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ECONOMIC AND FISCAL INCENTIVES AS A MEANS OF ACHIEVING ENVIRONMENTAL POLICY OBJECTIVES

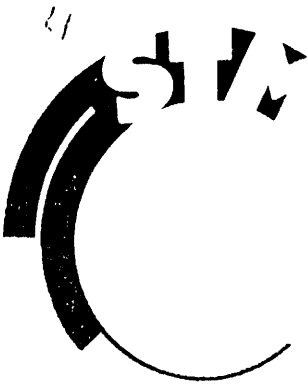
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Environmental policy instruments in Dutch practice

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1. Introduction: direct regulation as the background

Dutch environmental policy deploys a large number of different policy instruments designed to influence the environmental behaviour of the various policy target groups. The policy instruments break down into a number of categories. Some aim to encourage new behavioural alternatives or, alternatively, to stop existing forms of behaviour. Others manipulate the information that the target group receives about the behavioural alternatives and their specific characteristics, or determine the importance the target group attaches to these characteristics. Finally, we have a large group of policy instruments that manipulate the characteristics of the behavioural alternatives themselves. Their purpose is to make one or several behavioural alternatives either more or less attractive to the target group.

Policy instruments that enlarge or restrict the number of behavioural alternatives have so far been negligible in Dutch environmental policy. The category of policy instruments that provides information and moulds the target group's perception of the environmental impact of its behaviour is rapidly gaining ground. Such "communicative" instruments include public information programmes, covenants and environmental effect reports. Their part in Dutch environmental policy is discussed in section 3.

By far the largest category of policy instruments in Dutch environmental policy concerns those that alter the consequences of the various behavioural

alternatives. These include regulations as well as financial incentives. The Dutch experiences with financial incentives are dealt with in section 4. But first section 2 will discuss the licensing systems and other regulations which play such a dominant part in environmental policies, both in the Netherlands and in many other countries. This will provide a background with which we can compare the experiences with communicative instruments and financial incentives.

There is a variety of criteria by which we can assess policy instruments. Evaluation studies of the practical effects of Dutch environmental policy tend to concentrate on the achievement of objectives and effectiveness. Often these studies look at whether the instrument is being applied properly rather than addressing the question whether it is up to the task of realising the actual policy objectives. As far as the research materials allow, we will also devote attention in the concluding paragraphs to the following questions:

- does the instrument permit spatial differentiation, e.g. to prevent "hot spots"?
- how much uncertainty surrounds the application of the instrument?
- Is the instrument flexible enough to respond to changes, such as economic growth or more drastic environmental objectives?
- what are the costs and who are to pay?
- is the introduction of the instrument a feasible proposition?

2. Licensing systems in practice

The central instrument in Dutch environmental policy is the ban on performing any environmentally harmful activities without a licence. The 70s in particular brought legislation covering virtually every aspect of the environment. The various environmental laws put forward this ban as the cornerstone of the environmental policy instruments. For a long time, the licensing systems based on the ban were virtually the only available instruments for manipulating environmental behaviour. The most important licensing systems concern nuisance, air quality, surface water quality, (chemical) waste substances and ionising radiation. A survey of a large number of Dutch evaluation studies gives us the following overall picture of the implementation and effectiveness of this dominating policy instrument.

Nuisance

The first major studies of the effects of licensing systems centred on the Nuisance Act. The aim of this act, incidentally, is not only to counter nuisance experienced

by humans, but also to protect the environment against activities that are not regulated under any of the other environmental acts. The results of these initial studies came as a bombshell. It was estimated that in 1976 only 25% of the relevant businesses had a valid licence. Hardly impressive, considering that the act had been in force since 1952 and had precursors dating back even further. Applications for licences took about eight months on average to process. But in 15% of the municipalities, mainly the larger cities, applications could take over a year to handle. One reason for this was that almost all of the applicants were operational long before the licence was granted. So no-one was in too much of a hurry. "For this reason, the Nuisance Act Departments of local authorities are often operated on a shoe-string, both in terms of manpower and resources." (TG,1976)

In a follow-up study in 1979, the research agency concludes that only 38% of approximately half a million businesses falling within the Nuisance Act actually possessed a licence. And only 24% had a licence that was sufficiently far-reaching. Among industrial and agricultural businesses the percentage was even lower (20%). The study also finds that, in certain cases, the Nuisance Act imposes licensing requirements on environmentally harmless or fairly harmless businesses while failing to clamp down on some of the confirmed polluters. At one-third of the businesses, the level of environmental damage had actually increased after being granted their most recent licence. About 65% of the time that officials spend on implementing the Nuisance Act is taken up by the processing of licence applications. Important tasks - such as the monitoring and tracing of businesses that fall within the Nuisance Act - receive only scant attention. (TG,1979)

Aalders (1980) concludes from a study in 5 municipalities that the formal sanction - i.e. the closure of the business - is rarely, if ever, carried out. He remarks that the sanction and, by extension, the act itself seem to have a purely symbolic function. This theme is elaborated in his dissertation that appeared in 1984. (Aalders, 1984) Aalders ascribes the problems that bedevil the enforcement of the Nuisance Act to the following factors: There are staff shortages. Serious forms of nuisance often stem from virtually irreversible legacies from the past. Police do not give the enforcement of the Nuisance Act priority, partly due to their reluctance to create precedents. "If you check one, you've got to check them all, and we simply don't have the manpower to do that." Local authorities often give precedence to economic considerations, especially employment. (Aalders, 1980)

In order to provide a more practical sanction, a provision for penalties was then incorporated into the Nuisance Act. But in practice, penalties prove to be almost as cumbersome as the ultimate sanction of closure as the courts require all due caution to be exercised before proceeding to impose the slightest sanction. (Hillen and Nijhoff, 1983)

A study carried out in 1983 by Berenschot, a consultancy, confirms this picture. The Nuisance Act is enforced passively or selectively. There is no question of strict enforcement (either to the letter or the spirit) and this laxity is often deliberate. There is a shortage of manpower and equipment, both in terms of quantity and quality. More intermunicipal cooperation is badly needed, but so far this has been slow to get off the mark. (Berenschot, 1983)

In 1986, the situation in two categories of business - then still falling within the Nuisance Act but later to be governed by general rules - was far from optimal. The first category was the bakeries: though 86% had been issued with a licence, only 44% had one that was sufficiently stringent. On balance, the second category - propane storage plants - showed a slightly more favourable picture: admittedly, only 72% had a licence, but 64% of these were at least sufficiently far-reaching. But again these licences are not vigorously enforced. Local authorities tend to turn a blind eye unless residents complain. (TG, 1987) In his dissertation, Aalders claims that it is only through "social side-effects" (i.e. manipulation of perceptions and attitudes) and informal consultation that the Act has any practical effect. Bennet (1984) also points to the importance of consultation between industry and government. The cases he studied show that in the event of serious differences in opinion, both parties inevitably look for a compromise. It also became evident that the authorities are inclined to bow to business and industry, not least out of economic (employment) considerations.

In an effort to improve the implementation, and thereby, the effectiveness of the act, the so-called nuisance act enabling programme was introduced (HUP). Under this programme, an inventory is made of the existing backlogs and measures are taken to improve the issuing and enforcement procedures. Local authorities that commission a HUP qualify for a refund of the costs involved and many have taken advantage of this opportunity. An evaluation study conducted by the consultancy DHV remained unpublished. However Ten Elshof did combine the results of DHV's study with the results from his own research. His study shows that HUPs do help to reduce the backlogs of applications for licences, but fail to stimulate more vigorous enforcement efforts. For this reason, he concludes that the HUP is too weak an instrument and even voices the fear that the Nuisance Act is doomed to remain a paper tiger. (Ten Elshof, 1988)

Air

In 1972 the Air Pollution Act entered into force. By 1 January 1976 about half of the businesses concerned had applied for licences and in 60% of the cases licences had indeed been issued. (TG, 1976) So it's fair to say things got off to a rather slow start. A follow-up study of the situation in North Brabant until mid-1977 showed that 15 of the 50 businesses concerned had one or more licences under the Air Pollution Act. (TG, 1977)

One study in the early 80s concluded that about eight years after the act became effective, three-quarters of the businesses concerned had been issued with licences. According to the provincial authorities, two-thirds had adequate licences. (VAR, 1981)

A study of the Rijnmond area (where the refineries are concentrated) revealed that the levels of SO₂ emissions had fallen between 1974 and 1980, but that this had little bearing on the licensing requirements. Far from it, in fact. For these requirements permitted pollution levels one-and-a-half times higher than those actually produced. The main reasons for the reduced levels are the economic slowdown, the switch to cleaner fuels (gas) and a central government measure reducing the maximum permitted levels of sulphur in fuels. (TG, 1982)

Unlike previous studies, Honigh (1985) first measures the achievement of objectives and the effectiveness of the Act, and only then turns his attention towards the implementation process in order to explain the results. His study centres exclusively on SO₂ and NO_x pollution caused by industry and power stations. This form of pollution rose between 1976 and 1982 by 7%. The slight deterioration is made up of various components. It turns out that it was mainly SO₂ pollution from refineries and other industrial plants that fell sharply (-33%), but that this reduction was more than offset by the increase in pollution from electricity-generating plants. Almost 50% of the fall in industrial pollution is the product of increased energy efficiency. The air pollution policy seems to provide the most plausible explanation for at least part of the remaining 50%. The pollution from power stations has increased largely because the shift to cheaper and dirtier fuels (coal and oil) in the research period was not compensated by additional purification facilities.

In order to explain these results, Honigh analyses the aims, available information and power of the parties involved in the policy implementation process. His explanation for the failure to effectively curb industrial pollution is that not all provinces see air pollution as a policy priority and often give precedence to economic considerations. The enforcement efforts and the percentage of adequate licences also differed widely from province to province. Furthermore, many provinces did not have the know-how required to assess the licence applications properly. As a consequence, they often erred on the side of caution to avoid making unrealistic demands. The provincial authorities also complained that the law only provided them with heavy-handed - and therefore impractical - sanctions. The reason for the deterioration in the electricity generating sector is ascribed to the high priority that the Ministry of Economic Affairs and the electricity-generating companies give to minimising electricity prices and, furthermore, to their (informal) position of power vis-à-vis the licence-issuing provinces. Van der Tak (1988) takes issue with this view. He argues in his dissertation that the electricity generating companies in the province of North Holland were subjected to a rigorous regime. It is hard to say whether or not North Holland is an exception.

Water

The implementation of the licensing system under the Surface Water Pollution Act is also far from perfect. Again we note the by now familiar phenomena of (substantial) backlogs of applications for licences and inadequate enforcement (Audit Office, 1987). This even holds true for heavy metal pollution, one of the water management boards' top priorities.

Since 1984 regional water quality managers have been empowered to issue licences directly in order to enable them to impose restrictions on firms that discharge the so-called grey and black list substances - in particular heavy metals - into the municipal sewage systems. A survey conducted by DHV among water quality managers from 1984 to 1987 shows that just over half of these firms were issued with licences. Moreover, the requirements contained in these licences were more moderate than initially envisaged. The business's economic position was often the overriding concern, even to the extent that the "best existing techniques" criterion was often interpreted as "the best practicable/affordable techniques", a formulation that central government had expressly avoided in relation to these substances.

Chemical and other waste substances

Various researchers have observed that by no means all chemical waste is disposed of legally. Henselmans and Noë (1984) estimate that disposal takes place legally in merely 15% of the cases. The main reason for this is that the waste disposal is often carried out by the businesses themselves. This, in itself, need not be a bad thing. But the absence of supervision has detrimental effects. With small chemical waste, 40% (Meijer et al., 1986; study of the Gooi and Vecht areas) or 50% (Heuvelman et al., 1988; nationwide study of 10,000 small businesses) of the businesses are guilty of illegal disposals. Excluding used oil, it is estimated that 18% (Meijer et al., 1986) or 36% (Heuvelman et al., 1988) of the disposals are illegal. Furthermore, Kremers et al. (1989) studied thirty dumps for ordinary waste and found that the requirements laid down in the licences were often not compatible with the policy guidelines. And even these requirements were not fully observed at a single dump.

Radiation

Studies into the implementation and effects of the licensing system and reporting scheme contained in the Nuclear Energy Act for radio-active substances and

equipment (i.e. not nuclear power stations or nuclear fuels) reveal that in this case the licensing system is effective. Most businesses operating in the field of radiation have licences. Though not all the licence requirements are consistently observed, most infringements have little bearing on safety. One reason perhaps for this exceptionally good record is that in this sector, unlike most sectors of environmental policy, the staff of the businesses involved stand to suffer most from the consequences of carelessness. Furthermore, the researcher attaches great value to the easily enforceable requirement that institutions must employ at least one expert whose training corresponds with the specific radiation sources used.

However, excessive zeal on the part of officials and time-consuming advisory and co-signing procedures do impair the effectiveness of the current licensing system (Arentsen, 1988).

Conclusions

Clearly the mere existence of a licensing system in an environmental act does not necessarily entail that the businesses falling within the act will actually have adequate licences. And even those that do have licences are not compelled to comply with them due to the lack of efficient enforcement. If we link the findings of these evaluation studies to our other criteria, the following picture emerges. The backlogs of licence applications and checks vary from region to region, but this of course is not the kind of spatial differentiation envisaged by policy-makers. The ability of the system to respond to altered circumstances - e.g. by issuing revised licences - is also questionable considering its inability to issue all businesses with proper licences in the first place. On paper, the licensing system is an effective means of controlling the operational activities and environmental behaviour of businesses. But practice shows the system is fraught with uncertainties, and therefore often ineffectual. One cause may be that the implementation costs of the licensing system are underestimated, resulting in a lack of manpower (both in numbers and skills). On the other hand, adequate implementation would probably be very expensive. Another disadvantage is that the degree of implementation varies from region to region. As a result, businesses in a relatively strict area will pay more in the way of environmental costs than a business in a laxer area. This, in turn, could distort domestic competitiveness. But notwithstanding all these drawbacks, the universality of the licensing system in Dutch environmental policy does indicate that this instrument is still very feasible.

3. Communicative instruments

Direct regulation through licences and other regulatory measures has not been selected as the main policy instrument in all environmental sectors. In the field of energy saving and products policy, for instance, there is a clear preference for communicative instruments. We have defined communicative instruments as instruments that provide information (e.g. through public information programmes) in an attempt to manipulate the target group's behaviour or to change the significance the target group attaches to environmental values (persuasion). These instruments were particularly popular in the 80s because they seemed to fit in with the new relationship that had developed between government and society. The 80s saw government and the private sector as partners who were both instrumental in the shaping of social developments. Within the framework of Dutch environmental policy, the following instruments have been applied and assessed: information on energy saving to industry and households, so-called covenants between government and (representatives of) business and industry, and the environmental effects reports. Though the latter instrument is based on regulations, its purpose is to increase the environmental awareness of the various actors (and so influence their environmental behaviour) by guaranteeing the availability of sufficient relevant environmental information. For this reason, it certainly belongs among the communicative instruments.

Information on industrial energy-saving

The literature distinguishes between four types of energy-saving behaviour, namely energy management (e.g. comparing meter readings), investments in the adjustment of existing plant (e.g. insulation), investments in an independent energy supply and investments in the replacement of existing installations. Van der Doelen (1989) studied the application and effectiveness of policy instruments in the field of industrial energy-saving from 1977 to 1986. This study shows that information sent to businesses in the form of publications had some positive effects on energy management but failed to stimulate other forms of energy-saving behaviour. In fact, the indications were that the information actually discouraged investments in adjusting existing plant. Evidently additional information tends, on balance, to make businesses averse to invest in adjustments. Two more targeted information instruments - i.e. visits from information officers and grants to pay for external advisors - had no visible effect on any form of energy-saving behaviour.

Information on household energy-saving

An experimental study among households (Ester, 1979) examined whether certain communicative instruments had indeed prompted consumers to start saving energy. It was found that public information and the advice given to consumers to read the meters regularly resulted in small but lasting savings.

Covenants

In the 80s, the Dutch government concluded covenants in diverse fields with (representatives of) business and industry in an effort to counter various environmental problems. A covenant is a written agreement that is deliberately not given formal legal status. The government hoped that industry would be more willing to do business on this basis and also that it would be more committed to such arrangements than to regulations imposed from above. Covenants also provided a means of circumventing EC rules which are highly sensitive to any threat of market distortion whenever regulatory product policies are involved. Covenants were concluded in such fields as: mercury oxide batteries, alkaline batteries, drinks packagings, PET bottles, cadmium in crates, air pollution from heavy commercial vehicles, CFCs in aerosols and phosphates in detergents.

Klok (1989) concludes that, considering the objectives of the Ministry of the Environment, the content of the covenants was satisfactory in five out of eight cases. In three of the five cases, agreement was not difficult to reach as industry had already decided of its own accord - albeit for different reasons - to aim for the same result. The main purpose of these covenants, therefore, was to document existing intentions. In two of the eight cases, the result was less satisfactory. One case, concerning the use of phosphates in detergents, was difficult to judge. It involved a successive series of moderate covenants of which the last, though again not far-reaching, did lead to good results.

This brings us to the achievement of the objectives and the effectiveness of the covenants. The breakthrough in the detergents sector did not come until one of the manufacturers ventured to go ahead with the large-scale introduction of a phosphate-free detergent. The move was a great commercial success and others were quick to jump on the bandwagon. As a consequence, the results far surpassed the objectives laid down in the covenant. It is hard to say whether the covenant was actually instrumental in this development. The same goes for the other covenants. In four out of eight cases, it looks as if the objectives will be achieved. But again the actual significance of the covenants is open to question. In the other four cases, it is either still too early to judge or there are already signs that the covenants will prove unsuccessful. All in all, an unimpressive result. But this should be seen against the background of the equally limited

effectiveness of regulatory measures as used in Dutch environmental policy. It is highly questionable whether alternative instruments would have given better results.

Environmental impact assessment

Like most industrialised countries, the Netherlands operates an environmental impact assessment system. The system came into force in 1987, but was preceded by a voluntary interim scheme. The scheme was designed to put the environment firmly on the decision-making agenda. To this end, it aimed not only to provide sufficient environmental information during the decision-making process but also to ensure that decision-makers would actually take this information on board. In addition, the arrangement was to help streamline the decision-making procedures. The evaluation studies of both the interim scheme and the actual scheme see improvements as regards the latter point, but are less positive about the main objective. In his evaluation of the interim scheme, Haskoning (1986) observed that in most of the evaluated cases the actor and the local authorities had already reached agreement before the e.i.a. procedure was set in motion. There was a danger that the e.i.a. reports would thus degenerate into a mere procedural formality, serving exclusively to make proposed plans more acceptable to the public at large.

The actual e.i.a. scheme has been evaluated in greater detail. But Berenschot (1990) arrives at similar conclusions to Haskoning. Despite doubts voiced by some when the scheme was first introduced, the actual implementation seems to pose few problems. Thanks to the e.e.r, there is also a plentiful supply of good-quality information. But whether this information has helped to give the environment added weight in the decision-making process is doubtful. A more realistic view would probably be to assume that -in addition to the objectives and sources of power of the various actors - information is only one of the factors that determine the decision-making process and, as such, the importance attached to the environment within that process. As a consequence, even if the e.e.r functions well as an instrument for diffusing information, its ability to put the environment high on the decision-making agenda is strongly dependent on other factors.

Conclusions

The adopted communicative instruments are too diverse to allow any general conclusions about their effectiveness. But what goes for the e.e.r, probably also applies to communicative instruments in general. Communicative instruments can effectively manipulate behaviour only insofar as other factors create a decision-

making context in which the new information can tip the scales. If such a context does not already exist, it may be created by means of other policy instruments. This brings us back to policy instruments which are capable of changing the consequences of behavioural alternatives for the target group. In section 2 we discussed the experiences with licensing systems. In the next section, our attention will centre on financial incentives.

4. Financial incentives

In the past, financial incentives have proved more stimulating to the imaginations of environmental policy scientists than to the willingness of businesses to change their environmental ways. Throughout the Western world a wide range of financial incentives has been used, but rarely did these instruments ever have any real practical impact (Opschoor and Vos, 1989). Instruments with a direct regulatory effect, such as licensing systems, generally set the tone. Still, a number of financial instruments with regulatory potential have been used in the Netherlands. The Dutch water pollution levy, for instance, is one of the most interesting examples in the world of a financial incentive used as an environmental policy instrument. For this reason, we have discussed it at greater length in appendix 1. The Netherlands also operates several subsidy schemes. Of these schemes, the results of the subsidies granted for industrial energy-saving, the reduction in water pollution from heavy metals and the reduced use of PCBs have been evaluated. Researchers have also evaluated the Dutch tax differentiations introduced for cleaner and dirtier cars, and for leaded and unleaded petrol. Finally, an evaluation study has been made of a compensation scheme whereby industry is granted subsidies to cover "abnormally high" costs for cleaning up, most specifically, the air.

Industrial energy-saving subsidies

In the same study as cited above in connection with information on industrial energy-saving, Van der Doelen (1989) also investigated the effects of the various subsidies on industrial energy saving. The investment grant scheme effective from 1980 to 1987 had no significant impact on the relative level of adjustment investments (insulation, heat recovery, etc.), but did have some positive effect on investments in independent energy supply systems. The energy credit scheme (soft loans) also encouraged businesses to a certain extent to invest in the replacement of energy-intensive parts of the production process. But the policy

instruments only had a modest independent effect. The overriding factor in all forms of energy-saving behaviour is energy prices. Van der Doelen concludes that the effectiveness of the instruments is overshadowed by what he has called the Matthew effect after the apostle's words "To him that hath, shall be given". Businesses that already have information and/or financial resources will get the most benefit out of the communicative and financial policy instruments without making any additional changes to their behaviour.

Subsidies for the reduction of heavy metals in effluents

Heavy metals in industrial effluents contribute to water pollution. As a supplement to other policy instruments, one of the water managers decided to introduce a subsidy for businesses who removed heavy metal pollutants from their effluents. The scheme was successful in the sense that most businesses did indeed proceed to clean up their effluents. Vermeulen (1989), however, argues that this was not directly attributable to the subsidy which, incidentally, only covered a small portion of the costs. But he does note an indirect effect of the subsidy: the scheme did wonders for the relations between the water manager and industry and this, in turn, significantly enhanced the effectiveness of other policy instruments (licences and levies).

Subsidy for the reduced use of PCBs

PCBs are used in coolants, transformers and condensers. A scheme was introduced to subsidise the replacement of PCBs before the PCB replacement drive had well and truly got under way. But the period from 1984 to 1989 brought the replacement of 72% of all PCBs. No less than 21% of this result was accounted for by one company which fell under a separate scheme. Vermeulen and Goes (1989:119) also observe that the scheme deserves credit for 32% of the reduction while the remaining 19% is attributable to other considerations. PCBs are still widely used in small condensers and these account for the largest part of the unreplaced portion. The researchers point out that the subsidy not only acted as a financial incentive, but also prompted industry to think more about the problem.

Compensation scheme

Various environmental laws incorporate compensation schemes to ensure that the principle of "the polluter pays" does not significantly distort the competitiveness of certain businesses. For this reason, businesses that incur "abnormally high"

costs are, in principle, entitled to compensation for the excess costs. An evaluation study of the effects of the compensation scheme under the Air Pollution Act (Grimbergen et al., 1988-a) reveals that compensation was effective in five of the seven cases studied in greater detail. The term "effective" here means that without compensation the competitiveness of the businesses in question would have been seriously undermined. It was also found that, especially in the initial years of the scheme, compensation was often allocated without due regard to the two key criteria, i.e. the "abnormally high" costs and the serious distortion of competitive relations if compensation were withheld.

In a follow-up study, Grimbergen et al.(1988-b) investigated whether the compensation scheme enabled the authorities (provincial or local) to negotiate additionally stringent environmental regulations with the licensee (the business). For the second objective of the scheme is to permit the licensor, where necessary, to take additionally strict environmental measures (cf. the problem of the "hot spots"). The follow-up study of all 67 cases showed that, in 40% of the cases, compensation did not stimulate the businesses to make "abnormally high" investments in environmentally friendly facilities; and, in a further 13% of the cases, such a causal relationship is doubtful. On the other hand, it seems that in about half of the cases compensation did induce businesses to take more far-reaching environmental measures than their competitors, and that these businesses would not even have contemplated such action without compensation.

Cleaner cars

The Dutch government is not completely free in the way it chooses to stimulate the introduction of cleaner cars. The European Community views national measures in this field with considerable distrust, fearing that such initiatives might lead to unfair competition. For this reason, and also because clearly more can be achieved through a pan-European approach, the policies of the individual member states are governed by a European policy. This restricts the policies of member states such as Germany and the Netherlands who actually favour more radical action. However, these states were given permission to promote the introduction of cleaner cars (i.e. cars that already comply with the future European standards) by means of financial incentives on condition that the incentives did not exceed the additional costs. In other words, cleaner cars were not allowed to be cheaper than dirty ones, but at best just as expensive. The Netherlands achieved parity between the two kinds of cars by applying different rates of sales tax. The tax was reduced for cars that complied with future Euro-standards and raised for the dirtier models.

Though less drastic than originally envisaged, the measure was an immediate success (Klok, 1987). In the market for small cars (two-thirds of the market), the percentage of future Euro-standard cars jumped from 37% to 70%, an increase

achieved in half the time the ministry of the environment had expected. Considering the ineffectiveness of most environmental policy instruments, this was an exceptionally good result. The results were less spectacular in the market for larger cars, partly because the tax differentiation did not fully compensate the more stringent standards applicable in this category. In view of this success, it was not surprising that the Dutch government extended the measure to include compensation for compliance with the stricter American standards. This was initially done under protest of the European Commission, but with the general approval of the Dutch parliament. Again the measure caused the number of new cars fitted with a regulated three-way catalytic converter to shoot up. Because the European Commission was eventually reluctant to ban the measure, it even helped to reinforce the Community's overall commitment to the clean-car policy.

Unleaded petrol

Cars fitted with catalytic converters run on unleaded petrol. For this reason, a regulatory levy - the only official regulatory levy in Dutch environmental policy - was introduced to ensure that unleaded petrol would be widely available. In this case, the absence of EC restrictions even made it possible to make unleaded petrol cheaper than leaded petrol. The result was that, within the space of two months, unleaded petrol had completely ousted normal petrol from the forecourts. (Klok, 1987)

Water quality charge

The most far-reaching and best-known financial incentive in Dutch environmental policy consists of the charges on water pollution. In 1970 the Surface Water Pollution Act came into force, delegating the task of water quality management to the provincial authorities and often, through these authorities, to the water management boards. An important aspect of the task in hand was the need to clean up sewage water. This called for a great deal of money. So the water boards were permitted to introduce charges in order to cover their annual costs. Degradable organic pollution, for instance, was taxed with a hefty charge per unit of pollution. Each water board applies different rates, according to their costs and the number of units of pollution these costs have to cover in their district. Within a few years almost every water board had raised the rates to such a level that it paid businesses to start significantly reducing pollution levels. From 1970 to 1980 organic pollution from industrial effluents fell by two-thirds. Research (Bressers, 1980, 1983, 1988 and Schuurman, 1988) showed that almost all credit for this reduction went to the charges. The licences introduced at the same time as the charges had had little effect. This is a striking result,

considering that it was the licences, not the charges, that were officially designed to manipulate the environmental behaviour of businesses. Bressers (1983) attributes part of the charges' success to the drastic change they bring about in the consultative climate between the water manager and industry. The keynote of the contacts is collaboration rather than conflict now that industry is able to achieve significant savings by cleaning up pollution. In practice, therefore, environmental charges do not function as a purely economic mechanism. They do not replace consultation between authorities and industry, but actually increase its beneficial effects on environmental conservation.

In view of the damage that heavy metal pollution causes to the sewage water treatment process and to the quality of the resulting purification sludge, most water boards also introduced a charge on the presence of heavy metals in effluents. But as the charge was relatively low, the water boards felt it had little to do with the 50% reduction of heavy metals in industrial effluents achieved between 1975 and 1980. Without negotiations and licensing regulations, so they thought, industry would be unwilling to budge. Statistical analysis (Bressers, 1988) showed, however, that negotiations in districts that had substantially raised the charges were much more successful than in other districts. So the regression analysis revealed that the charges, far from being insignificant, were in fact the most powerful policy instrument!

Conclusions

The Netherlands has used a number of financial incentives in its environmental policy. Generally speaking, these incentives have given good results compared with the other instruments. In fact, so far, it's the charges and tax differentiations that lie behind the success stories of Dutch environmental policy. One of the main strengths of financial incentives is that they do not simply operate as economic mechanisms, but also help to enhance the effects of consultation between government and industry.

A look at criteria other than effectiveness shows the following picture. As a rule, spatial differentiation within the Netherlands was not an environmental policy aim. The only exception is the compensation scheme. With this particular scheme, we do indeed see strong regional variations. But these evidently reflect the familiarity (or unfamiliarity) of the local and provincial authorities with the scheme and tell us little about the relative gravity of the local environmental problem. However, the example of water quality charges - where higher local rates led to stronger local reductions in pollution - do make it clear that charges are capable of achieving spatial differentiation where required. Naturally, such spatial differentiation would make certain "expensive" areas less attractive to businesses than "cheaper" areas. But the same holds true for differences in land prices, and everyone accepts these without a second thought.

The same example indicates that charges are fairly easy to adjust to changing circumstances. Note, however, that in the Netherlands such changes were not prompted by the desire to reduce pollution levels, but rather by the need to meet water treatment costs. Businesses may be less willing to accept increases in rates for financing new policy objectives than increases necessary to meet higher purification costs.

In all cases, there was a great deal of uncertainty about the effects of the instruments in all cases. As we have seen, the water quality charges were actually not even intended to change environmental behaviour. Strikingly enough, this uncertainty did not in most cases lead to disappointing results and, in a number of cases, even to much-better-than-expected results. After the generally poor performance of licensing systems, this is truly remarkable.

The feasibility of financial instruments varied strongly. Subsidy schemes seem to meet with little resistance. In the case of tax differentiations, EC restrictions clearly impressed their stamp on the policy. The charges on water pollution were acceptable because they were introduced as charges for sewage water purification, i.e. as payments for services rendered. The employers' organisations in the Netherlands still maintain that other forms of charges would be completely unacceptable to them. This may be precisely where the effectiveness of the instrument lies. Another reason for this resistance may be that charges without compensation impose a heavier burden on industry than on government.

5. In conclusion

This paper summarises the results of the studies into the implementation and effects of various policy instruments in Dutch environmental policy. The author was involved in a large number of these as a researcher, project manager and supervisor. The overall picture is not very positive. The dominating policy instrument - i.e. licences - is in practice bedevilled by implementation problems and, as a result, largely ineffective. One could summarise the results of Dutch environmental policy so far in the following sentence. About half of the policy objectives formulated in - and with the insights of - the 70s have been achieved, but our current insights tell us we need to achieve objectives that reach twice as far. In recent years, many people in and outside the Netherlands have become convinced that a much more intensive environmental policy is necessary to bring the objective of a sustainable environment closer. But whether the licencing system - without additional measures - will permit the implementation and enforcement of a much more intensive environmental policy is very much open to question.

The communicative instruments studied in this paper worked well enough but can only play a supplementary, and hence limited, role. As a rule, the policy mix must - in addition to communicative instruments - include other instruments that do have the power to change the consequences of the various behavioural alternatives for the target group.

Financial instruments fall into two categories: first, subsidies and related instruments which the target group applies for on its own initiative; and, second, charges and related instruments such as tax differentiation. The latter category has made the most visible contribution to the success stories within Dutch environmental policy.

Furthermore, it has become clear that no absolute statements can be made about the feasibility and effectiveness of policy instruments. The effectiveness of an instrument or mix depends very much on the given circumstances, and no instrument will be effective in all circumstances. It is therefore essential that theories on the feasibility and effectiveness of instruments take these circumstances into account. Building on our experience with research into the effectiveness of large parts of Dutch environmental policy, a contingency theory has been developed at the University of Twente. This contingency theory assesses the feasibility and effectiveness of policy instruments, taking into account the circumstances in which the instruments are applied (see appendix 2). It therefore enables us to make global predictions and statements about the feasibility and effectiveness of the various (combinations of) policy instruments in different situations.

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- the expansion of the water purification capacity;
- the reduction of pollution from industrial effluents containing organic substances and heavy metals;
- the reduction of air pollution from SO₂ and NO_x by industry and power stations;
- the introduction of cleaner cars and unleaded petrol;
- the reporting scheme and the licensing system of the Nuclear Power Act;
- the compensation scheme under the Air Pollution Act;
- the evaluation of the Act on General Provisions for Environmental Protection;
- the reduction of traffic noise;
- the nuisance act enabling programmes (HUPs);
- energy saving in industry;
- environmental covenants as an instrument of product-oriented environmental policy;
- the environmental impact assessment;
- the introduction of industrial environmental care (current research);
- the official evaluation of the Act on Environmentally Hazardous Substances (current research);
- the general regulations within the Nuisance Act (current research).

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