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Chapter 6

The Means of Environmental Policy

Preface

This chapter offers a more detailed discussion of the methods that we shall need to use to achieve an environmental policy that will, once the aim has been clearly set, become the principal subject matter of further discussions about how best to achieve that aim. Our main concern here will be to analyze the relationship between policy methods and the regime actors. We hope to show that the policy instruments operate as a tie-in between environmental governance and the regime actor's capability.

We wish to demonstrate that the combination of policies known more familiarly as the 'policy mix' — the personal styles and the mutual relationships of the regime actors themselves as well as each regime actor's individual ability and the policies that will nurture their voluntary participation in seeking to solve the problems — will be equally indispensible in dealing with the environmental issue.

1 Theoretical basis for selecting environmental policies

As for Japan, *The Third Basic Environment Law* of 2006 divides the instruments of environmental policy into a number of categories: among others, the direct regulation method, the framing method, the economic method, the voluntary participation method, the information method and the procedural method. In this text, however, we have grouped these categories under three headings: the direct (regulation-based) method, the indirect (economy-based) method and the basic (information-based) method. Each of these can be further distinguished with respect to the involvement of the regime actors, the methods that involve a governing public institution, devices for controlling the polluter, and the voluntary contract between regime actors (see Table 6-1).

In the case of the direct method, and through the offices of public institutions, environmental protection includes the maintenance of the environmental infrastructure, urban planning and public investment in the conservation of the environment, while direct regulation or regulation of land-use takes responsibility for the control of such polluters as factories. The voluntary contract between the regime actors can, for example, be achieved through willing cooperation on pollution-prevention methods agreed on between local governing bodies and companies.

The indirect method includes research and development, as well as sus-

tainable (green) procurement on the part of public institutions. Until now, the (indirect) economic policies which have conventionally played a key role in creating the incentive for following environmental policy have featured the control of development and have been aimed against polluters. In the future, however, a voluntary contract between actors that empowers them to act will become more important.

Finally, the basic method is indispensible for the prevention of informational asymmetry between the regime actors, while meeting the public's rising consciousness of dangers to the environment. Thus, the basic modes of selection for environmental policy are economical effectiveness, informational efficiency and reduced administration costs, the creation of incentives to ensure fairness, trustworthiness, adaptability and the renewal of technology, as well as the encouragement of political tolerance.

The development of a proper environmental policy will finally depend on the heightening of the regime actors' ability and the independence of each system. The variety of these criteria creates the need to balance the elements of environmental governance. In the case of the reduction of greenhouse gases, the Kyoto Mechanism, the CDM and emissions trading systems have been introduced for economical efficiency, while, at the same time, emission reduction targets have been established for each country separately with due

Table 6-1 Classification of environmental policy instruments (Ueta, 1998: 60).

Actors	Public sector	Polluter control	Self-intiative and agreement
Direct (Regulation-based) method	Environmental infrastructure (drainage, waste disposal), city planning, public investment in environmental conservation	Land use regulation, direct regulation	Pollution prevention agreement, voluntary agreement
Indirect (Sconomy-based) method	R & D, green procurement	Surcharge, subsidy, emissions trading, taw relief	Eco-label, green purchasing, environmental organization system
Basic (Information-based) method	Public disclosure right, environmental monitoring, environmental information data-base, environmental assessment, environmental education		

regard to its ability to reach them.

2 Direct (Regulation-based) method

Direct regulation consists, first, of an environmental standard, based on the law and set by a civil authority, which is then formalized as a goal and imposed as a duty upon all the regime actors, in order to cope successfully with a diversity of short-term situations. 80% of the EU's environmental policy is still based on direct regulation. The problem inherent in the direct method is that considerations of economic efficiency within a limited cost equation become the secondary concern.

The rationale of the direct regulation step is based on the public interest theory in three specific cases:

[1] In the case of imperfect competition and natural monopoly (e.g., the too lenient regulation of the electricity industry),
[2] In the case of information incompleteness (e.g., the overly permissive regulation of the medical industry),
[3] In cases when 'externalities' are present (e.g., when environmental regulation is needed to correct market failure).

We will examine the third case in detail.

As we have said in earlier chapters, it is because a "market" does not normally function efficaciously and because such market factors ("externality") result in both pollution and an environmental dis-economy that the need for environmental regulation became clear in the first place. Although "market failure" was the cause of such disasters as the Minamata disease, where money was saved on the factory's anti-pollution equipment, "government failure" was also to blame in so far as the government delayed the introduction of environmental protection policies, thus ensuring the escalation of the damage. The "government failure", along with "market failure", is largely a phenomenon of 20th century economics, and examples of "government failures", such as the failure of socialism or of the Keynesian deadlock, need to be rethought within the framework of environmental regulation.

Turner et al. (1994: 80) defined the three causes of "government failure" as follows:

[1] When government policies offer favorable conditions for a particular social minority to amass funds,

[2] When the government is unable to obtain correct information,
[3] When government officials are unwilling to take responsibility for the results of their decisions, or are disinclined to pay appropriate compensation.

Let us examine an example of how "government failure" can exercise an adverse influence on the environment.

Against the backdrop of the Plaza Accord of 1985 and with an expansion of domestic demand, the Japanese government introduced the Resort Act (*The Act for the Development of Comprehensive Resort Areas*) in 1987. The Act's initial premise (Article 1) claimed that areas rich in "natural wealth" were favorable for exploitation by private enterprises or companies and could therefore be developed as resorts. This was meant to bring about an expansion of domestic demand to reignite the interest of the urban population in the world of nature and to revitalize the private economy, all in one fell swoop, hitting, as it were, three birds with one stone. The government believed that by the creation of the "resorts" it would both ease the friction that had occurred after the 1985 Plaza Accord and solve the concurrent problems of agriculture and housing.

Before the 1987 Act, the determined efforts of environmental conservation had proved a major hurdle for large development projects, but once this obstruction had been removed, the Japanese "resort boom" began in earnest, encouraged by preferential tax remittances. By 1990, approximately 900 separate projects had as a result been drawn up in all 47 of the Japanese prefectures, and 20% of Japanese land had become targeted as ripe for resort development.

This naturally caused a surging rise in land prices and eventually became one of the greatest contributors to the national debt and ultimately to the "bubble economy". Many local administrations attempted to obtain permission from the government to borrow large amounts of money from banks, and to obtain subsidies and tax relief. Private capital became entangled in competition to create new golf courses, ski resorts and resort hotels. The resort projects governed by the third-sector were considered almost as public corporations and were, to some extent, treated as public works. It became very unclear indeed as to who was in overall control and who would take the ultimate responsibility.

After the bubble burst, Japan was left with enormous debts and severe disruption of the environment, so that the question we now have to answer here is to decide who was responsible for the legislation process pertaining to

the Resort Act: what parts were played by the government, the developers and the various self-governing bodies who sought to take advantage of the Act? (Sato, 1990) While the invitation issued by governments and local authorities to indulge in this type of "developmental impulse" was not limited to Japan (China, for instance, underwent a similar craze), Japan's "Resort Boom" legislation included subsidies, tax relief, a relaxing of environmental regulations, all of which promoted the bubble economy.

We are now faced with the question of how to prevent the government's failure to take action when action is called for. The EU, for instance, has instituted certain regulations, whose speedy implementation will offer both short and long perspectives, by arranging for (1) a policy impact assessment, (2) dialogue between the actors, and (3) consultation through the internet.

The *Japanese Basic Environment Law* represents every aspect of environmental control as a separate issue (Kurasaka, 2004), and among those aspects that especially interest us we find "discharge regulation for pollution control", "regulation of land-use and placing facilities for pollution control", "general regulation for natural conservation" and "particular regulation for natural conservation".

Consequently, we can summarize the regulatory aspect of the Law's provisions under three headings: 1) mode regulations (e.g., regulation of the water treatment tanks), 2) performance regulations (e.g., auto exhaust regulations), and 3) procedural regulations (environmental impact assessment).

2-1 Environmental standard

An environmental standard is an administrative aim of the government that seeks to protect human health and preserve the living conditions that allow this. Among the seven recognized public hazards that are to be dealt with in terms of the government's environmental standard, we note air pollution, water pollution, soil pollution and noise pollution, while the environmental standard stipulates the discharge standard for each particular type of material, for example, the controlled discharge of waste waters or smoke. Although telemeters are in some cases used to monitor big emission sources, the methods employed for this monitoring are varied.

In Japan, the national standard is actually the minimum standard, on the basis of which local governments are free to impose their own additional criteria. Furthermore, they can impose restrictions on the total volume of emissions in an area of high toxicity. More specifically, the environmental standards are decided upon as a consequence of interaction between the government, the industry and the populace of a specific neighborhood. In

other words, the regime actors' relationships are important in finally deciding a concrete reference value.

When, in Japan, however, the nationwide standard was being decided, the influence of industry was particularly strong, which is one of the reasons why direct regulation has not always been efficient or effective. Although the environmental standards may be decided locally through pollution prevention agreements, this also means that there can be discrepancies from area to area in standards of acceptable drainage levels or smoke emissions. These discrepancies, of course, have stemmed from the involvement of different systems and particular regime actors.

In Japan, the civil authority establishes the emission standard, although the methods by which this is to be achieved are entrusted to each individual company. In the US, on the other hand, the methods are implemented through the operation of the technical designation model BACT (Best Available Control Technique), which has often been criticized for its lack of flexibility and its inefficiency. We therefore maintain that the creation of a system that allows for and encourages the involvement and growing influence of the regime actors themselves will be indispensable.

2-2 Restrictions on total volume

In areas where serious air or water pollution constitute actual as well as potential problems, the gross weight of the polluting material responsible for the problems has to be strictly regulated if the area is to maintain a standard of purity that is environmentally acceptable.

In Japan, measures that fall under the Air Pollution Control Law have been introduced in places of industrial activity where the levels of SOx and NOx are high. As a consequence of the *Water Quality Pollution Control Act*, restrictions on total volume are now implemented in the areas around Tokyo Bay and Ise Bay. The same is true for the Seto Inland Sea, thanks to the *Act on Special Measures concerning the Conservation of the Environment of the Seto Inland Sea.*

Methods to restrict the total volume of pollution start with a plan to reduce the pollutant itself, after which the discharge gross weight is decided case by case. In the process of deciding upon the emission standard and the criteria of restrictions on total volume, the techniques and costs of each industrial establishment are taken into consideration. Specifically, each local government serves to coordinate the agreements on pollution prevention and sets standards for determining the gross weight and density of the discharge with each individual establishment that is located within its own area or

jurisdiction.

Various steps, such as awarding subsidies and tax relief, finally enable the establishment to achieve the criteria that are set forth in the final agreement. The restrictions imposed on greenhouse gases are examples of restrictions on total volume from which we may learn much.

2-3 Agreement on pollution prevention

An agreement on pollution prevention is a contract between the industry, the local municipality and the population of each particular area, although another type of pollution prevention agreement is limited to the industry and the area's population. In both types of contract, the industry promises to obey the anti-pollution measures that have been agreed upon. In the 1980s, agreements on pollution prevention in Japan amounted to 2,500 contracts every year, but since then industrial activity has shrunk, and these days the number of contracts a year comes to less than 1,000.

An evaluation questionnaire carried out by local governments has found that pollution prevention agreements possess three advantages. First, they are adaptable to local economic and natural conditions; second, companies are more willing to provide technological information about their activities; and, thirdly, they make it a good deal easier to obtain the people's agreement to build new plants (Matsuno, 2007).

In recent years, enterprises have shown a wish to acquire some such environmental auditing certificate as the ISO14001, and, in order to do this, they have applied what is known as the PDCA management cycle of planning, execution, inspection and improvement; more precisely, this is termed the goal establishment (plan), its execution (doing), and its evaluation (checking and acting). While this system encourages the enterprise to act spontaneously in coping with environmental problems, this only happens if the goal is adequately outlined and accountability is clear.

2-4 Public infrastructure and city planning projects

In Japan, the sewage system and garbage collection and disposal both play important roles in the infrastructure maintenance of public institutions. How we deal with this issue of waste management lies at the heart of the question of current environmental investment.

Yet in Japan the details of urban planning, which are vitally important to a city's environmental conservation, are largely insufficient, and we need to pay much closer attention than we do at present to the visual appeal, style and contents of architectural structures as well as to the harmony between the

personal and public aspect of newly commissioned buildings. The poverty of imagination and the uniformity of the cityscape, as well as defiling it with advertisements, the weak protection of historic buildings and other important cultural mementos all add to the problem.

In Germany and the Netherlands, urban planning is known as Raum Ordnung ("space order") and it specifies the unity and harmony of the external appearance of buildings, as well as the spaciousness and degree of freedom of movement provided for their occupants by their internal design and layout (Nishimura, 2004). Japan, it is true, has passed the *Urban Planning Law, Building Standard Act*, which divides the regulation of land use (its division, restriction on over-use) into urban planning, architectural planning and factory planning, but, in comparison with European stipulations, Japanese regulations are weak. The main reason for this is that in Japan land-ownership is as strong as any other property right, while, at the same time, the laws of land management themselves do not incorporate sufficient measures to prevent land pollution.

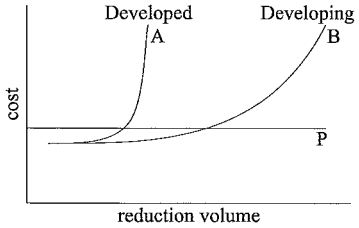
Measures against global warming are largely dependent on urban planning, and there must be unity between parties within the urban infrastructure in order to achieve cogeneration: for example, if an electric generation plant is to be built within the margins of the city, the people affected by this must be consulted and they must agree on the siting and building of the facility. To that end, we need to overcome the sectionalism of the public sector and break down the barriers that hinder the entry of the private sector.

3 Indirect (Economy-based) method

Since the economy-based step in the furthering of environmental policy greatly affects the technical conditions of the economic structural frame, what, in theory, does the economic step consist of ?

Since the minimization of social cost can be achieved by the suppression of abatement and damage costs, the amount of surcharge is determined so that the marginal damage costs equal the marginal abatement costs. This might suggest that all the costs can be evaluated in monetary terms.

But minimizing the social cost does not take into account the allocation of the cost. In other words, the model leaves unsolved the problem of the inequality between the benefit afforded to one party and the costs or damages awarded to the other. For example, in developing countries where the marginal costs are relatively low, the emissions trading systems, the CDM (Clean Development Mechanisms) and JI (Joint Implementation), are more



Note: The abatement level is determined by the intersection between the marginel abatement cost curve and the price. Figure 6-1 shows the situation when the reduction volume in developing country (B) surpasses the level in advanced country (A).

Figure 6-1 Marginal abatement costs.

successful in reducing CO_2 levels than they have been in advanced countries, as Figure 6-1 shows. However, the disparity of CO_2 emission levels per person remains problematic.

The marginal abatement costs for each development source differ greatly, and differ that much more under the influence of a surcharge. Yet since the surcharge must necessarily differ when the local conditions differ, it is very difficult to make practical use of the principle of equalizing marginal costs. In other words, the marginal abatement costs equation is only true for greenhouse gases and materials responsible for ozone layer depletion that are able to move freely through the Earth's atmosphere (Russel and Powell, 1999: 312).

As means to reduce risks to health and prolong human life, the relatively low marginal abatement costs applied in developing countries seem to be more efficient. If the theories of neoclassical economics were correct, it would mean that a country such as Mexico, where the cost of living is relatively low, dedicates more funds to risk reduction than does an advanced country such as the USA. Consequently, this would mean that the CO_2 reduction aim of the advanced countries, along with the advancement of human rights and the living standard of the developing countries, ought to be satisfied in the same way. This problem was first raised during the 2002 Earth Summit meeting in Johannesburg.

3-1 Environmental tax

Types and characteristics

There are three types of environmental tax. One is the incentive type of tax rate, which seeks to restrain intentionally big economic activities that

burden the environment. Another is the finance supply type, which seeks to raise funds for measures to promote environmental conservation. A third is the polluter burden type, which possesses the characteristics of both the incentive and finance supply types, in so far as it taxes polluters and then uses that money to finance environmental conservation (Hosoda and Yokoyama, 2007: 166).

The incentive type, also known as the Pigouvian tax (see Chapter 5), was the first and basic type of environmental tax, and its goal was "to internalize the externality problems" of the environment, which, in plain language, means to deal with potential environmental problems internally, on the factory floor, before they are carried outside the factory gates to work out their problems within the market. Yet, since it was not simply a matter of accurately predicting the marginal cost and marginal abatement curves, it has proved as hard to apply the Pigouvian tax in practice as it was to work it out in theory. For an example of this type of tax, we can take Denmark's energy related tax. Without the tax, the prices of wood pellets, wood chips and straw are actually higher than that of fossil fuel. With the energy tax, CO_2 tax and sulphur tax, however, the relative prices of the fossil fuel become higher than those for biomass fuel.

The Baumol-Oates tax imposes a tax on pollutant discharge so as to achieve a certain environmental benchmark at the least possible social cost. Yet, even this principle is in practice problematic, for, in reality, the environmental tax has come to be linked with the subsidy, and in order to finance environmentally friendly technologies, the level of the tax has been adjusted to the level of the subsidy and has thus grown in a way quite dissimilar to the workings of the Pigouvian tax.

Toru Morotomi, on the other hand, divided the environmental tax into two general types. One of these is an economic model of environmental policy, such as the Pigouvian tax (the internalization of externalities), where taxation itself is the policy, and a system which get targeted taxation of the polluter depending on the benefit that the polluter receives from his business activities (Morotomi, 2000: 31).

The double dividend

It is now said that the environmental tax has caused a shift in the imposition of tax from 'Goods' to 'Bads', which is to say from labor or capital (which are goods) to pollution (which is bad). This means that 1) the labor supply is distorted, and 2) the environmental burden (waste disposal or CO_2) has become subject to the imposition of tax, of which the ultimate goal is

environmental conservation. At the heart of this criticism is the belief that natural resources are the property of mankind as a collective, and that, therefore, all those who use and make a profit of natural resources should be obliged to pay for them.

Yet, by allowing the object of tax imposition to shift from labor or capital to pollution, we may possibly succeed in both conserving the environment and correcting the distortion of economic conditions brought about by the taxation system, as well as providing a means to improve efficiency: this benefit is called "the double dividend".

Studies carried out by the OECD suggest that after taxation has shifted its attention from the relatively abundant component of labor to the relatively impoverished environment, employment has generally experienced a plus effect (substitution effect), while the GDP has experienced a minus effect (nominal income effect). Generally, the reduction of tax impositions on labor, especially if the tax proceeds are used for the reduction of the social security financial burden between employers and employees, brings about a positive effect on levels of employment. By contrast, if the tax proceeds for collective payment are allotted to the domestic economy and reduction of the value-added tax, the positive employment effect becomes smaller, or even becomes negative. According to Binswanger (1983), the reduction of the social security burden for under-qualified laborers is likely to bring about an even bigger positive employment effect.

Should a substantial part of the tax proceeds be dedicated to a target tax, as when, for example, it is used to finance environmental investment, the potential advantage of the double dividend becomes that much less. When the tax proceeds are used for the reduction of capital-targeted imposed tax (for the encouragement, that is to say, of the investment) and the environmental tax is progressively introduced, we can expect the GDP to react positively. The GDP and the employment effect, both therefore depend on the imposition of the tax shift we have thus briefly sketched (when, that is to say, the object of taxation shifts from labor and capital to the materials that are responsible for pollution).

In order to aggrandize profits, it is necessary to reduce the labor imposition tax, and, to that end, a decision to fix the baseline for an environmental imposition tax by, for example, dividing it into the imposition tax on energy or on transport, will be instrumental in bringing about that reduction. The results of simulations generally show that when an energy tax is introduced gradually, so that the price advance does not grow from the yearly 4% to more than 5%, we can expect a positive effect on both the GDP and employment

figures. In Germany, an estimated employment of 250,000 people has been accompanied by a 2.5% reduction of CO_2, all thanks to the ecology tax system. The negative influence of international competitiveness can be effectively controlled by reducing all border taxes, by subsidizing energy-consuming industries, and by easing short-term negative effects of energy consumption.

Recent studies carried out by the OECD have made the following three factors clear; 1) the environmental tax should be the key component of the holistic tax system reform; 2) the auctioning method for allocating the initial endowment of emission rights should be encouraged; and 3) a border tax is the ideal way to conduct public finances so that international liquidity is not damaged (OECD, 2006). In the Nordic countries a number of variations to the environmental tax are commonly implemented in everyday life. In Sweden, for example, taxes on carbon and energy occupy a large share in the environmental tax and are responsible for 3% of the GDP (Nordic Council of Ministers, 2006).

The waste-end tax

The waste-end tax is an example of the incentive environmental tax, as well as of the local environmental tax. In Japan, the local administrations that have introduced the special purposes waste-end tax, as well as those that are considering doing so, have been growing, and recently the majority of administrations have begun to impose this tax. The first waste-end tax regulation was introduced by Mie prefecture in April, 2002, since when 28 local governments throughout Japan have followed suit and by January 2009 were responsible for 8.5 billion JPY in tax revenue.

The following three conditions have informed this process (Kurasaka, 2001):

[1] After the enforcement of the Omnibus Decentralization Law in April 2000, the local municipal authorities were more easily able to introduce outside independent types of taxation (the local discretionary tax, the special-purpose tax).
[2] Since the conventional techniques available for regulating CO_2 and preventing the increase of waste are limited, more and more authorities have recognized the importance of applying economic factors to environmental policy-making.
[3] As the properties of local municipalities become degraded (owing to depopulation and loss of services), the stabilization and conservation of finance becomes a matter of primary concern.

Table 6-2 Classification of industrial waste tax in Japan (Kaneko, 2009: Table 2-3).

Classification by MOE	Theoretical classification	Adoption areas
Self-assessment and payment by producer	Emission oriented, "Charge on carry" type, self-assessment and payment	Mie, Shiga Prefecture
Special levy from final disposal operator	Final disposal oriented, "Charge on carry" type, special levy	Hokkaido, Aomori, Akita, Iwate, Miyagi, Fukushima, Niigata, Aichi, Kyoto, Nara, Tottori, Shimane, Okayama, Hiroshima, Yamaguchi, Kumamoto, Okinawa Prefecture
Taxation on final disposal operator	Final disposal oriented, "Charge on bury" type, self-assessment and payment	Kitakyushyu, Tajimi City
Special levy from incineration & final disposal operator	Incineration & final disposal oriented, "Charge on carry" type, special levy	Fukuoka, Saga, Nagasaki, Ooita, Miyazaki, Kagoshima Prefecture

Let us examine these points in more detail.

In Mie prefecture, the intermediate processing and final output of industrial waste amounted to over 1,000 tons, where for every ton of waste the polluter was charged 1,000 JPY (thus allowing the prefecture to cover 60% of the industrial waste, without exceeding its transportation costs). The tax proceeds were used to assist companies in the development of their waste prevention technologies, to improve the maintenance of dumpsites and their public surroundings, and to reinforce the surveillance of the unauthorized dumping of waste.

The primary benefits to the environment which waste-end tax induction brings about are the acceleration of such good habits as [a] waste prevention, [b] recycling as well as [c] suppression of the influx of waste from other prefectures, [d] surveillance and prevention of unauthorized dump sites and [e] restoration of the environment to its original state. Since the waste-end tax is poorly financed, however, a shift from the income and corporate tax to the imposed tax would provide a more effective incentive for suppressing the

further creation of waste materials.

The use of the waste-end tax as an environmental tax for the conservation of the environment is a new idea entirely. Until recently, the incentive for an anti-pollutant strategy had been based solely on administrative guidance and regulations, and, as such, has been insufficiently effective. Since the reduction of waste leads to a reduction in the burden of tax, however, and as less than 1,000 tons of waste is non-taxable, we can expect an eventual reduction in the quantity of waste itself.

We can argue for its value as a means to keep an eye on the unauthorized dumping of industrial waste, and we can divide the strategies to deal with unauthorized garbage disposal into on-site control and management on the one hand and the issue of cost burden on the other. In the USA, these two issues are taken under the advisement of the Superfund Law that provides tentative systems to deal with them, while the immediate means to cope with the problem of unauthorized garbage disposal include, amongst other things, on-site investigation, and improved management.

The problem of the cost burden has to be dealt with more gradually: after establishing the responsible, polluting party as well as the party responsible for the disposal, followed by working out the method of cost recovery, we can then establish a basic fund while involving the country or the concerned administrative unit in the whole process. Although, at present, Japan has laws in place for the disposal of waste, an amendment that details strategies for the prevention of unauthorized dumpsites was introduced only recently. It now features a clarified clause on the responsibility of the polluter and the basic fund system, which was established as an autonomous contribution from the industry in question and as the subsidy from the country itself. Nevertheless, at the moment neither the metropolitan government nor any of the prefectures is able to cope with the problems raised by the practical execution of these administrative measures.

For example, the responsible party contributes little to the basic fund since in order for there to be a violation of the law, it has to be proven that the party "knew or was able to learn about the correct waste disposal procedure, yet nevertheless did not act in accordance to that procedure". For example, Teshima town, Kagawa prefecture, left uninvestigated the financial responsibility of a waste disposal company and a discharging company within their jurisdiction, while the country itself covered the expenses. Although, since the 17th of June 1998, the industry and the national government have been responsible for three quarters of the basic fund, before this date half the costs had been covered by the national government in the case of toxic materials and

a third for non-toxic materials, drawing the money from public bonds (Seki, 2006: 115).

Although penal provisions are planned as a way of dealing with the causes of unauthorized waste disposal as well as the promotion of recycling and surveillance of the dumpsites, the current state of the country's legislation is still rudimentary and leaves much to be desired.

Forest tax

In 2003, Kochi prefecture was the first authority in Japan to pay special attention to the forest environmental tax as a way of financing the local environmental tax, an idea which, since then, has been taken up by 29 Japanese prefectures.

Kochi is the most afforested prefecture in the country, 84% of its territory being given up to woodland, and the timber industry has been its main business; but as human beings have found it more and more difficult to live in the mountains, rapid depopulation and the ageing of those who have remained has led to problems in the management of the timber trade. An annual amount of 500 JPY was therefore added to the citizen's prefecture tax, so that the individual residents as well as corporations are now asked to bear a part of the forest tax. In 2006, this yielded about 170 million JPY in proceeds, which is then directed to the maintenance of the forest environment.

Money collected in this way is used for two main purposes. One is to encourage the population to believe that it is actively helping to protect the forests, while the other is to ensure that those afforested areas which supply public benefits, such as areas upstream of a dam, water sources, bamboo forests and populated mountains, should be thinned and managed more efficiently. Within a 3-year period, enough conifer and broadleaf trees had been harvested to fill approximately 240 Tokyo Domes. This type of forest environmental tax specializes in the maintenance of the targeted area and we can call it the finance supply type of environmental tax.

3-2 Emissions trading system

We can define emissions trading as "the transferable publicly approved discharge" of a pollutant or CO_2 that is bought and sold (Amano, 2009: 36). If the marginal contamination reduction costs are lower than the price of the discharge approval certificate, companies in this situation will have the incentive to sell it. Inversely, if the contamination reduction costs have a higher value than the discharge approval certificate, these companies are motivated to buy it.

There are two kinds of emissions trading. The first releases the permitted transferable amount to an individual enterprise based on the degree of pollution. If the aim of the reduction is achieved, a transfer (sale) is possible, and there is thus an incentive to reduce pollution.

The second kind of emissions trading is a restriction imposed on the total volume; this is also known as the cap and trade method, which distributes the discharge of all pollutants and thus manages the gross weight of the pollutant. In such a case, there is the need to determine the initial endowment of the discharge. This can be done by [1] distributing the discharge proportionally and free of charge, according to the current discharge level (grandfathering), or [2] through a government distribution method (bidding, auctioning). A completely acquired grandfathering system has the same effect as a subsidy and perfected bidding system, while it has the same effect as a surcharge.

President Obama was planning to introduce just such an auction method into the energy policy of the USA. This should yield the same results as the carbon tax, and further the goal of reduction of pollutants through restrictions on the total volume. Although, in the meantime, it will be necessary to institute measures against price change and risky adventures, we nevertheless believe that the emissions trading system, applied together with constraints on the amassing of local pollution, will become a valuable tool in the balancing of environmental policy.

Although an environmental tax and the emissions trade are indirect environmental methods, Morotomi has pointed to the following discrepancies between them (Morotomi, 2000: 57–59):

[1] Although it may be simpler to revise emissions trading than the environmental tax, it will also engender a subsequent transaction cost;
[2] While the emissions trade system can surely fix the discharge level, the environmental tax cannot guarantee it if the authorities are unable to obtain correct information concerning the marginal abatement costs curve;
[3] As the result of price fluctuations due to inflation and deflation, the environmental tax fluctuates in synchronization with the real tax, and consequently the discharge levels may fluctuate with it;
[4] On the other hand, in the case of emissions trading, even if it were possible to control total emission, it would be impossible to control the value of discharge approval certificates, seeing how their prices may spike as a result of the ventures and differing strategies of the market players;
[5] Finally, the emissions trade system may be used to ease the burden on the party actually responsible for pollution, especially early on, through the

system of bidding and acquired right.

The international solidarity tax (Currency trade development tax)

One suggestion, already adopted by France, is for a kind of international environmental tax, a system that imposes low tax rates on international currency trade or airline tickets, and in this way finances anti-poverty measures and serves as development aid for developing countries. Within two years of its initiation the "international airline ticket solidarity tax" had amassed 200 million euro that could be used to battle infectious disease in Africa, including AIDS, tuberculosis and marsh fever (UNITAID). The currency trade development tax imposes 0.005% on every foreign exchange transaction for the specific currencies around the world. It is said that it would be possible for the tax proceeds gathered this way to come to more than 33 billion dollars a year.

3-3 Surcharge

A surcharge puts a price directly on environmental use and may be divided into the following four types:

[1] A surcharge imposed not only on damage to the atmosphere, water and soil through the discharge of pollutants, but on noise levels as well. The damage costs are decided in response to the environmental impact, which is to say, on the quantity and harmfulness of the pollutants.
[2] A surcharge intended to increase user revenue in connection with the processing costs, and one that would include fees for waste disposal, recovery, cost of disposal and administrative costs.
[3] A product charge imposed where a material harmful to the environment is used and/or is disposed of externally during the process of production.
[4] A deposit system that can be considered a combination of surcharge and subsidy, where a person is charged for incorrectly disposing of bottles or batteries, and is compensated on returning them.

In Russia and China the discharge surcharge on wastewater and air emissions goes into the working fund of the administration, and as this surcharge is set quite low, the effect on the reduction of discharge is small. When in Sweden, however, a surcharge was added to nickel-cadmium batteries, their use declined sharply.

There is considerable dissatisfaction with the surcharge system because the companies that have achieved levels of pollution below the standard set for

acceptable discharge pay nothing while the companies that overstep this standard have to pay a surcharge not just on whatever exceeds the set standard but on the total level of discharge. Yet even more important than creating incentives to justify the tax increase is the need to make the system of gathering the necessary finance both understandable and socially acceptable, as is the case with Germany's drainage surcharge, or with Japan's *Pollution-related Health Damage Compensation Law*.

3-4 Subsidy and tax incentive (Tax breaks)

Once a tax has been imposed on all the polluters, a further technique to help their economic management is to offer them tax reductions (tax breaks) or subsidies if they manage to reduce pollution to levels even lower than the proposed policy criteria. Yet since the delegation of a subsidy is left of the discretion of the administration, it offers an easy opening for political favoritism. Another problem, especially in the case of environmental issues, is opposition to the allocating of funds to the high polluters who are in violation of the PPP (polluter payment principle).

The OECD countries are criticized for the various subsidies given to the farming or mining industries that are actually harmful to the environment. In Japan, subsidies are combined with strict direct regulation. This is a political compromise between the polluter, the victims of pollution and the government. For example, investments aimed at pollution prevention are financed by several funds, such as the Japan Environmental Corporation (formerly the Environmental Pollution Control Service Corporation) or the Development Bank of Japan. At the same time, the government exempts the industries of the fixed asset tax, the business tax and the special depreciation of environmentally friendly technologies (Li, 2004).

When we look at the system of subsidies and exemptions from the perspective of the environmental tax, we must also take into consideration the efforts that a company makes to further environmental improvement. For example, a company may submit a reduction plan: if the plan achieves a timely success, the environmental tax is then reprieved and reduced. This presents the companies with an incentive, promotes self-motivated effort and offers a structure for a company's re-evaluation.

Finally, the system will allow room for companies to cope with those unforeseen problems that may arise outside a purely theoretical frame, unlike the economy-based method (environmental tax and emissions trade).

The following issues will then need to be addressed.

[1] In order for the Pigouvian tax to work, the policy-makers need to obtain precise figures of the social abatement costs and the social marginal damage costs, something that it is very difficult to do.
[2] Since a system of direct regulation already exists, it will be difficult for the environmental tax to function independently unless direct regulations are abolished in its favor.
[3] Polluters are strongly opposed to both the environmental tax task and the trading system because they impose an even greater economic load on them than does the direct method.

Dietz and Vollebergh (Dietz and Vollebergh, 1999: 339–351) have looked in the following way at this problem from the perspective of the regime actors:

Polluters

Because of the cost increase, the polluters prefer direct regulation to the environmental tax. If a product needs to be put under direct regulation, the polluter can negotiate which product to single out for such regulations and determine how the regulations will affect production and other related matters. Once the initial distribution of discharge has been decided, emissions trading may increase the earnings of an enterprise to such an extent that trading will create an entry barrier strong enough to prevent any other party from joining in.

Environmental groups

For years, environment-protection groups have been opposed to the economy-based method, and only lately have they begun to accept the idea of an environmental tax. Yet they are still highly suspicious of emissions trading because of its uncertainty as well as for ethical reasons (because it is in essence a license for pollution).

Politicians

Since, in accordance with the theory of public choice, politicians ought to be aiming to maximize the support of the electorate, they will be criticized by the environmentalists should the environmental tax not yield an improvement of the environment; they will also be criticized by the employers (for wasting tax proceeds), by the workers (for losing liquidity on the international market), and by the taxpayers. In view of all of this, the question of efficiency retreats to the background.

Officials

The bureaucracy prefers the direct regulation method since it carries a heavier workload than the new economy-based method. Sectionalism within the government lies at the root of the competition which exists between the ministries and government offices, and which in turn influences every industry.

Although, in recent years, interest in the environmental tax and emissions trading has been on the rise, while at the same time society softens its stance towards these ideas as measures against global warming, solutions to the problems seem tantalizingly out of reach.

4 Basic method (Informational method)

The basic method fulfills the tremendously significant function of improving the regime actor's level of familiarity with overall environmental policies, while strengthening the informational framework and preventing "information asymmetry".

4-1 Environmental impact assessment

The environmental impact assessment consists in identifying those industries that have a strong adverse impact on the environment, while investigating, predicting and evaluating that impact. Finally, and on the basis of the results of these investigations, it considers the methods of environmental protection appropriate to that particular industry.

Even Japan, which, in comparison with other OECD countries, has been late in systematizing this process (having only established the *Act for Assessment of Environmental Impacts* in 1997), obliges industries that plan to undertake a project big in scale and potentially harmful to the environment — such as the building of a road, a dam, railway lines, aviation fields, generating plants, landfill, drainage-based land reclamation or any other type of land readjustment for industrial purposes — to assess, as a mandatory first step, the plan's impact on the environment. Some 160 new businesses have deferred to this Act, as well as to whatever municipal bylaws that the particular area might have.

Nevertheless, even in cases where a company has changed its business plans because of its environmental impact assessment, positive results remain, in Japan as in other countries, few and far between. For this reason, the EU has implemented high-level plans to incorporate statutes of environmental care for individual enterprises and given them the status of a law. This is known

as SEA, the Strategic Environmental Assessment. SEA projects various possibilities concerning the environmental impact from the very beginning of the business development plan. Unlike the current Japanese assessment strategy which takes place just before a project starts, and therefore cannot expect to change the plan itself, SEA can influence the business plan from its inception, and, in these terms, it has been accepted by the Japanese Cabinet.

Nevertheless, the Japanese Ministry of the Environment announced in March 2007 that electric generation plants were to be exempted from the 13 target businesses to be assessed for their environmental impact. This has, naturally enough, started a landslide of questions and criticisms. The local monopoly of the electric power companies and the policy of "steady supply of electric power" preferred by the Ministry of Economy, Trade and Industry's Agency of Natural Resources and Energy thus seeks to bypass the system of information disclosure, as well as confusing the people.

4-2 Disclosure of environmental information

In 1984, an accidental explosion at an American-based multinational chemical plant in Bhopal, India, led the USA to set up in 1986 the Emergency Planning and Community Right-To-Know Act (EPCRA). Its stipulations [1] allow state and localalities to plan for chemical emergencies, [2] provide for notification of emergency releases of chemicals, and [3] address communities' right-to-know about toxic and hazardous chemicals. Following the introduction of this law, all plants that carry toxic materials have to inform the public and must disclose the full list of toxic chemicals (the program for chemical safety), as well as the TRI (Toxic Release Inventory), which lists the annual release dates of toxic chemicals. This information must cover all environmental media (the atmosphere, rivers, landfills or non-institutional treatment channels) through which a plant intends to discharge the chemicals. At the same time, the information for each separate substance must be available to and easily understandable by the general public. Thanks to this system, the end user's insight into the large corporation's treatment of chemical material, as well as a reduction in their waste disposal, has advanced by leaps and bounds.

The OECD has also promoted the PRTR system (chemical substance discharge and transfer quantity report). In 1999, Japan introduced the same system with the *Act of Confirmation, etc. of Amounts of Specific Chemical Substances released into the Environment and the Promotion of Improvements to the Management Thereof*. Thanks to this law, businesses are obliged to report their chemical substance discharge activities, so that the

public can freely and easily access the information at their leisure, while the acquisition of data itself also becomes much easier: lists of self-reported discharge reveal that the chemicals most often deposited are organic solvents such as the toluene xylene, which makes up 43% of overall waste; but the system does not require disclosure of the chemicals actually stored in the plant itself.

At the same time, under the amended *Energy Saving Law* (2006) and the *Law Concerning the Promotion of Measures to Cope with Global Warming* (revised in 2006), the companies have to inform the government of their discharge of greenhouse gases, although it has subsequently come to light that remarkably insufficient directives were given to specific transport companies or authorized shippers, and demands for amendments to the *Energy Saving Law* have since been made.

And though, as a result of the requirement to disclose information to the public, the companies have improved the effectiveness of their environmental management, information about the inner workings of individual plants has remained still largely inaccessible.

4-3 Environmental report

More and more Japanese companies have begun to publish environmental reports, all of them proclaiming their concern for the environment, while the Department of the Environment has published guidelines that, along with the *Law of Environmental Friendliness* (2005), work in forwarding the companies' willingness to offer environmental information. Lately, it is not only companies that compile and publish information about the state of the environment: universities do so, too.

By means of such basic methods as those addressed above, all the individual regime actors have, voluntarily, begun to take an interest in the environment, now gather information pertaining to it, and compare their opinions to the other parties' understanding of the situation. One question remains, however: is the information that the companies provide reliable and trustworthy? How accurate is it?

5 A policy mix as a strategy for environmental policy

One way of accomplishing the aims of a viable environmental policy might be through a combination of several economic instruments. When speaking of environmental economics, neoclassical economics takes the view that when the marginal damage curve is steep and the uncertainty is high, it is

better to apply direct regulatory methods rather than such economy-based methods as the environmental tax.

If the marginal cost of the discharge shows uncertainty, as when, for instance, the marginal damage costs curve (MD) is steeper than the marginal abatement costs curve (MC), then regulation of the physical volume is preferable. If the situation is reversed and the marginal abatement costs curve is the steeper one, then the preferred method is the introduction of the environmental tax. For example, when the marginal damage costs curve is gradual, as is the case with the global warming policy (Weitzman's theorem), then the economy-based method will be superior.

See Figure 6-2 for greater clarification of this observation. The x axis represents the level of discharge (e), while the y axis represents the price (p) and the cost (c). The MD curve represents the marginal damage cost, while the MC curve represents the marginal abatement cost. In this model, we suppose that there are two types of abatement cost, which realize their conditions (or behavior) stochastically. These are high abatement cost type (MC_H), and low abatement cost type (MC_L). Here, we denote the real marginal abatement cost as MC.

In the graph on the left, we suppose that the MD curve is steeper than the MC curve. In this case, the dead-weight loss caused by the environmental tax (the light grey area) is bigger than the dead-weight loss caused by direct regulation (the dark grey area). The introduction of physical volume regulation is therefore ideal.

In the graph on the right, by contrast, we suppose that the MD curve is more gradual than the MC curve. Since the dead-weight loss caused by the environmental tax is therefore smaller than the dead-weight loss caused by

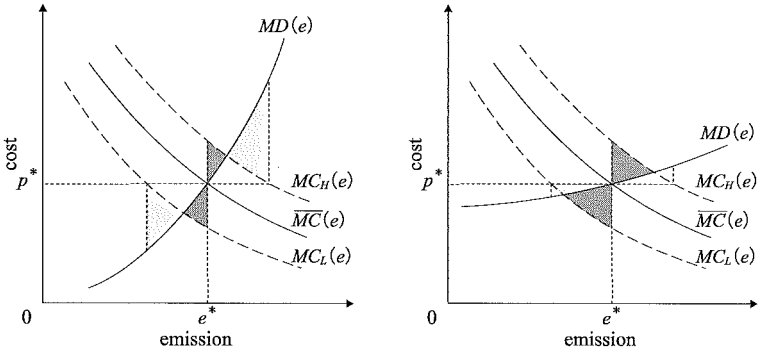


Figure 6-2 Weitzman theorem (Kolstad, 1999: Figure 10.4).

direct regulation, the environmental tax is a more favorable option.

In reality, however, we find many situations in which the marginal damage costs and the marginal abatement costs curve are uncertain. For this reason, it is best to use the regulation and economic methods together as a policy mix. Roberts and Spence were the first to demonstrate this rationale (Roberts and Spence, 1976; 193–208), and their model supplements direct regulation by superimposing a subsidy combined with an imposition tax.

Specifically, the model envisions quantitative control of discharge levels, as Figure 6-3 shows. On the x axis, we find the emission rate (e), while the y axis represents the cost (c) and the price (p). The marginal benefit curve is styled MB. Roberts and Spence envision two players, the industry and the government. The MC^E curve represents the marginal abatement cost predicted by the government, while the MC_1^R and MC_2^R curves represent two marginal abatement cost curves not known to the government. We note that if there is no uncertainty about the MC curves: the optimal level of emission for the MC_1^R is E_1^*, and E_2^* for MC_2^R.

Where the environmental tax is imposed (p), the dead-weight loss would be equivalent to the dotted area, but if, on the other hand, direct regulation (E^P) is introduced, the dead-weight loss would be equal to the sum of the areas of grey and slanted lines.

What Roberts and Spence suggest is that the introduction of the policy mix would mean a combination of direct regulation methods with additional tax (t) and subsidy (s). In Figure 6-3, this mix is represented by the sqru line. Under this policy mix model, the actual level of emission is E^U or E^S, as a result respectively of a tax introduction or the subsidy system. The flexibility inherent in the policy mix method allows for minimizing loss. Notice, too, that the sqru line is an approximation of the MB marginal benefits line (Morotomi, 2008: 68–69).

The practical uses of the policy mix and the various combinations within the mix are several. The American emissions trading program is a policy mix of direct regulation within the emissions trading system, while the German discharge surcharge combines taxation and direct regulation, which together prevent the "accumulation of pollution in a specific region".

On the other hand, the Japanese anti-pollution measure is a combination of the direct regulation system with subsidies and self-motivated agreements, although this was initially meant to avoid the problem of the distribution of the anti-pollution investment burden. Similarly, the climatic variation policies of the UK and Denmark consist of a combination of taxation, emissions trading and self-motivated agreement, and were introduced in order to prevent

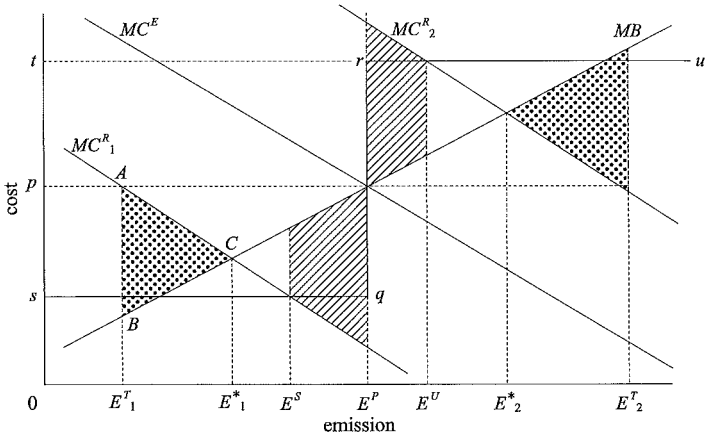


Figure 6-3 policy mix (Morotomi et al., 2008: Figure 4-3).

the reduction of the "industry's international competitiveness" (Morotomi, 2005).

Summary

As the problems affecting the global environmental grow daily more apparent, so the public interest in environmental tax and emissions trading is becoming more widely engaged. These economy-based methods of achieving the goals of the environmental policy have conventionally been classified as indirect (as opposed to direct) regulation methods. However, policy instruments other than these exist in abundance, and fulfill the important role of gaining public approval of the policies, as well as disclosing information about them.

In this chapter, we have classified and inspected each policy according to its proposed structural frame. The aim of these policy instruments is to evoke the regime actor's self-initiative, while supporting the creation of incentives so as to oblige the actor to abide by the policies (as is the case with the finance-supply type of environmental tax such as the forest and industrial waste tax). We believe that from the perspective of a combination of policy instruments, policy style and the regime actor's relationships, the policy mix, along with the citizen's participation, disclosure of information, agreements on pollution prevention et cetera, together form an effective technique for devising an effective environmental policy.

All of which is to say that an effective environmental policy cannot be serviced through economic methods alone: it requires thorough distribution of information and a system of political tolerance where each aspect within the policy is balanced. Although a Policy mix consists of a combination of a variety of environmental measures, any attempt to consolidate environmental crises with economic ones, and solve the problems all at once, is like chasing after two rabbits running in different directions — it cannot be done. We have to move one step at the time.