unparalleled throughout the industrial world, and present environmental policy in Japan looks back on a long history of bitter struggles. This history can be roughly subdivided into three phases.

1.1. The phase of ecological ignorance

Japanese environmental conflicts have a long tradition. A "Chronology of Environmental Pollution in Japan" (Iijama, 1979) lists conflicts due to environmental pollution that date back as far as the Tokugawa era (1603-1867). In December 1690, for example, the citizens of what is today

Tokachiho petitioned for tax remissions because toxic emissions endangered trees they needed for lacquer works.

Perhaps more widely known is the big fight against the Ashio Copper Mining Company at the end of the 19th century (cf. Tsuru in Tsuru/Weidner, 1985). The sequence of events as well as the reactions of responsible authorities bear a great resemblance to pollution-related conflicts after World War II. In spite of clear evidence of damage to health and farmland caused by the production of copper, the government did virtually nothing for about six years. The mining company tried to settle the conflict by paying out small amounts in compensation (so-called tear money) to those harmed, but to no avail. The enraged villagers gathered in demonstrations which ended in violent clashes with the police. Only when the case gained nationwide attention did the Japanese government issue regulations, which, however, proved inadequate. In the following decades a whole series of controversies occurred without prompting any effective response from the central government.

After World War II Japan evolved a strategy of economic expansion which was particularly orientated towards the highly polluting sectors of industry, such as the iron and steel, and chemical and petroleum industries (Miyamoto, 1981). From 1956 to 1968 production in these sectors increased tenfold. This strategy along with the indifference to increasingly conspicuous damage to health and nature paved the way for the severe diseases mentioned above (Itai-Itai, Minamata). The Minamata disease caused by mercury poisoning first occurred around the small city

of Minamata in the 1950s. The Itai-Itai disease--the results of cadmium poisoning--mainly occurred around the Jintsu River. The disease was called Itai-Itai (i.e., ouch! ouch!) because of the intolerable pain suffered by its victims.

In response to the above-mentioned incidents the Japanese government and the responsible ministries reacted with a classical repressive environmental policy which ignored the ecological aspect (Ui, 1972). When the number of victims increased and the first organized protest occurred, the hypothesis that the diseases was caused by toxic industrial waste water was still officially refuted even to the extent of calling in experts who proved to be biased. The government used all the means within its power to constrain the increasingly militant protests by the people affected, and independent researchers were hampered in their support for pollution victims. Years went by until the cadmium and mercury theory established by upright scientists was finally officially recognized. In the meantime, however, the diseases had already spread to other parts of the country. The government, which was intoxicated with economic growth and indifferent to the environment, took abatement measures only when the evidence could no longer be ignored and when the conflict had nationwide repercussions.

This pattern of policy, ignoring the ecological context of industrial pollution, is also identifiable in other cases (cf. Huddle et al., 1975). However, the above strategy became increasingly threadbare as growing numbers of pollution victims were willing to enter controversies, which were backed by critical scientists, lawyers, citizen action

groups, students of the "new left" and the mass media. For centuries the philosophy from Prince Shōtoku's constitution of 1604 ("Consensus is praiseworthy and to refrain from opposition is honorable") was revered by the Japanese, but in settling environmental conflicts it came to have less and less meaning. The traditional political and social forces (such as political parties and unions) did not at first support anti-pollution movements, and large sections of the population initially discriminated against pollution victims (cf. Weidner, 1977), but over time their hostile attitude towards "victims' groups" and their claims gradually subsided.

This change of attitude towards pollution victims in particular and the consequences of the prevailing strategies for economic growth and industrialization in general was brought about by various events and developments (cf. Huddle et al., 1975; Tsuru, 1976; McKean, 1981; Reed, 1981; Tsuru/Weidner, 1985), among which the following ones had the greatest impetus:

- o Growing evidence of pollution-related diseases: The very high levels of all kinds of environmental pollution induced most severe health effects from which socially and politically "weak" groups of the population (with a high proportion of elderly people and children) had to suffer most. In the face of the clearly identifiable victims and the ever frequent outbreaks of new pollution-related diseases (especially the second outbreak of the Minamata disease in Niigata, far away from the region where it had first occurred), it was hard to further

ignore this issue.

o Negative economic impacts due to environmental pollution:

The basis of existence of many farmers and fishermen was increasingly endangered. Every now and then it occurred that products from polluted areas could not be sold, as, for example, in 1960 when the catch of the fishing cooperative of Isozu was not accepted by various markets all over the country including the important central fish market in Tokyo.

o Increasing awareness of potential negative repercussions of large-scale industrialization (anticipatory self-interest):

The Japanese industrial development strategy adopted in the 1950s, which pursued the establishment of huge industrial complexes (so-called kombinatos) in many parts of the country and often in the immediate vicinity of densely populated areas produced its first negative effects. In 1955, the city of Yokkaichi located on the Pacific coast and once renowned for its beautiful beach was selected as the site for the largest of Japan's first industrial complexes. Pretty soon, in the 1960s, the city became notorious for severe water pollution and, particularly, for a dramatic increase in respiratory diseases due to air pollution. This provided empirical evidence for hitherto more diffuse fears among the public that these kombinatos (agglomerations of heavy industries) would be a threat to health and the environment. Increasing opposition against industrial expansion and siting decisions was the result.

- o Gradual erosion of the ignorant attitude on the sublevels of the political system: Because of the massive health impacts of industrial pollution which owing to the rudimentary medical and social security system often entailed harsh economic problems for those affected, some local authorities took to establishing aid systems of their own. The City of Yokkaichi, for example, officially acknowledged air pollution disease victims to receive financial support by the city government for their medical expenses. With this initiative, at least the most detrimental effects of environmental pollution received official recognition, and--since the city's limited budget was burdened with extra payments and not the central government or even the polluters themselves--the potential basis was laid to demand reimbursement from those responsible in case the city's treasury would be overtaxed.
- o Mobilizing effect of the first successful opposition to the industrial development plan: In 1964, a broad citizens action group had formed in the three small cities Mishima, Numazu, Shimizu in opposition against a planned huge petrochemical complex (cf. Nishioka, 1975). The struggles went on for over a year, but eventually the central government had to abandon the project. Huddle et al. (1975: 256f.) attach fundamental importance to this incidence:

"Battling the nation's bureaucracy and big business leaders, an aroused citizenry channeled its energies into a movement that was to become known as the first major domestic challenge to the nation's postwar economic policies. The fervor underlying it signaled a turning point in the people's awareness of the dangers posed by pollution, and the move-

ment's tactics provided a groundplan that would later be adopted by other groups."

o Better coverage of pollution affairs by the mass media:

Most of the pollution diseases occurred in remote rural areas. Increasing press coverage of pollution problems--often with a marked tendency to criticize the behaviour of officials and industrialists--brought about that the urban population was more frequently confronted with environmental problems in rural regions. This was an essential prerequisite for the topic to evolve into a public issue in spite of the strong centralist structure of the Japanese political system.

In view of the general change of mood, the government thought it wiser to relinquish its partly ostrich-like and partly repressive attitude in favour of a more lenient policy. It took measures to reduce conflicts, to engender trust, and to make future environmental problems more manageable by creating a legal framework to which it could refer.

1.2. The phase of symbolic environmental policy

The conservative central government set out to superficially alter its environmental policy and from the 1960s onwards the machinery of legislation worked overtime to produce what was, in effect, merely a covering for the government's flimsy environmental policy. However, it offered no protection against those responsible for emissions. This case is not an isolated one: most industrial countries have gone through--or are still

going through--similar phases of symbolic³ environmental policy which yield impressive programmes but poor results. This kind of deficient implementation of control programmes (principles, laws, standards) is particularly evident in the area of air pollution control policy--and not only with respect to national policies of Western and Eastern countries alike (Wetstone/Rosencranz, 1983; Knoepfel/Weidner, 1985; Schreiber, 1984, Godzik, 1982), but also with respect to the activities of international organisations such as the EEC and the ECE (Weidner/Knoepfel, 1981; Prittwitz, 1984).

In 1967, the Japanese government passed a basic environmental protection law which laid down the general principles of environmental policy (objectives, strategies, instruments, and authorizations). The subsequent laws and regulations pertaining to single environmental sectors or specific cases had to keep in line with this basic law. Unfortunately, the law also contained a special clause which turned out to be a serious obstacle to the development and implementation of concrete environmental policies. This clause stipulated that the protection of the "living" environment be pursued in "harmony" with a sound economic development. This "harmony clause" was often used by industrial lobbies to prevent strict environmental protection measures and was generally interpreted as an option in favour of economic priority.⁴

This altogether weak law was followed by a series of equally half-hearted special laws and regulations most of which proved inadequate because of implementation difficulties (Weidner, 1981). They were unable to break up the traditional growth cartel formed by big industry, the leading fractions

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of the ruling party, and (the economy-oriented departments within) the ministerial bureaucracy (Pempel, 1977; Watanuki, 1977) and could not steer it in an environmentally less harmful direction. The result was that the acute pollution, hitherto restricted to local and relatively small problem areas, spread throughout the country in the course of further rapid industrial growth. This led to the chronic contamination of the entire population as opposed to the acute contamination of the few. In particular, this development applied to air pollution which was responsible for a great increase in respiratory diseases. But in other sectors, too, the rate of pollution soared. There was almost no inhabited region of Japan in which rivers, lakes, coastal waters or larger areas of land had pollution levels which could be classified as unarmful to health.

The Tokyo Metropolitan Government in its self-critical evaluation of the environmental quality of the city (Tokyo Metropolitan Government, 1971) gives an appropriate description which also fits to the nationwide situation at that time: Japan has become a "showcase for environmental pollution". The Japanese people, however, had become increasingly unwilling to play the parts of mute actors in this ecological drama. Protest actions and lawsuits filed against those responsible for pollution and development projects grew in number. In view of the daily occurrence of photochemical smog, the impressive statistics for GNP growth rates (from 1961 to 1970 ca. 11 per cent) lost their lustre. According to public opinion polls more and more people were unwilling to tolerate damage to the environment and to health for the

sake of economic growth. Even inhabitants of rural areas, who would have welcomed development measures a short while before, disapproved of all kinds of industrial projects (Environment Agency, 1973, 1982). The slogan of a rural anti-pollution group became nationally famous: "We'd rather eat rice under blue skies than steaks in smog."

For quite some time managers of those companies that were responsible for serious pollution-related health injuries had maintained an unyielding attitude towards the relatively moderate demands of pollution victims. In addition, governmental authorities did not support these demands in any appropriate way. So, as a last resort, many pollution victims took their cases to court. This turn of affairs began in 1967 when four lawsuits were initiated which soon became widely known as the "Four Major Pollution Trials."⁵ The suing parties were strongly supported by "progressive" or leftist groups in the big cities, by lawyers who in most cases developed close personal relationships with the plaintiffs and began to play a central role in the (extra-judicial) anti-pollution movement, by local politicians, independent researchers, and journalists. All in all, the litigations were closely connected with the general anti-pollution movement which rose rapidly in the late 1960s (Ui, 1972; Kuroda, 1972; McKean, 1981), or, as F. K. Upham (1976: 588) put it: "The legal action was designed to support the general anti-pollution movement, not the reverse". As it were, the pollution victims became the centre of the national uprising against pollution because in their fates the moral failure of big business and government institutions was particularly evident:

"Indeed by the late 1960s and early 1970s many Japanese considered pollution that endangered health as a fundamentally immoral act. Against mindless economic growth the average citizen now advanced new concerns: the sanctity of human life, individual dignity, and integrity of local communities. This transformation in values influenced all subsequent judicial and administrative policies" (Gresser/Fujikura/Morishima, 1981: xviii).

Not only citizen action groups fought for more rigid environmental protection measures, but administrators of some highly polluted cities and prefectures also urged the central government to take action. Tokyo in particular was frequently in the front line of those pressing the government to pass stricter laws. As a form of protest against the government's one-track policy of growth local or regional administrations issued environmental regulations which were sometimes much stricter than the respective national legislation. And where the legal bases for issuing such regulations were not broad enough, companies were put under political pressure to enter into so-called environmental agreements (Shibata, 1985a). Such contracts, too, fixed environmental requirements that went beyond the stipulations of the national environmental protection law, and, additionally, they proved a pragmatic means for a more flexible consideration of specific local pollution problems. Environmental agreements were not only concluded between companies and local or regional environmental authorities but also between companies and groups of citizens.

It eventually became clear that environmental problems could not be tackled with symbolic policies. In the eyes of the national growth cartel (Kaplan, 1972) the decreasing confidence of the Japanese people in economic growth and

their increasing opposition to industrial and public development projects (such as new railroads and highways) posed a threat. It was more and more difficult to find new industrial sites since the conurbations in densely populated Japan offered sparse possibilities for further expansion. Along with the monetary costs (compensations for siting permits and pollutions victims, etc.) "political" costs also rose: apart from a general loss of trust in the government due to its obvious partisanship in environmental conflicts, support for the ruling party started to crumble (Steiner/Krauss/Flanagan, 1980).

The Japanese government responded with a comparatively radical change in its attitude towards pollution problems thereby initiating some lasting changes in national environmental policy.

1.3. The phase of active technocratic environmental policy

During the third, active technocratic, phase of Japanese environmental policy, several very strict measures were taken against important pollution offenders and some internationally singular regulatory instruments were developed. These, added to the considerable increase in private and public investment in environmental protection measures, led to the spectacular improvement of some pollution problems. A more detailed description of these successful measures will be given below.

The most conspicuous indicator for the beginning of the third phase of Japanese environmental policy was a

parliamentary "tour de force" in 1970. In a special session Parliament (the Japanese Diet) passed a whole package of altogether 14 environmental laws and regulations. In the course of time, and frequently in reaction to "environmentally conscious" jurisdiction (see below), these laws have been supplemented and amended, and, moreover, the disastrous "harmony clause" was abolished.

This marked turn in the environmental policy of the Japanese government was initiated, and in the following years intensified, by developments in the social, municipal and judicial sectors. The relevant social developments (the increasing potential for protests among those affected by pollution, etc.) have already been indicated above. Municipalities and other local administrative bodies increasingly refused to follow the central government in its strategy of slow and reluctant action and successfully introduced stricter environmental protection regulations in their spheres of responsibility. In doing so they exerted quite some influence on the Japanese government to eventually incorporate these regulations into national legislation. In particular, the coordinated action of several local authorities to force the central government and the motor car industry to restrict car exhausts created a strong public momentum (Shibata, 1985b).

Seven large Japanese cities were especially concerned with the central government's lax attitude towards stricter NO_x standards for cars. These cities founded a "Seven City Panel of Experts" to promote more rigorous limits on car exhaust values with the help of relevant research projects and public relations activities. They also issued bans on

the use of motor vehicles for particularly highly polluted districts, preferred to purchase cars with low exhaust values for official use and published hit lists of the "cleanest automobiles." This concerted municipal effort was eventually successful: Today Japan has the strictest car exhaust standards in the world and since 1975 lead-free petrol is obtainable in any part of the country (Weidner, 1983).

Some Japanese judges, too, were determined to counteract the ecologically depletive economy. It is probably not exaggerating to say that in no other country court decisions have so successfully and favourably influenced environmental policy. Owing to the pioneering decisions in the Itai-Itai, Minamata and Yokkaichi trials (1967-1973), various companies had to pay large sums in compensation to pollution victims, an outcome unprecedented in Japan's legal history. All four trials dealt with civil tort actions and were won by the plaintiffs. The most innovative judicial approaches pursued by the courts in order to cope with the intricate legal problems usually associated with pollution damage (and which, as a rule, serve as a barrier to victims demanding remedies) will only be briefly summarized here because several legal studies have dealt with this matter in depth (e.g. Gresser/Fujikura/Morishima, 1981; Upham, 1976; Nomura 1975/76). Most importantly, the courts imposed strict liability for industrial polluters, developed new standards of proof for causation, introduced joint and several ("collective") liability for multiple pollution sources, and shifted the burden of proof to the companies charged with negligence.

In the case of "Yokkaichi asthma"--the industrial city of Yokkaichi was soon nicknamed "Asthma City" because of its high rate of respiratory diseases--a group of six companies was sued on account of high SO₂ emissions. Here, judges went particularly far in their interpretation of the law. They decided that companies should be obliged to pay compensation for health effects even when they could prove that they had observed the legally fixed requirements, since companies should not be exempted from a general "social responsibility" for their activities. It is perhaps worthwhile to give here the exact wording of the corresponding passage in the judgment:

"Even if the defendant (...) abided by emission standards, this act only immunizes the defendant from administrative sanction. We cannot say that because the standards were followed, the victims must naturally endure [their fate]" (quoted in Gresser/Fujukura/Morishima, 1981: 121).

The most spectacular judicial innovation was the fundamental change in the principle of causality. By adhering to the conventional legal conception it would not have been possible to establish a direct link between detrimental health effects and their causation by the companies accused. The traditional principle of scientifically proven causality which still predominates in the law of torts and in the environmental law of many countries calls for unequivocal evidence of a cause-effect relation, which can seldom be produced in connection with normally highly complex environmental problems. Japanese courts have replaced this type of evidence by a more realistic "legal" proof of causality, i.e., if statistical data--usually generated by means of epidemiological investigation--suggest a connection between the occurrence of certain pollutants

and certain diseases, then this is evidence enough for courts to enforce measures which include damage awards. (This kind of legal argumentation is also known as "epidemiological" or "statistical" evidence of causality.)

Because this principle of scientific evidence for causation is still firmly rooted in most industrial countries, environmental protection groups of pollution victims cannot fight those responsible for pollution with the same weapons. Those who are economically privileged always have the additional advantage of being legally privileged, too. It is to the credit of the few pioneering Japanese judges that they created a counterbalance against the privileged position of those responsible for industrial pollution.

Additionally, plaintiffs were relieved of large parts of the burden to prove the damage causing source: when it is highly plausible that the toxic substances involved stem from the defendant's plant then it is for him to prove the opposite. The underlying reasoning was the consideration that it is usually impossible for plaintiffs to enter factories to get the necessary information, to conduct tests or to take samples. Therefore, to quote the judge,

"...to acquire the 'trade secrets' of the company (...) is an unattainable goal for them. In contrast to the victims, the polluting company in many instances enjoys exclusive possession of the technical knowledge of the formation process and discharge of the effluent. With regard to this, the company technicians are in the best position to clarify the matter most efficiently" (quoted in Gresser/Fujikura/Morishima, 1971: 74).

Much of the impetus for these court decisions probably came from the judges' firm intention to establish a principle of equity in cases of pollution damage, yet the tremendous

social pressure exerted by the anti-pollution movement must not be underestimated.

For environmental policy, the overall outcome of these lawsuits was a moral verdict on environmental pollution and a weakening of the hitherto strong position of polluters. Moreover, the government was forced to implement more effective environmental policies, especially in order to prevent a flood of lawsuits against polluters which might easily obstruct an efficient planning and organization of industrial policy. Therefore, the government's response to this challenge was not restricted to a mere broadening of legislation. Instead, in close cooperation with the industries affected, the government set up short-term goals for an improved environmental quality and determined the necessary strategies to reach these goals. The main emphasis was put on clean air measures, partly because of their "noticeable" effects (rapid visibility of environmental political success), and toxic substances (because of their serious health hazards). And, as it turned out, the characteristic relationship between industry, government and bureaucracy in Japan (cf. Pempel, 1977; Johnson, 1982) was able to produce (though not harmoniously) clear decisions and consistent implementation measures. In other countries even the objectives are frequently vague and seldom pursued by the use of effective instruments (see below). In this way, Japan produced its greatest achievements in the most crucial policy areas.

2. Air pollution control measures

The Japanese have achieved the best results in the field of clean air policy, in particular with respect to SO₂ air pollution.⁶ The SO₂ concentration in ambient air had been extremely high and annual averages sometimes lay far above 150 µg/m³. These concentrations were reduced relatively quickly and largely owing to special measures to lower emission levels. Between 1970 and 1975, SO₂ emissions in the industrial and power generating sectors decreased by more than a half. Today, 99 per cent of Japan's 1,590 monitoring stations measure SO₂ values far below the national ambient air quality standard for SO₂, in 1973 the figure was a mere 4 per cent. The national regulation for ambient air quality standards stipulates that the daily average of hourly values shall not exceed 0.04 ppm (= 110 µg/m³), and that hourly values shall not exceed 0.1 ppm (= 276 µg/m³). Actually, the annual average monitored at 15 representative stations in 1984 was about 0.01 ppm (= 28 µg/m³). Even in the conurbation of Tokyo considerable abatement of air pollution was achieved. SO₂ air pollution, for example, was reduced by about a quarter (annual average in 1983: about 0.013 ppm = 36 µg/m³). The ill-famed "oxygen stations" that had once been installed in the streets of Tokyo to supply breathless citizens with clean air are no longer necessary.

These improvements in environmental quality subsequently led to an easing of the tense environmental political atmosphere. They were primarily achieved by supplementary measures to previous activities on the basis of the general environmental

protection law. The most important ad hoc measures were a policy of systematic fuel desulphurisation, the enhanced installation of flue gas desulphurising equipment in industrial and power plants (both old and new!), clean air programmes on the basis of a so-called total SO₂ emission control system, and the expansion of the public compensation system for health damage through environmental pollution.

2.1. Technical measures

In the field of flue gas desulphurisation Japan has meanwhile taken the world lead. Today about 1,360 units of such facilities are already in operation. This figure demonstrates that a speedy development of pollution abatement technologies is basically dependent on explicit political goal-setting and public pressure. Half-hearted environmental policy decisions relying on an autonomous technological progress in the environmental sector rather perpetuate the lethargic development of the technical "state of the art."

Air pollution through lead and carbon monoxide has also been reduced in Japan over the last few years. Nitrogen oxides (NO_x) which cause respiratory diseases similar to those caused by SO₂ and are also responsible for damage to forests, still pose a major problem. It has not been possible to reduce concentration levels, on the contrary, in some agglomeration areas they have even increased. Nevertheless, the efforts of the Japanese are remarkable in this field, too. No other industrial country has taken comparable action against NO_x air pollution. Once again, the development of appropriate abatement

technologies accelerated by environmental policy measures put Japan in a pace-setting position: So-called denitrification plants of an industrial scale can be found--almost exclusively--only in Japan. In 1981 the Japanese already had 175 such facilities. Since 1973 NO_x emission standards have been tightened up continuously, both for industrial and power plants, for the last time in 1983. Today, Japan's emission standards for NO_x are among the strictest in the world.

Japan is also responsible for the sharpest limits for car exhaust values thereby surpassing the previous leader in this field, the USA (Heaton/Maxwell, 1984). Most Japanese passenger cars (all classes) are nowadays equipped with catalytic converters. European car manufacturers can only be listed in the rubric "also ran." These measures did, however, not show corresponding positive effects on air quality, mostly because the traffic volume increased rapidly in Japan: it had doubled between 1970 and 1980. A direct positive influence on air quality trends was achieved through energy-related measures. Particularly energy-intensive industries succeeded in drastically cutting down on energy consumption in a relatively short period of time. From 1973 until 1980 energy consumption per unit of GNP had decreased by 22 per cent. Simultaneously, the Japanese government had pursued a "shrinking policy" with respect to industries that were no longer competitive but that nevertheless consumed large amounts of energy and were responsible for a great deal of pollution (Laumer, 1980). With these structure-related policies air pollution could be diminished and, as it were, in a way which was compatible with preserving the environment.

The Japanese government, prefectures and local authorities also invested enormous sums in monitoring equipment to supervise the effectiveness of laws and regulations and compliance with them. Meanwhile, Japan has an almost complete nationwide network of monitoring stations for the most relevant pollutants. Private industries were also forced to monitor their emissions at the sources and to submit the data continuously to the responsible public authorities.

2.2. Instruments of environmental policy⁷

Not only Japan's technological measures deserve attention. The national compensation system for damage to health, the total pollutant load control programmes for SO₂ and NO_x as well as the instrument of quasi privately settled environmental agreements are equally exceptional in kind and extent.

Japan is the only country with an extensively regulated compensation system for damage to health caused by environmental pollution. The corresponding act of 1973 was the outcome of the conflicts and court decisions related to the four major pollution trials and was influenced by the relief systems (of a much more limited scope) which had been established earlier by several local governments. When the law was drafted even industrial leaders were not fully opposed. With such a formalized conflict resolution system they expected to improve their image in the public by showing responsibility to pollution victims and, moreover, hoped to avoid a surge of "uncontrollable" court actions. According to the "law on compensation for pollution-related health

effects" of 1973,⁸ compensation must be paid for certain "pollution diseases" as defined in the law. Persons suffering from these diseases can apply to local authorities for acknowledgement as pollution victims. With such a certification they are entitled to compensation payments. The amount depends on the seriousness of the disease, age, sex, and some other factors. Payments are made, among other things, as reimbursement of medical costs, as index-linked disability pensions, or, in case of death, as the so-called "money of condolence."

Victims of environmental pollution are not only entitled to receive compensation when the culprits are known (as in the case of the diseases through toxic chemical substances). The much larger group of people suffering from illnesses or impairments caused by SO₂ air pollution are also granted compensation. On the basis of special government decrees certain regions have been singled out in which a statistically significant coincidence of air pollution and respiratory diseases has been identified. Anybody living or working in these regions for a certain period of time and suffering from specified diseases, such as asthma or chronic bronchitis, may apply for certification as a pollution victim.

A particularly interesting feature of the Japanese compensation system is the apportionment of costs. For "specific cases" (Minamata disease, etc.) the responsible companies have to pay, but for "non-specific cases" (air pollution induced diseases) caused by multiple sources approximately 80 per cent of the compensation costs is covered by the contributions paid by companies into a fund

according to their SO₂ emission amounts. The administrative overhead to determine the amount of contributions is relatively low owing to a very simple and pragmatic procedure: emissions are calculated on the basis of the sulphur content of the relevant fuels and the amount of fuel actually used; a special bonus is deducted when abatement measures are taken. Companies operating in polluted areas have to contribute much more than those in other regions. This system of "emission fees" has, in fact, worked as an incentive for polluters to reduce their SO₂ emissions both in the industrial and in the power plant sectors. Car owners, too, must contribute to the compensation fund: about 20 per cent of the cost is covered by means of an automobile weight tax.

What is most impressive about this compensation system is that the Japanese have come up with a simple and pragmatic solution to a highly complicated problem. Other countries usually refrain from introducing health effect compensation into their environmental policies just because of the complexity of the matter and its manifold implications. Nevertheless, there are still some implementation and other problems which have provoked criticism in Japan, the main one being that the certification procedure for specific cases takes too long and is too rigid, i.e., some medical cases have been unjustifiably rejected as being pollution-related. By the end of 1982 87,648 medical cases had been officially acknowledged, 85,581 of which were respiratory diseases. It is, however, estimated that the actual number of pollution victims is much higher. That the amount of compensation granted is often insufficient is a further

criticism. Shortly after the system had been implemented industry, too, began to attack it in several aspects (cf. KEIDANREN, 1976; Miyamoto, 1983). They not only argued that the scientific bases for the designation of areas were ambiguous, but also questioned the selection of SO₂ as the leading indicator for respiratory diseases. In particular, they vehemently attacked the cost allocation system for being unfair in principle: although SO₂ emissions had decreased drastically, the burden of pollution levies had continuously increased owing to the growing number of certified pollution victims. Especially during the first years after the introduction of the compensation system this number had increased by leaps and bounds. There are two contrary explanations for this development. On the one hand, it was contended that pollution-related health injuries often become manifest only after a longer latent period. On the other hand, industrial organisations, headed by KEIDANREN (Federation of Economic Organisations in Japan), claimed that many people participated in the compensation system whose ailments had other causes (e.g., automotive air pollution or smoking). There are more or less convincing arguments for both opinions. It is true, for example, that since the beginning of the 1970s the relative proportion of NO_x air pollution from motor vehicles has increased considerably. It is likewise true that health injuries may occur after quite a long period of exposure to air pollutants. In this latter respect, industries would have to pay for "sins of the past." (In this case, only newly established factories without relevant contributions

to SO₂ air pollution are treated 'unfairly'.) The debate on these and other issues related to the compensation system is complex and highly politicized, the outcome still being unclear. Yet, it seems to be certain that it will result, at the most, in modifications, and not in the abolishment of the system.⁹

In spite of these remaining shortcomings and unsolved questions one must acknowledge that the Japanese compensation system for pollution-induced health effects has fundamental social and political repercussions that go far beyond the individual cases. In western countries, these more general implications have so far been largely neglected in environmental political debates. They have to do with the mobilizing and legitimizing functions of such a system as well as its overall potential to act as a counterbalance to industrial risk production. Moreover, with the help of a formalized and state-regulated assessment of pollution-related health effects, it has been possible to empirically establish a social group of many anonymous individuals who had been isolated in their misery. Once their suffering was widely acknowledged, their confidence to organize protests and to fight for their rights increased along with the support they received from the general public. Because of their newly achieved status as certified pollution victims, they had been freed from more or less open resentment ("own negligence", "parasitism"). Now that claims for compensation had become politically and socially legitimate, pollution victims who had hitherto been afraid of public repercussions were also encouraged to fight for their cause.

This shift of pollution-induced health effects from its previous obscurity into the focus of public attention also helped to sharpen awareness to the risks of a neglectful environmental policy. Consequently, a growing number of applications for compensations effected more intensive investigations into pollution-related health hazards. It seems to be an inherent feature of the scientific community that it only becomes active when damage is already too great to be ignored. Until then, mostly "outsiders" of the Japanese scientific community had undertaken critical research in spite of their colleagues' open hostility (Ui, 1985). (This leads to the general question whether the overall lack of anticipatory and preventative environmental policy in industrialized countries is caused, among other things, by a built-in ecological deficiency of science. This aspect definitely deserves closer examination.)

For a conclusive appreciation of the Japanese compensation system it must be added that this pragmatically organized regulatory instrument harbours a certain potential for a "transcending effect." This means that its initially intended function as a (belated) remedial corrective has been broadened, making room for considerations of precaution and prevention on the part of risk-generating entrepreneurs--all the more so in view of impending and enforceable sanctions in terms of compensation payments.

In view of the present revival of concern about health effects (as well as damages to buildings, forests, and lakes) through SO₂ air pollution and acid rain in European countries, a more intensive consideration of the Japanese compensation

system could be most helpful, especially because the air pollutant SO₂ with its multiple sources has a central role within that system.¹⁰

Clean air programmes on the basis of the so-called total emission control system have been equally disregarded in spite of the good results achieved in Japan. The basic aim of this system is the reduction of SO₂ emissions in highly polluted areas as specified by the central government. The prefectural governments of these regions are called upon to work out special programmes fixing the envisaged reduction in emissions and the respective time limits for achieving these reductions. On the basis of these programmes the permitted amount of SO₂ emissions is individually determined for each of the larger industrial plants. For practical reasons, this procedure is not applied to smaller factories; these must simply use fuels with sulphur contents not exceeding the legal limit.

Larger companies are free to decide which emission abatement measures they wish to apply to which specific emitting facility as long as they keep within the stipulated emission limits. Thus they are granted a relatively large measure of freedom to choose the most convenient means for the implementation of government directives. This strategy serves the principle of putting more political effort into programme formulation in order to reduce the bureaucratic costs during programme implementation. Meanwhile, this strictly emission-orientated concept is applied in 24 areas where-- compared to the situation around 1970--considerable

decreases in SO₂ emissions have been achieved.

Regional air quality management is usually a rather complicated task in industrialized areas with many old emitting facilities. And, correspondingly, the Japanese system is a rather complex one. This does not only apply to the organizational aspects of management but also to its more technical features such as the calculation of emission levels assuring the envisaged ambient air quality on the basis of sophisticated formulas and wind tunnel experiments (Weidner, 1985).

Encouraged by the success of this approach in the field of SO₂ air pollution, the total emission control system was applied to NO_x, too. In 1981, it was introduced, for the time being, in three congested urban areas. Here, however, the envisaged ambient air quality standards could not be reached within the set period of time (April 1985) because automotive air pollution could not be sufficiently controlled.¹¹

Japanese industrial companies are reminded of their ecological duties not only by governmental regulations. The environmental political system leaves plenty of latitude for direct negotiations between prefectural or municipal administrations and companies on the one hand or between citizen groups and companies on the other to conclude quasi gentlemen's agreements on environmental protection measures which, as a rule, are much stricter than required by law (JELRI, 1984). Such agreements are quite commonly regarded as an appropriate means to supplement the national environmental protection law according to local or regional needs. Meanwhile, there are more than 23,000 of these agreements and the trend is still upwards.

These pollution prevention agreements address nearly all aspects relevant for pollution control, e.g., standards and regulations for all environmental media (air, water, soil), the use of raw materials and fuels, abatement technologies, monitoring, etc. Recently, agreements have increasingly been concluded which restrict operation under unfavourable environmental conditions and provide for compensation for pollution-induced damage, liability without negligence, unannounced inspections or sanctions in case of violation of agreements. The duration of agreements is quite frequently limited so that they can be updated in accordance with the technological progress.

The first pollution prevention agreement in Japan was probably the one concluded in 1964 between the city government of Yokohama and an electric power supply company. In the late 1960s this strategy found its real break-through when the Tokyo Metropolitan Government succeeded in entering important agreements with some economically powerful private companies. Supported by the general public hostility to polluting industries, many local authorities all over the country followed Tokyo's example (Shibata, 1985a).

It may come as a surprise, especially to countries very much relying on legal regulation, that Japan had no legal basis whatsoever for such agreements. It was just by way of "extra-legal", political power that local governments and anti-pollution groups "persuaded" polluting firms to make concessions. Local governments, for example, delayed licencing procedures by being overly "bureaucratic," took an uncooperative position in questions of infrastructural

projects (road construction, sewerage connexion, etc.), or, even more spectacular, cut off industrial plants from municipal water supply.

There is no doubt among Japanese experts that pollution prevention agreements and similar anti-pollution guidelines and regulations issued by local authorities had a strong, perhaps the strongest, influence on the development of environmental policy in Japan (Weidner/Rehbinder/Sprenger, 1985).

3. An evaluation of air pollution control policy: the limitations of a technocratic policy

More recent studies on approaches to and methods for the evaluation of environmental policy (e.g. Schneider/Sprenger, 1984) have pointed out at least four crucial issues as being particularly essential for an assessment of environmental policies:

- o effectiveness: While earlier studies often assessed environmental policy on the basis of governmental programmes of action (including laws, regulations, standards, etc.), studies in implementation research (e.g., Bardach, 1977; Barrett/Fudge, 1981; Mayntz, 1980, 1983; Knoepfel/Weidner, 1982) drew attention to policy enforcement and the actual effects on environmental quality.
- o efficiency: In the face of current financial constraints on public budgets and a general economic stagnation, the consideration of pollution abatement costs and related

administrative expenditures has gained tremendous weight in the environmental debate (OECD, 1984; Schneider/Sprenger, 1984).

- o equity: Right from the beginning of the debate on environmental issues the question has been raised whether environmental protection measures will increase the trend towards inequality of favourably contribute to social justice. This discussion often focussed on the question whether middle and upper income groups support environmental concerns primarily in order to defend their own interests (protection of "positional goods") while the poor have to bear the bulk of the costs for environmental protection although their share of the benefits is smaller (Stetton, 1976; Schnaiberg, 1980; Schnaiberg in Knoepfel/Watts, 1986).
- o prevention: Aside from theoretical studies (McHale, 1970) experiences with the unsatisfactory results of environmental policies in most countries have drawn attention to the fundamental shortcoming of existing policies, namely to be reactive instead of anticipatory and preventative (O'Riordan, 1985; European Community, 1983; OECD, 1984).

These four criteria considered essential to an evaluation of environmental policies will be applied in the following assessment of Japanese air pollution control policy. Due to the limited space the first three aspects will only be touched upon briefly. More room will be given to a consideration of the fourth category (prevention) according to the main purpose of the article: to delineate the limitations of technocratic

environmental policy. For this reason, the subsequent section will outline in short the concept of preventative environmental policy and the shortcomings of a reactive, non-anticipatory policy.

3.1. "Anticipate and prevent" versus "react and cure"

Conventional environmental policies are basically reactive, ex post policies. The emphasis is on the restorative aspect after an environmental has occurred. The deficiencies of such an approach are well-known: nature and human health have been seriously harmed, often irreversibly. In addition, the economic shortcomings of this approach are enormous and evoke increasing criticism. Because a problem situation is identified very late and the pressure to take immediate measures then is very high, it is usually not possible to develop skillful and cost-efficient strategies. Moreover, with respect to equity, it must be noted that reactive policies mostly adhere to the taxpayer pays principle instead of the polluter pays principle, especially when emergency situations have occurred.

So, there are many good reasons to develop environmental policies on the basis of an anticipate-and-prevent approach. This does not imply a simple avoidance of problems in one environmental medium (air, water or soil) but calls for a long-term orientated policy giving due consideration to the whole "ecological context." This is, admittedly, a rather difficult task, not only from a theoretical point of view but also from an institutional and political one (O'Riordan, 1985). In several studies (McHale, 1970; Mayer-Tasch, 1974) it was

pointed out that the insufficient consideration of the "ecological context" and the long-term effects of pollution is characteristic of most environmental policies because of their prevailing strategy of peripheral and selective intervention.

Intervention is selective when the environmental political focus is only on one part of the ecological context in which damage has become manifest and when remedial activities are limited to that part, i.e., dealing incrementally with air, water, soil, etc. pollution with medium-specific policies without a systematic coordination of these policies. A peripheral intervention is defined as a policy which does not tackle the cause of a pollution problem in an attempt to eventually overcome it but instead simply "manages" (mitigates) pollutants or controls the last link in a chain of events. In the field of air pollution control for stationary sources, for example, this could be the abatement of harmful emissions by dilution (e.g., tall smokestack dispersion policies) or aggregation (e.g., end-of-pipe technologies such as desulphurisation plants) instead of suing energy saving measures thereby producing less pollutants from the very beginning or, more advancing, introducing structural changes towards modes of production and consumption which would be ecologically sound.

An environmental policy which does not consider the comprehensive ecological context is necessarily limited. With its strategy of selective and peripheral interventions, short to medium-term improvements may be achieved, but the rate of improvements will sooner or later slow down and old problems may reappear to an even more severe degree. There are at least

two reasons for this development: first, the ongoing accumulation of residual pollutants caused by the structurally unaltered sources of problem generation is not prevented (further economic growth, for example, will in the long run nullify positive effects of abatement measures, all the more so since pollution abatement is very rarely achieved to a full 100 per cent; cf. Jänicke, 1985), and, secondly, pollution problems are constantly being shifted from one environmental medium to another.

There are various forms of such an environment related "problem dislocation." In my earlier research work I had come across these mechanisms, and at that time I had pointed out that they must be given special consideration in evaluation studies. (This would, of course, require that studies on policy evaluation cover the actual policy effects and the complete "emission cycle." The difficulties in obtaining the necessary data make this a very troublesome task, so that more often than not it has been skipped altogether; cf. Weidner, 1977; Knoepfel/Weidner, 1983). As far as my previous studies permit a judgment, the aspect of "problem dislocation" can be classified in the following way:

- o Medial problem dislocation: Environmental problems are shifted from one medium to another, e.g., from air to water or soil. Dust collectors, for example, reduce air pollution at the expense of higher water or soil pollution when dusts are recklessly disposed of.
- o Spatial problem dislocation: One region is "cleaned up" at the expense of others, e.g., air quality in urban agglomerations is improved through long-range distribution

- o Temporal problem dislocation: Environmental problems are protracted over a lengthy period of time, e.g., the concentrations of pollutants in the ambient air are being diluted thus avoiding immediate and acute health injuries. This may create a short-term mitigation of critical problem situations, yet, the continuous and long-term exposure to pollutants induces chronic diseases (or impairs well-being) which become noticeable relatively late and are then difficult to trace back to their actual causes.
- o Problem dislocation caused by substitution measures: Industrial processes, raw materials, fuels, etc. are substituted by others (sometimes in response to environmental policy decisions) which may pollute the environment to the same or even to a greater extent, e.g. switching from fossil fuels to nuclear power or substituting phosphates in detergents, which contribute to the eutrophication of water bodies, for the chemical substance NTA, which may wash out heavy metals from river and lake sediments.

With the term technocratic environmental policy I refer to policies which achieve impressive temporary alleviations on the basis of concrete political intervention but "systematically" create the long-term deficiencies mentioned above.

3.2 Evaluation of Japan's achievements in environmental policy

(1) Pollution trends¹²

The achievements of Japan's SO₂ air quality control policy have already been indicated above. A considerable level of pollution abatement was equally arrived at for carbon monoxide (through rigid emission standards for cars) and lead (through the nationwide introduction of leadfree gasoline). Today, 90 per cent of cars are fuelled with leadfree gasoline. Success is not so apparent with respect to suspended particulates: concentration levels are still far from reaching the required national environmental standard, although since 1980 considerable progress has been made. The NO_x air pollution level has been almost stable since 1974. However, at 30 per cent of the installed monitoring stations NO_x values still exceed the national standard. NO_x, along with hydrocarbons (HC), is also responsible for photochemical smog. Between 1973 and 1982 smog warnings and registered health effects have decreased considerably but recently an upward trend has been observed, particularly in the large conurbations of Tokyo and Osaka.

The amount of industrial and domestic waste has also increased continually and waste disposal sites are sparse in densely populated Japan. With respect to toxic substances, the rigid control measures have led to a notable reduction of these substances in water bodies, and hazardous pollutants such as arsenic, PCB, lead, cadmium or mercury are nowadays

very rarely detected in lakes and other waters. On the other hand, water pollution with organic substances is on the increase. According to official reports, several lakes and bays are still "extremely" polluted. The main reason for the bad water quality is Japan's long neglect of sewage systems and waste water treatment. In comparison to other industrial nations, Japan has a minimal sewage network and only 31 per cent of the population are connected to it. Pollution is also still present in the soil, owing to the environmental sins committed in the past when there was no effective legislation against the dumping of chemicals. The situation started to improve when in 1973 Japan as one of the first nations issued a law on chemicals. An investigation initiated by the Government in 1981 revealed that about 124 regions of altogether 6,610 ha were still contaminated with cadmium, copper or arsenic.

Noise and vibration constitute the main public complaints relating to environmental deterioration (about 40 per cent of all complaints in 1982). The main reason for complaints is traffic noise, in particular through trucks. The Shinkansen express trains also rank high on the list of "notorious noise-makers." The rail network for these trains, which was expanded to 1,800 km in 1982, frequently leads through densely populated areas. In recent years more and more complaints have been voiced about health effects due to "inaudible noise" (the Japanese call it "white noise"), i.e. low-frequency vibrations caused by automobiles or trains running over vibratory overpasses. Such vibrations affect the nervous system leading to sleep disturbances, headaches,

vomitting and nose-bleeds, especially in children. As early as 1980, a group of citizens living in the near vicinity of a highway bridge filed a lawsuit against this new kind of "plague of civilization."

Japanese cities may spread out almost unrestricted in all directions like huge octupusses owing to a very rudimentary land use and town planning policy. Hitherto untouched nature fell victim to heavy construction activities. Parks and other recreational land, already sparse in Japanese cities, were increasingly swallowed up by concrete and asphalt. In Osaka alone the portion of recreational land was reduced by 10 per cent between 1970 and 1980. It can be said without exaggeration that the sky has become bluer in Japan, but also that the countryside has definitely grown greyer.

As the above outline shows, there is still much to be done with respect to Japanese environmental policy. Moreover, there are increasing signs that environmental political success is slowing down even in areas of hitherto great achievement, added to which there are new challenges with which to cope.

As regards SO₂ pollution, there have been few further improvements in recent years and in 1983 almost none at all. The switch--motivated by the oil crisis--from oil to coal in the generation of energy would increase SO₂ emissions owing to the higher sulphur content in coal. If negative effects on air quality are to be avoided, then there must be a far greater emphasis on flue gas cleaning. This brings with it not only a financial problem but also problems in

the shape of the by-products gypsum and ash which also can have negative effects on the environment. It is already becoming increasingly difficult to find a market for gypsum arising from flue gas desulphurisation and to find proper sites for the disposal of ash. Coal-fired power plants are widely disfavoured because they produce more pollution, and residents of prospective areas for new power plants are becoming increasingly obstinate in opposing them.

Following the second oil price crisis of 1979 it has become quite an uphill task for politicians to urge industries and power plants to invest more in environmental protection, since there is already growing opposition to existing regulation. The powerful economic umbrella organisation KEIDANREN, for example, demands a revision of the compensation system for health effects.

In the control of SO₂ pollution, the economic, technical, social, political, and monetary limits to a further pursuit of peripheral technocratic intervention are now evident. The inherent shortcomings thereof might become more acute should it turn out that the previous objectives and measures, primarily devised to restore an air quality not harmful to human beings, do not suffice to protect nature. Since there is insufficient information, one can only speculate on whether the Japanese Government purposely avoided such topics as forest damage and acid rain for a long time, in order to delay new efforts in clean air policy which, this time, would have to be made for the sake of long-suffering nature. That which should be learned from the effects of pollution on health, is that prevention is always the best

medicine and that subsequent cures are very expensive; however, this is a lesson which the Japanese Government has still not learned.

As with SO₂ air quality control, similar deficits and follow-up problems become apparent in pollution control for cars and water, as well as waste management. In spite of the introduction of very strict car exhaust standards against the violent opposition of Japanese car manufacturers, NO_x air pollution is still increasing, mainly because the development of abatement techniques (catalytic converters) cannot keep pace with the growing volume of traffic. An environmental policy more concerned with the causes of pollution would have to give more consideration to policies concerning traffic and infrastructure. In Japan, however, with its densely built and densely populated conurbations, environmentally beneficial infrastructure measures are much more difficult to pursue than in other countries. However, this, in its turn, is the fault of Japan's ecologically deficient environmental policy: with only few exceptions, the development of cities in Japan is the result of uncontrolled construction, and Japanese town planning policy rests on an insufficient legal basis (Schwind, 1980; Glickmann, 1979).

Following the implementations of the broad clean air programme, the Japanese Government has developed a similar large-scale programme concerning water pollution, and has set aside immense amounts of money for its implementation. Meanwhile, expenditure for the construction of sewers and for waste water treatment constitute the largest part of

the public budget for environmental protection (Environment Agency, 1983: 71ff.). This political effort has indeed been responsible for the improved quality of numerous rivers. Due to the selectivity of the measures taken there is, however, once again, medial problem shifting. With progressing technology, waste water treatment plants generate growing amounts of contaminated sludge. Meanwhile, about 15 per cent of the sludge can be used for soil fertilization. Most of it, however, is dumped or used for "landscaping." About 10 per cent of the sludge is dumped into the ocean--together with radioactive waste from Japan's nuclear power plants (Powell, 1983).

Because of insufficient measures to prevent the marketing of products whose disposal is technically difficult or dangerous, the unfavourable and hazardous composition of waste still prevails. The increasing amount of plastic waste poses a great technical problem concerning waste incineration. Small mercury-containing batteries have a rapidly increasing market share in the consumer goods sector. They have turned waste incinerations into highly questionably distributors of poison.

(2) Efficiency and equity

Compared to Western industrial countries, the debate on the economic effects of environmental policy (e.g., on the employment situation, growth rates, export business or inflation) has had only a marginal role in Japan. Accordingly, studies on such effects are scarce. This extraordinary lack

in economy-related arguments against environmental policy measures, especially in view of the enormous expenditures in this field--worldwide the highest--, is primarily due to the following reasons: Until 1974, the economic growth rate in Japan was higher than in any other industrial country, thus, intensive pollution abatement measures were introduced under very favourable economic circumstances. In 1975, private expenditure on pollution abatement had reached its peak (17.7 per cent of the total capital investment). After 1976, private investments decreased notably, but only a few years later, about 1980, picked up again. In the mid 1970s, public expenditures, particularly for sewer systems, waste water treatment and waste incinerators, also increased remarkably. It must, however, be noted that this investment policy was partly pursued to accelerate economic growth and maintained even in phases of a general economic slowdown as a means of general industrial policy to modernize the country's industrial structure. It was the intention to shift the emphasis from resource and energy intensive, heavy industries to so-called "knowledge-based" industries requiring less inputs of energy and raw materials (OECD, 1977).

Considering the improvements in environmental quality, environmental policies (including industrial policy measures aimed at energy and resource saving) and anti-pollution expenditures "appear to have been fairly efficient" (OECD, 1977: 67). Moreover, a tentative assessment of the macro-economic consequences of environmental policies comes to the conclusion: "that the impact of relatively high pollution abatement costs on macro-economic magnitudes, such as GNP,

employment, prices, and foreign trade, is practically negligible" (OECD, 1977: 87). Japanese experts even went a step further when they stressed that strict pollution abatement regulations and the activities of anti-pollution movements exerted a favourable influence on industry, helped overcome the two oil price crises in the 1970s and secured the continuation of the "Japanese economic miracle" (Ui, Miyamoto, in Tsuru/Weidner, 1985).

Even though it is generally very difficult to assess the effects of environmental policy on equity, or rules regarding social justice, the case of Japan clearly reveals that equity was furthered by anti-pollution measures. From the outset, those groups had suffered most from pollution who generally hold a very weak position in society, i.e., the old, the young, the ill and the poor (Miyamoto, 1983: 5ff.). Furthermore, the basic principles of the court decisions in the "4 major pollution cases" and the administrative system of compensation for pollution victims have substantially strengthened the power position of these groups (see above). However, there still are many disparities, especially with regard to the preservation of the natural environment per se. Here, the principles derived from the law of torts within the Civil Code are less suitable because they do not provide a sufficient basis for litigation against public development projects (e.g., motorways, airports, railroads) to prevent damage to the natural environment. In response to these difficulties, environmentalists have developed a concept of an "environmental right" based on the constitutional guarantees providing for a full and cultured life. As recent court decisions show, this concept has not

found favour with the Japanese judiciary.¹³ For several years, environmentalists--supported by the Environment Agency (equivalent to a ministry)--had fought for the enactment of a law on environmental impact assessment. Owing to the strong opposition of industry and influential ministries the proponents of this law eventually had to give up. In 1984, their up to now final attempt to achieve a positive Cabinet decision on the bill had failed once again (Japan Environment Agency, 1985).

As questions of equity apparently tend to become the more difficult to evaluate the more environmental policy focusses on "amenity" (Blower, 1984), the Japanese case is, all in all, a rather simple one since the stress was on the diminishment of health hazards. Thus, if we center the issue of equity on the uneven distribution of risks and damages to health and property on emitters and the population (including future generations), Japanese pollution abatement policy clearly has improved the position of the latter. This shift to an increased equity through the reduction of health hazards by means of technocratic pollution abatement is, in principle, not challenged by industries or politicians, even in the face of less favourable economic conditions. So, it may be concluded that conventional pollution control policy (anit-kōgai policy, as the Japanese call it) has become firmly rooted in industrial policy and an accepted social responsibility same as security at the workplace and similar duties of care. Opposition is mainly directed towards attempts to broaden the rather limited approach of avoiding damage in terms of an active policy of preservation and improvement of environmental quality (and amenity) as such.

(3) Pollution prevention or anticipatory environmental policy?

An assessment of Japanese environmental policies reveals that much has been done to prevent pollution from industrial sources and that legal developments have created strong disincentives by forcing industrial polluters to pay compensation for the damage they cause. However, a preventative environmental policy per se, as a general concept applied to all sectors of public policy-making and private activities, does not yet exist: "Japan has won many pollution battles, but has not yet won the war for environmental quality" (OECD, 1977: 83).

In its 1983 report on environmental quality, the Japanese Environment Agency draws an almost identical conclusion and calls for a more integral approach in environmental policies with a broader consideration of the requirements of the ecosystem. It even speaks of a "mission" in which we should see to it that nature, both priceless and finite, be handed down unadulterated from generation to generation (Environment Agency, 1983: 40). This view resembles closely that of Karl Marx when he postulated that present-day societies do not possess the earth but merely hold it in trust to then pass it on in an improved state to future generations just as "boni patres familias" should (Marx, 1965: 784).

It is obviously a difficult task to fulfill this postulate, not only of Japan but for all societies. As yet, the concept of anticipatory environmental policy is not a well-defined and clear-cut one. There still are many theoretical and methodological problems to be solved including the most important question of how to implement this concept under existing political and administrative conditions (O'Riordan, 1985). Nevertheless, the "notion" of such a concept may provide an excellent basis for the analysis and evaluation of existing environmental policies as well as for the long-term planning of the future relationship between man and nature.

3.3. The Japanese approach: technocratic environmental policy

In spite of the general ecological shortcomings of environmental policies in all industrial countries--apparent in peripheral interventions rather than interventions related to cause--an international comparison nonetheless reveals some distinct differences among the various policies of individual countries. These become apparent in the various kinds of policies applied according to their respective regulatory instruments (e.g., laws, regulations, economic incentives, etc.) and in the results thereof as reflected in the development trends of environmental pollution. For example, unlike many industrial countries, Japan has

established quite unconventional regulatory instruments, with great emphasis on technological innovation, and has now taken the lead in many fields of environmental technology. Furthermore, because of its technological progress Japan has, to an astonishing extent, succeeded in alleviating severe pollution-related problems. All this has been achieved on the basis of a kind of policy which I refer to as active technocratic environmental policy.

The difference between an active technocratic environmental policy and other forms of environmental policy equally indifferent to the overall ecological context can be characterized by the following features:

- o In the development of concrete pollution control measures the emphasis is on technical feasibility rather than on the legal bases for such measures.
- o For selected problem areas stringent goal-means relations are set up and, moreover, the goals to be reached are very explicit and not intentionally vague. In this respect it is noteworthy that in Japan the legal basis for the formulation of environmental policy measures is often less precise (formalized) than in other countries. Nevertheless, these objectives are a far greater impetus for action. This may be so because the actors involved (as a rule representatives of administration and industry) are willing to strive for objectives once they have been mutually agreed upon regardless of whether they are legally enforceable (OECD, 1977: 26).

- o To achieve environmental policy objectives a short, and sometimes medium-term deadline is envisaged, and implementation is strictly supervised, e.g., by a comprehensive and sophisticated monitoring system.

An environmental policy bearing these three features is called here active technocratic, and not simply effective, policy, since it adheres to technocratic problem solutions in spite of its relatively good qualities. Policies which pursue transcending problem solutions would have to deal more directly with the causes of problems in an attempt to eventually overcome them. Thus, Japanese environmental policy remains an intrinsic part of the political system, which is still dominated by a power coalition consisting of big industry and the most influential fractions of the ruling party and bureaucracy and pursues an economic growth policy based on industrial expansion.

What makes Japan so remarkable and outstanding is the mere fact that other industrial countries have not yet reached the same level of activity in their--likewise technocratic--environmental policies (OECD, 1985). Japan is one of the few countries to have succeeded in alleviating massive environmental political conflicts, which otherwise would have had far-reaching consequences for industrial policies, by taking effective pollution abatement measures compatible with the economic and political system. Anti-pollution protests, which had a tendency to grow into an anti-industry movement, posed a challenge that was quite unusual for the Japanese political system. This challenge and the impending

danger of mushrooming litigations against all sorts of industrial pollution have been channelled into surveyable and "manageable" procedures. Nevertheless, a great deal of latitude previously attained by local governments and citizen action groups still remains, above all the possibility to conclude pollution control agreements with industries--an effective strategy for pollution abatement which is not state-controlled. All in all, one might say--and, as a matter of fact, it has been widely acknowledged--that the pollution disputes, in general, have had a favourable effect on Japan's democracy: committed citizen action groups have gained more rights to participate in decision-making processes of vital public concern and local authorities have attained more influencing control thus softening the prevailing authoritarian centralist policy (McKean, 1981; Pempel, 1977).

On the other hand, the visible success of environmental policy has eventually led to a decrease in environmental activities of citizens and local authorities. There are still some relevant groups calling for a genuine environmental (conservation) policy, but compared to former times they are less in number and also less active (Ui, in Tsuru/Weidner, 1985).

4. Approaches to air pollution control in Europe and Japan: some comparative remarks

Air pollution control has quite a long tradition. However, in many western European countries, with the exception of England (Hill, in Downing/Hanf, 1983), a systematic and comprehensive policy was not developed until the 1970s. In this section I shall compare

the Japanese approach to some of the European approaches-- based on the results of a cross-national comparative study on air pollution control policies in selected EEC member countries.¹⁴ Owing to the complexity of this research area this can, however, only be done on a very general level.

Japan's air pollution control policy is a rather peculiar mixture of formal requirements, informal guidance and decentralized implementation practices. From a formal point of view, Japanese air pollution control policy is of the "regulatory type", i.e. basic goals are set by comprehensive and detailed laws and regulations, enforced according to formalized procedures by the responsible authorities. In actual fact, however, the most influential pollution control measures are applied by local authorities ad hoc and on a non-legal basis. National regulations, in terms of ambient air quality standards and emission standards for specified pollutants and pollution sources, mostly serve as minimum guidelines. As a matter of fact, local governments commonly impose tighter standards. Potential economic consequences are usually taken into consideration, but, nonetheless, requirements are frequently 2 to 3 times stricter than those set by the central government. The companies regulated are allowed to choose the most economic pollution control measures and are, therefore, granted reasonable deadlines and much latitude with respect to which means of control they prefer to apply. As these local pollution control requirements result from a consideration of two aspects, namely the local environmental condition and the

economic situation of the companies concerned, regulations vary to a great extent from one area to another (Weidner, 1985). Nonetheless, even relatively "weak" local standards are--by international comparison--still rather strict.¹⁵ In this way, the innovative part played by local governments in the history of Japan's pollution control continues to prevail in their enforcement activities. The support from their constituencies in applying tight measures against industrial pollution has remained strong over time, and the direct involvement of citizens in these matters is still considerable although it has decreased in the past few years. All in all, the so-called anti-pollution agreements (there are now about 23,000) have proved to be the most effective means of Japan's approach to controlling stationary sources. These agreements are the result of bargaining processes between emitters, local governments and citizens. Within the enforcement system the role of courts is almost negligible (litigation is mainly restricted to compensation in case of health injuries).

With respect to the policy instruments used it is furthermore an important characteristic that direct administrative control is preferred over indirect economic incentives for pollution abatement. It is true, the Japanese government has encouraged private investment in pollution abatement technologies (via tax concessions, low interest loans, favourable depreciation rates, etc.), and it has created a "negative incentive" by introducing a charge on SO₂ emissions in connection with the compensation system for health injuries, but most of the measures taken are basically non-economic. The selection of policy goals and instruments

is guided much more by the aim to reduce pollution than by cost-benefits considerations (OECD, 1977). The well-organized and comprehensive network of monitoring stations for ambient air quality and emissions, which is operated almost exclusively by local governments, and the continuous publication of data serve as an important basis for authorities and the general public to assess the achievements in air pollution control policy.

In contrast to pollution control of stationary sources the exhaust standards for automobiles are set by the central government. Against the vehement opposition of the car industry a graduated time schedule was established and implemented, although with a two-year delay. Nevertheless, Japan has taken the world-lead by introducing the strictest car exhaust standards. Even in this central government policy domain the local governments played a decisive part in pushing through the strict standards by taking political action (see above).

To sum it up: the environmental policy approach in Japan provides sufficient instruments and institutional arrangements to cope with pollution dangerous to health but it lacks provisions for the preservation of the environment per se. This is presumably due to the fact that public awareness is as yet too weak for an efficient politicization of the issue of nature conservation. More sceptic observers think that only a severe environmental catastrophe might create the necessary impetus for Japan to give up her primarily health-oriented, technocratic anti-pollution

policy and to enter a new phase of economic and social policy (Reich, 1983).

During the 1970s, most western European countries had either enacted their national clean air laws or amended existing regulations for the control of domestic and industrial emissions. In addition, new administrative agencies were established or reorganized. Public concern about damage through air pollution has increased ever since, and, in view of the transboundary nature of many air pollution problems, steps towards an international cooperation in this area have been initiated. In this respect, the European Community has come to play an increasingly active role in shaping the environmental policies of its member states. However, the policy approaches and the effects of pollution control policies vary greatly among EEC countries (cf. Knoepfel/Weidner, 1985; OECD, 1985).

Classifying air pollution control policies in EEC member countries according to the legal and actual rank of standards for air quality and emissions, one comes up with two basic types and one mixed type of policies:

- o Type 1: legally binding standards for ambient air quality and emissions as a basis for regulatory activities (air quality management approach);
- o Type 2: general requirement to treat each case on its own merits, guided by considerations of technical feasibility and economic implications of emission abatement (best practicable means approach);

- o Type 3: no (or no legally binding) standards for ambient air quality but statutory emission-oriented standards (mixed type).

In the Federal Republic of Germany the stress is on type 1, whereas air quality control policy in Great Britain is largely based on type 2; in the Netherlands, the mixed type 3 is prevailing. In spite of these differences in the basic approaches, the results of a multi-national comparative study on air pollution control policies for stationary sources in selected EEC countries show that the respective features of different approaches have not relevantly influenced the reduction in emissions and the improvements in ambient air quality achieved (Knoepfel/Weidner, 1983; 1985).

The following factors have had a much greater influence: the degree of environmental awareness, the number of issue-oriented (air quality) citizens action groups and their organizational strength, the provisions for a substantial participation of citizens in environmental policy decisions (both on the level of programme formulation and implementation), the availability of data and their public disclosure (monitoring and control), and the degree of environmental pollution (for details cf. Knoepfel/Weidner in this volume).

The aforementioned studies revealed that all types of approaches are susceptible to influences from interest groups which they try to exert at various levels employing a broad range of means and strategies (Knoepfel/Weidner, 1982). Thus, the less developed factors mentioned above are, the greater is the likelihood for merely marginal results in pollution abatement. The great variance in these factors explains much

of the fact that the two countries pursuing the most contrasting types of approaches (i.e. FRG and U.K.) have produced very similar results and consequences of their air pollution control policies for quite a long time: reduced emissions in the domestic and industrial sectors, but increased emissions from power plants, as well as the "dilution of pollution" via a "policy of high smokestacks." Except for the Netherlands, the other EEC countries exhibit much the same developments. Therefore it is not surprising that now almost each country has similar problems with acid rain, although to varying degrees due to the different natural and meteorological conditions and to the different emphasis put on air pollution control policy by local authorities (see Knoepfel/Weidner in this volume). Moreover, in all countries investigated the four types of problem shifting as described above occur in considerably greater quantity than in Japan. In this respect, Japan could benefit from her relevant achievements in emission reduction. A comparison of EEC countries reveals that Great Britain holds the top position with regard to medial (dumping) and spatial (policy of high smokestacks) problem shifting.

For mobile emission sources policy approaches and their effects (namely, increasing amounts of total emissions) are more or less identical since this area is, to a great extent, regulated supranationally (on the EEC level). This policy area especially demonstrates that international coordination of environmental policies and strategies is not so much a question of what is ecologically necessary and technically feasible, but rather a matter of politics as such. In view of the EEC's general failure to develop a meaningful environmental policy considering the international implications

of pollution problems, it is very important for any discussion on or formulation of international environmental policies to give this aspect of politics better consideration than has previously been done. To develop such a "realistic" international environmental policy will certainly be a most difficult task, considering that existing international agreements and treaties have only been reached after sluggish and conflict-laden negotiation processes and then have only had little effect in improving environmental quality. Moreover, the scientific basis for a realistic international environmental policy is rather weak. Hitherto, policy research on international or global environmental problems has more or less neglected the issue of politics in highly complex multinational bargaining situations where the flow of information is restricted (and biased) and the chances for ecology-oriented actor groups to participate are limited (Weidner/Knoepfel, 1981, 1985).

A comparison of air pollution control policies in Japan and EEC member countries focussing on implementation and effects shows the significance of political factors which can modify the power structure in favour of those affected by pollution. Of particular importance were, for example, the innovative principles established by Japanese jurisdiction in connection with the four major pollution cases and, in reaction to the severe health injuries, the fundamental changes of attitude among the Japanese population and local authorities towards environmental pollution. The evolving widespread opposition against industrial and infrastructural development projects put the central

government under pressure to take effective action. In order to regain power of control, particularly with respect to industrial policy, the Japanese government simply had no other choice than to tackle the critical situation with immediate and noticeably successful measures (compensation of health injuries, restoration of an environmental quality preventing further damage to human health). In this respect, the weakened power position of industry-related groupings within the central government has decisively influenced the environmental political objectives and instruments as well as their legal and institutional incorporation. In the end, the basic principles of the court decisions on the one hand, and the rigid implementation measures applied on the local level, on the other, had to be adopted for the national environmental policy. Japan's rapid and considerable achievements in pollution abatement cannot primarily be interpreted as autonomous effects of environmental policy instruments. They must also be attributed to the fact that the business sector, for its own sake, accepted a strategy of fast pollution reduction. This, however, could not prevent that, in the course of time, some policy instruments developed a kind of independent existence, neither anticipated nor desired by industry and the government, which led to pollution abatement measures by far exceeding the mutually sanctioned policy objectives. Among the policy instruments with "unintended" effects are the compensation system for health injuries, the pollution control agreements on the local level, and

the requirement to monitor the ambient air quality and emissions and to regularly report on the results.

The political preconditions that largely shaped the policy objectives, the selection of instruments and the enforcement activities were, nevertheless, also the cause for the deficits in Japan's environmental policy: the primary demand was compensation for and prevention of health injuries--not environmental protection per se.

4. What can be learned from Japan?

The aforementioned conclusion that "Japan has won many pollution abatement battles, but has not yet won the war for environmental quality (OECD, 1977: 83) still holds true. As I tried to demonstrate in the preceding sections, Japan's efforts in pollution control lead to an ambivalent assessment. From a long-term, ecological perspective their success was only limited because of their negligence of the environmental context and the "new problems" that arose from established pollution control activities. On the other hand, Japan has reduced pollution loads harmful to health and property at a pace and to an extent presumably not achieved by any other nation. This "ambivalent result" can be explained with the Japanese technocratic approach of selective and peripheral interventions which--by ignoring the ecological context--are effective in the short run but fail to substantially tackle environmental problems.

In addition to this more general experience which can be drawn in concreto from the results of Japan's advanced technocratic environmental policy, the following aspects may be of basic interest from a comparative angle:

- o Evidently, there are much more feasible pollution abatement techniques available than industries and responsible authorities in other industrial countries usually admit. Not long ago, it had been officially averred, e.g. in Great Britain and West Germany, that there were no suitable facilities for flue gas desulphurisation or denitrification (cf. ECE, 1980; Weidner/Knoepfel, 1984). An observer of the very recent discussion on the introduction of stricter car exhaust regulations might have experienced vivid déjà vu listening to the arguments brought forth by industry and politicians. The Japanese example clearly demonstrates that technological progress can be decisively accelerated when emitters are put under political pressure. Furthermore, decisions on pollution abatement measures in concrete cases (e.g. permit issuing) may be influenced in other countries by pointing to tested and applied techniques in Japan. Anyone who has either been involved in such decision processes or done case studies on this subject will know what an important role empirical information on practicable abatement devices has in situations of conflict (cf. Blowers, 1984). It can be said without exaggeration that information on Japanese abatement technologies have decisively influenced the political

debate on air pollution control in West Germany.

- o The substantial participation of the public proved to be fundamentally important for enhancing pollution control programmes. In this respect it can be learned that comprehensive, reliable, concrete and continuous information on all relevant environmental aspects (damages, emissions, environmental quality trends, etc.) is a prerequisite for the development of an unbiased, non-manipulated environmental consciousness and for a substantial participation of the public. Furthermore, reliable and problem-oriented monitoring data are a basic requirement for the preparation of rational pollution abatement programmes and also an important means for the general public to evaluate the achievements in environmental protection. In most EEC countries the means for public information on environmental issues are still in their infancy.¹⁶ Compared to other nations the system of environmental monitoring and reporting in Japan has reached a high standard and is by far better established.

For a meaningful participation it is furthermore necessary to have legal provisions for affected citizens or environmental interest groups to influence government policy and the behaviour of emitters or to seek remedy for damages caused by pollution through court action. In EEC countries the strict requirements for standing to sue and the restrictive legal doctrines often preclude court action by concerned citizens

and environmental organisations. In cases of actual or potential damage the burden of proof rests with those affected. They have not only to prove the cause-effect relationship but also the particular pollution source responsible for this. In complex cases such as damages through air pollution it is almost impossible to meet these requirements. It is no exaggeration to say that the dogmatic legal principles applied to environmental conflicts are mostly to the benefit of those polluting the environment. The Japanese experience shows that in order to create some kind of "parity of weapons" for those affected by pollution it would be most important to reverse the burden of proof and to introduce clauses of strict liability. With respect to cause-effect relationships it would be equally important to apply principles of plausibility and to accept statistical (or epidemiological) evidence.

- o Finally, we can learn from the Japanese that when the social pressure to take environmental protection measures subsides government and industry soon slacken their efforts. That this mechanism has not gone unnoticed proves the current debate on the introduction of more economic and flexible instruments into environmental policy in order to increase the incentives for emitters to do more for the environment more effectively. For that aim it would be very useful to draw upon Japan's experience with instruments such as the strict liability clause, SO₂ fees and

pollution control agreements. On the other hand, environmental policy is also basically a question of administrative action or inaction. Therefore, considerations of how to create more incentives should not neglect the administrative system. What can be done to incite the responsible authorities to do more than is required by law? Aside from the fact that, to my opinion, there is a lack of basic research on this problem in general, the Japanese example, again, may provide some simple answers. What we need is an increased transparency of administrative achievements (e.g. through a better environmental monitoring and reporting system), instruments such as pollution control agreements and a strong public concern for the protection of the environment.

Notes

- 1) I am indebted to Michael Hill and especially to Andrew Blowers for stimulating and helpful comments on a former version of this article. Any remaining errors and omissions are entirely my own responsibility. This article is a revised and expanded version of my article "Erfolge und Grenzen technokratischer Umweltpolitik in Japan" published in Aus Politik und Zeitgeschichte B 9-10/1984, pp. 31-46.
- 2) The Japanese usually distinguish pollution abatement policy (anti-kōgai policy and environmental protection policy). The former refers to conventional pollution abatement policies whereas the latter includes nature conservation and amenity. In this article these terms are not strictly separated.
- 3) For general information on the theory and function of symbolic politics see Edelmann, 1964.
- 4) An English translation of the complete text of the basic environmental protection law is published in Japan Environment Agency, 1984: 1-8.
- 5) The following cases are covered: the Itai-Itai disease in areas along the Jinzu River (Toyama Prefecture); the Minamata disease in the Minamata area (Kumamoto Prefecture); the Minamata disease along the Agano River (Niigata Prefecture); and the respiratory ailments and lung diseases in the Yokkaichi area (Mie Prefecture).
- 6) The official ambient air quality standard indicates the level of SO₂ concentration in the ambient air which is presumably not harmful to human health. It is not a statutory standard but serves as a guideline for environmental policy. In Japan the daily average of hourly values shall not exceed 0.04 ppm (110 ug/m³). The corresponding standards for carbon monoxide and suspended particulate matter are 10 ppm and 0.10 mg/m³, respectively. For nitrogen dioxide the daily average of hourly values shall be within the range of 0.04 and 0.06 ppm or below. For photochemical oxidants the hourly values shall not exceed 0.06 ppm.
- 7) This section refers only to those policies which are unique in international comparison and which have proved to be particularly effective. For a comprehensive description of Japanese environmental policies and organizational arrangements see Gresser et al., 1981, and Weidner, 1981.
- 8) A full-length English translation of the law and the enforcement order on compensation for pollution-related health effects is published in Japan Environment Agency, 1984: 13-69.

- 9) This assessment is based on my numerous interviews of Japanese scientists, representatives of environmental and industrial interest organisations, and of public authorities at the state and local level in March and April, 1985, in Japan.
- 10) For the German discussion on this issue cf. the leading article in the weekly magazine Der Spiegel, January 9, 1984, "Saurer Regen schädigt auch Kinder und Kranke" (Acid rain also harms children and the sick). Japanese investigations have also shown relatively unequivocally that particularly the elderly and children are affected by air pollution. In the industrial city of Kawasaki, for example, they make up about 60 per cent of the patients with respiratory diseases (cf. Neue Zürcher Zeitung of July 22, 1982). In Tokyo as early as 1975, parents of more than 8 700 infants received subsidies towards the cost of health care because their children had suffered from diseases caused by air pollution (cf. Tokyo Metropolitan Government, 1977: 199).
- 11) Interview given to the author at Japan Environment Agency in April, 1985.
- 12) For this section official environmental reports and, in particular, Japanese newspaper printed in English have been evaluated. In addition, interviews were held with representatives of the responsible authorities at the state and local level in March and April, 1985. The presentation had to be kept short here owing to the the limited space.
- 13) Based on interviews with Japanese legal experts in March and April, 1985. Cf. also Awaji in Tsuru/Weidner, 1986 (in preparation).
- 14) The study was mutually funded by Deutsche Forschungsgemeinschaft and Stiftung Volkswagenwerk. Cf. Knoepfel/Weidner, 1985 (in press).
- 15) Based on interviews with representatives of local authorities in March and April, 1985. Cf. Weidner, 1985.
- 16) This does not only apply to data on damages, emissions from stationary sources and environmental quality trends, but also--and particularly in this connection--to information on control activities of the responsible authorities. Compared to other EEC countries, the Netherlands have the most "open system" with respect to public access, whereas Great Britain presumably has the most "closed system." Cf. also the current debate on freedom of information promoted by the British Freedom of Information Campaign which, as yet, has no counterpart in West Germany.

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