

**ECONOMIC INSTRUMENTS AND CLEAN WATER:  
WHY INSTITUTIONS AND POLICY DESIGN MATTER**

**by**

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## EXECUTIVE SUMMARY<sup>1</sup>

This paper analyses the use of economic instruments for control of water pollution in four OECD countries -- Denmark, France, Germany and the Netherlands -- from 1970-1990. While there is now a vast theoretical literature on the use of economic or market-like instruments, this study is the first empirical investigation of the use of such instruments in a comparative perspective. And although the specific policies discussed in this paper may now be out of date, the analysis remains valid today.

The study confirms that economic instruments are indeed powerful instruments for the implementation of public policies. But the study also clearly shows that institutions matter. Neither market mechanisms nor market-like policy instruments operate in a vacuum. Regulatory reform does not mean leaving the market to itself. Formal and informal government institutions define and specify the conditions under which market mechanisms function.

Since market-like policy instruments are usually applied within existing rules, institutions, and policy processes, the policy and administrative contexts in which they operate become important. These contexts are quite different from country to country, often more so than policymakers are aware of. The *national style of policymaking* depends on the constitutional framework, the infrastructure of public authorities as well as the historical and cultural heritage, which are basic institutional premises that vary tremendously even between neighbouring western european countries.

The use of economic instruments in the Dutch water pollution control policy was especially successful, because it was combined with an exceptional infrastructure for water management, the Dutch Waterboards. In Germany and especially Denmark policies were less successful because local authorities were able to manipulate regulations in their favour, a consequence of their stronger position in these political systems. In France, the River Basin Agencies established in the 1960's provided an administrative structure on hydrological principles as the Dutch, but the policy was less successful due to interference from the Ministry of Finance, representing French centralism. Employing data from national and international sources, the study shows how the Dutch policy was most successful both with regard to pollution control and with regard to public spending and social costs.

For governments keen to introduce more economic instruments for pollution control as well as for other public policies, the water pollution control study offers interesting implications to consider. Because the use of economic and market-oriented policy instruments has become fashionable, some administrations are eager to increase their use of these policy instruments, regardless of their possible impacts. But to apply economic instruments thoughtlessly may quickly discredit this policy instrument.

The key lesson is that too little attention has been paid to the importance of basic institutions of policy-making -- whether formal or informal. The success of economic instruments depends on being

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<sup>1.</sup> This paper is based on a book, *Governance by Green Taxes* (forthcoming from Manchester University Press), that was supported by a grant from the Social Sciences' Research Council in Denmark and by Deutscher Akademischer Austauschdienst.

more alert to the opportunities and limitations that follow from established policy styles, and being more attentive to basic properties and oddities of the nation's system of public administration. Institutions already in place, for example, may need to be modified or altered to support the use of economic instruments.

An appropriate institutional framework should be seen as an important precondition for the use of economic instruments. The choice of an agent responsible for the implementation of a system of economic instruments, and the careful construction of incentives that support policy objectives, can be just as important as the introduction of economic instruments. Unfortunately, economic instruments are often introduced on a *marginal* basis, that is, they are simply added to existing structures and policies in the hope that everything will work smoothly together. This approach clearly does not produce an appropriate understanding of the incentives at work at the level of implementation.

Since the experience of individual departments in the use of economic instruments is often limited, a specialised task force that could assist in reviewing and assessing the construct of economic incentives could be helpful for many governments.

## **Economic Instruments and Clean Water: Why Institutions and Policy Design Matter**

### **I. INTRODUCTION**

During the 1980s, regulatory reform was on the agenda of most governments in industrialized countries. Emanating from the United States, a new philosophy concerning public regulation and the interplay between market and state spread to Europe and beyond. Economic think-tanks, such as the Brookings Institute in Washington, D.C., pointed out how regulation can distort competition and efficiency in the provision of public services. They examined how traditional command-and-control regulations can be exchanged for more flexible and efficient regulatory and non-regulatory measures -- measures that have come to be called "economic instruments." By using economic instruments, whether in health services, housing policy or pollution control, governments can employ market forces to secure a more efficient balance between the supply of public services on the one hand, and the demand for and benefits of such services on the other.

Yet the sphere of regulatory reform dealing with economic instruments has inherited some serious fallacies from neo-classical economic analysis. The most serious of these is that economic instruments are often treated in a partial equilibrium analysis; that is, they are considered as complete alternatives to so-called command-and-control regulations, while *institutional issues* are more or less ignored. That is, economic instruments are treated in a vacuum that offers little opportunity to understand how the market and its institutions actually function. When institutions are considered at all, they are regarded mainly as barriers to the functioning of market forces. While such presumptions from neo-classical economics are perhaps ideal for the science of economics, they offer only limited advice to government officials and other practitioners in the field of public policy, who wish to add economic instruments as merely one, albeit perhaps powerful, stimulus in a more complex world of regulations and institutions.

The importance of institutions is becoming better understood. Douglas North (1990) and other neo-institutional economists have pointed out how formal and informal institutions affect the functioning of the market. While some of the first contributions to economic neo-institutionalism implicitly treated institutions merely as obstacles to the market mechanism, North and other more recent writers offer a more sophisticated and differentiated account of institutions. Such economists are coming closer to sociological neo-institutionalism, which treats institutions -- historical, political or social -- as indispensable elements of reality (March and Olsen, 1989).

When governments consider using economic instruments, it is crucial to understand the institutional context in which the market-like mechanism will function. This context is determined partly by other regulations that are in place, but is primarily determined by the "standard operating procedures" through which public regulations are developed and implemented. Fundamental patterns of national policy-making are quite different among countries, but are seldom subject to much consideration because they reflect deep-seated constitutional and historical approaches to governing. Such patterns are repeated time and again as governments define and solve problems, and can be seen as *national styles of policy-making* (Richardson, 1982). Governments, in the words of North, need to understand such historical paths of institutional change in order to grasp the complexity of their own public policies, and to understand why policies succeed and fail.

This study, by examining the use of economic instruments for water pollution control, shows how national styles of policy-making are important for the choice and design of policy instruments.

Specifically, the study assesses the implementation of water pollution control policies from 1970 to 1990 in four countries: Denmark, France, Germany and the Netherlands.

The study shows that economic instruments are indeed powerful instruments for the implementation of public policy.<sup>2</sup> But the study also shows the importance of institutional settings in determining the success of economic instruments. Historical traditions of water management led the Netherlands to establish a coherent and very effective system, based on economic instruments, for pollution control of the surface waters, but different management traditions in France and Germany impaired the use of economic instruments. In Denmark, traditions of public policy-making impeded the use of economic policy instruments from the very beginning, and consequently results were especially disappointing.

## II. WHY ECONOMIC INSTRUMENTS?

There is a considerable and rich literature on the use of economic instruments for pollution control (Baumol, 1972; Baumol and Oates, 1988; Crandell, 1983; Pearce, et al, 1989). The idea was first introduced by the British welfare economist Arthur Cecil Pigou, a founding father of welfare economics (Pigou, 1920). Reflecting on the famous London fog at the turn of the century and the economic costs imposed on the city due to reduced sunlight, resulting diseases and other serious damages, Pigou found a strong case for the taxation of air pollution externalities. His 1920 work, *Economics of Welfare*, in which the use of economic instruments for pollution control was first introduced, is regarded as a 'blueprint' for the subsequent North-European welfare state, although the pollution tax proposal, contrary to many other proposals for regulations, did not win support in the 1930s (Collard, 1981).

While the pricing of external effects of industrial production was originally seen as a response to market failures, e.g. the failure of the market to include the costs of external effects in market transactions, more recent advocates of economic instruments have seen the use of such instruments as appropriate also to deal with so-called policy failures, e.g. the failure of 'command-and-control' policies to deal effectively with pollution.

Pigou's argument was essentially that when pollution remains an unpriced externality to market transactions, it will result in a less optimal allocation of resources than if pollution is properly priced. By adding a tax to pollution, it is, at least in theory, possible to equate net marginal private costs with net marginal social costs, and thus to assure that market transactions lead to outcomes that are Pareto optimum.

When modern environmental economists began to appear in the late 1960s and early 1970s, as pollution became a prime concern for governments, they found not only market failures but also numerous and detailed regulations for the control of pollution. These regulations had evolved gradually since the turn of the century, and were mainly based on the command-and-control philosophy; e.g. they forced all businesses to adopt the same measures and practices for pollution control and thus to accept identical shares of the pollution control burden regardless of their relative costs and impacts.

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<sup>2</sup> The research project was carried out from 1990-1992 and supported by the Social Sciences Research Council in Denmark.

A key concern for environmental economists is the inefficiency of these regulations. Their argument is a bit different from that of Pigou. In recent literature, such regulations are shown to be inefficient because different firms with different marginal abatement costs are required to take similar abatement measures. If governments take such a standardised approach, the total social costs of pollution control are substantially higher than if pollution is controlled where the marginal abatement costs are lowest. The use of economic instruments such as taxes, on the other hand, will assure that pollution control takes place only where the costs of control are smaller than or equal to the amount of the tax, thus for example inducing a low-cost firm to reduce 90 per cent of its discharges and for a high-cost firm only 10 per cent -- instead of command-and-control regulations requiring both of them to reduce pollution by 50 per cent.

In spite of the considerable progress in environmental regulation since Pigou's first proposal, economists unfortunately continue, however, to treat the issue through micro-economic partial equilibrium analysis that disregards the complexities present today. The theory treats economic instruments not as a complement to other regulations, but as a perfect substitute to all other regulations.<sup>3</sup> Although "command-and-control" regulations are criticised for not leading to efficient solutions, few attempts have been to explain governments' preference for command-and-control regulations. Instead, economists assume that inefficient regulations can at one stroke be replaced by a single policy instrument -- the Pigouvian tax. The literature on environmental economics is essentially an exercise in refining the circumstances under which such a tax could be applied or eventually replaced by transferable pollution permits.

If environmental economists intended to confine themselves to the science of economics, their premises would be regarded as necessary tools to pursue economic research and would raise no objections. However, environmental economists are probably the single group of researchers most inclined to make recommendations to policy-makers on the basis of their findings. Baumol and Oates claim that they work "is not meant to be theory for theory's sake. Our prime concern is policy." (Baumol and Oates, 1988).

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2. According to the authors of what has now become the standard work on environmental economics:

"The formal analysis confirms that in a competitive setting the solution to our problem requires only a *single* policy measure: a Pigouvian tax (or effluent fee) on emitters equal to marginal social damage. More precisely, the environmental authority should levy a fee per unit of smoke emissions equal to the marginal damages (residents and other firms)." (Baumol and Oates, 1988: 22 (*ibid*)).

The criterion according to which policy instruments are assessed is, as in the traditional Pigouvian solution, efficiency:

"As is generally recognized, the Pigouvian tax serves to internalize the external costs that the emitting factory imposes on others. Consequently, the factory owners will take into consideration not only their usual costs of production, but also the other forms of social cost that their activities entail (...) we find that a Pigouvian charge equal to marginal social damage leads to an efficient result." (Baumol and Oates, 1988:22).

In this study, the concern is also of policy, although only indirectly of future policies. The purpose of the study has been to investigate whether the use of economic instruments has made a difference in practice. It is a question which has only rarely been researched by environmental economists. Although a number of surveys have been carried out on the use of economic instruments, these surveys have not directly evaluated the use of economic instruments, but only recorded their application (Ewringmann and Schaufthausen, 1985).

When this study was initiated in 1989/90, there were only a few studies available on the experience of economic instruments.<sup>4</sup> Few have bothered to undertake such painstakingly empirical studies, probably because the theory appears to have such a logical foundation. However, when one considers the strict conditions that apply to the economic theory on pollution taxes, there is good reason for empirical research on their actual operation. The experiences should be pertinent to practitioners, given the considerable interest in the application of economic instruments for pollution control witnessed in the last few years. Furthermore, case studies on the use of economic instruments may also yield findings that can prove valuable for the future development of theories. The present study is, at least to the author's knowledge, the first systematic comparative, multi-case study on the use of economic instruments for pollution control.

In the national context, it is frequently the "too many variables, and too few cases" problem that impedes the evaluation of economic instruments (Goggin, 1986). By taking a comparative approach, and by selecting countries that have certain basic similarities as well as similar programmes of public policy in the area investigated, some of the variables can be held under control. According to the replication-logic of the case-study methodology, we expect to replicate outcomes when similar strategies and policy instruments are used (Yin, 1989).

### **III. FOUR CASE STUDIES OF WATER POLLUTION CONTROL**

All four countries in this study had, in spite of their different aquatic environments, substantial water pollution problems in the late 1960s. When the first modern environmental programmes were introduced around 1970, the control of water pollution was of prime concern. In Denmark, water pollution was regulated by the Environmental Protection Act passed in 1973. In France, the *Loi de l'Eau* (the Water Act) had been passed in 1964, but it was only in 1968-69 that the decrees necessary to secure the implementation of the law were issued. In Germany, Willy Brandt's ambitious environmental programme of 1971 included a call for amendments of the Water Household Act, which were passed in 1976 after consultations with the *Länder* governments, together with a new Waste Water Levy Act. In the Netherlands, the Surface Waters' Pollution Act was passed in 1969 and became effective in 1970. Thus, within a relatively short time span, from 1970 to 1976, all four countries ventured upon new and more active water pollution control policies (see also Johnson and Brown, 1976).

In the following review of these water pollution control policies, we will see how economic instruments were combined with other policy instruments in a setting that, to a very large extent, depended on institutionalised patterns and routines for policy-making, e.g. national styles of policy-making. This is the case despite the fact that, at the formal level, the use of policy instruments appeared to

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<sup>4</sup> To the author's knowledge, only studies of the Japanese S02-levy were available, but it appears that also studies of the Dutch water pollution levy had been carried out (Tsuru and Weidner, 1985; Imura, 1990).

be rather similar in all four countries: a permit procedure was instituted for dischargers, certain planning procedures were followed, user fees were imposed on dischargers and substantial competence was delegated to local authorities (see Table 1). From a narrow 'instrument' point of view, the programmes looked surprisingly alike, except that Denmark did not give the same level of prominence to economic instruments as did the three other countries.

<i>Policy instruments</i>	<i>DK</i>	<i>F</i>	<i>G</i>	<i>NL</i>
<i>Permit procedure</i>	++	++	++	++
<i>Mandatory guidelines</i>			++	
<i>Optional guidelines</i>	+	+		+
<i>Planning</i>	++	+	+	+
<i>Covenants</i>		++		
<i>Appeal procedure</i>	+			
<i>Effluent charge</i>		+	+	++
<i>User charge</i>	+	+	+	
<i>State subsidies</i>	+	+	+	(+)
<i>Local subsidies</i>	++	+	++	
<i>Local authorities</i>	+	+	+	
<i>Regional authorities</i>	+	+	+	+
<i>Special-purpose</i>				
<i>-agencies</i>		++	(+)	++
<i>Private tenders</i>		+		
<i>Water quality princ.</i>	+	+		
<i>Emission principle</i>			+	+

**Table 1. Policy Instruments for Water Pollution Control.**



However, the programmes and instruments were implemented in very different national settings. Despite the narrow similarities of programme design, there were in practice substantial discrepancies in the degree of importance attributed to different instruments, in basic pollution control principles, and in the role and significance of local authorities in the different political systems. Economic instruments were far from being *single* policy instruments as had been suggested in the formal analysis. On the contrary, as Table 1 shows, economic instruments were only one element of complex programmes. Such differences can better understood by considering constitutional and historical paths of development with respect to public administration in the four countries.

Before summarising the individual case studies, it is necessary to clarify the particular economic instruments used in these programmes.<sup>5</sup> A distinction must be made between normal user fees, on the one hand, and effluent charges (or levies) on the other. User fees are charged only for waste discharged to a collective sewerage facility, and cover the costs of a *service*. In contrast, an effluent charge is a *financial obligation* that must be born by any entity discharging waste, treated or untreated, into surface water, and in general the size of the bill varies with the amount of waste discharged.

Effluent charges were introduced in France, Germany and the Netherlands, implying a financial obligation for all dischargers, although the Netherlands had a more comprehensive and self-contained system of effluent charges than did the other two. France and Germany also had user fees to supplement effluent charges, although the Netherlands did not. In contrast, Denmark had user fees but no effluent charges, implying that manufacturing industries and other entities could discharge directly to surface waters free of charge. Furthermore, there were subsidies in Denmark which meant that user fees did not reflect full costs of sewage treatment.

A few words on important background variables are necessary before introducing the experiences of individual countries. Not only did the four countries considered here launch their modern programmes for water pollution control at almost at the same time, around 1970, but they are similar in other respects. Denmark, France, Germany and the Netherlands are, apart from Luxembourg, the four richest member states in the European Union and experienced almost parallel development in their GDP per capita from 1970-1989 (see Figure 1). The economic preconditions for pursuing an environmental policy have thus been reasonably comparable.

(Figures 1 and 2 here)

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<sup>5</sup> There are several reports and articles describing these systems, e.g. Schneider, Günter and Rolf-Ülrich Sprenger, eds., 1984, *Mehr Umweltschutz für weniger Geld*, München: IFO-Institut für Wirtschaftsforschung. Johnson, Ralph W. and Gardner M. Brown, 1984, "Pollution Control by Effluent Charges: It works in the Federal Republic of Germany, Why not in the United States?", *Natural Resources Journal*, 24:4, pp.929-66. Bochniarz, Zbigniew, 1990, "Economic Incentives to Protect Water Quality in Market and Planned Economies", *Natural Resources Forum*, 14:4, pp 302-11. Bongaerts, Jan and Andreas Kraemer, 1989 "Permits and Effluent Charges in the Water Pollution Control Policies of France, West Germany and the Netherlands", *Environmental Monitoring and Assessment*, 12, pp, 127-47. Bower, Blair T. et al, 1981, *Incentives in Water Quality Management*, Washington, D.C.: John Hopkins University Press.

Data on popular concern for the environment is available from Eurobarometer from 1974-1987 (see figure 2), and it appears that environmental concern has been pronounced in all four countries since 1970, with an increase during the 1980s (Eurobarometer 1974-90). In terms of popular support for environmental policies, preconditions have thus been reasonably similar as well.

How shall we judge the success of the water quality programmes? Data on achieved water quality is not a good indicator of the 'success' of environmental policies, since differences in basic environmental conditions make it inappropriate to use actual water quality to infer the effects of the policy. Furthermore, there are different sources of pollution, and it was mainly point sources of industry and cities that were the concern of the early environmental laws, while plural sources of agricultural nutrients did not become subject to regulation until the mid-1980s. Emission data, therefore, offer a more reliable measure of the effects of pollution control. We are interested in the ability of various programmes, and in particular of economic instruments, to rectify pollution at the source.

#### **A. Denmark: Consensus-seeker**

Despite its size, Denmark has a rather decentralised system of public administration. Some 277 municipalities and 14 counties are responsible for many public services, and local income taxes make up 30 per cent of total income taxation. In fact, no other local authorities in the EU have such a large direct share of revenue. One important reason for policy traditions being inclined towards decentralisation is found in the influential farmers' cooperative movement that emerged in the 19th century. This movement was strongly opposed to rule by decree from Copenhagen (Morch, 1982). The libertarian preference was reinforced by a 1968 administrative reform giving municipalities and counties a more important role in all policy sectors, including environmental policy.

Consequently, local authorities became the crucial element in a comprehensive planning and permit scheme intended to control pollution of surface waters. There were not any binding national emission standards; instead, a water quality approach was adopted in which the counties classified local surface waters according to the level of pollution and set performance targets for improvements. Dischargers in need of a permit would receive one on the basis of local targets for the improvement of water quality (von Eyben, 1989).

The use of economic instruments for pollution control was considered, but not introduced. In the words of the then-Minister of the Environment, the use of such instruments would imply "that those who can afford it will be allowed to pollute, and those who cannot afford it will not be allowed, and we don't want to bring class policy into environmental policy" (Folketingets forhandler, 1973). A welfare ideology had penetrated public policy-making for nearly 20 years, and egalitarianism was a pronounced principle.

A corporatist political system had developed, too, and consensus had to be reached with the most important interest organisations before legislation was passed. During implementation, there was further room for negotiations on everything from guidelines to local permits, especially with the influential Federation of Danish Industries. This was in accordance with the tradition for broad framework laws that had evolved with corporatism. Under this tradition, it was also usual to establish administrative courts with representatives of affected interests. To check the powers of the Ministry of the Environment, an independent Environmental Appeals Board, consisting of experts appointed by various interest organisations and the Ministry, was set up to handle complaints on environmental permits (Andersen, 1989).

When one considered the prevailing policy traditions, the approach to pollution control was rather logical. There was a considerable belief in public planning and in the capacity of local authorities. Although there was some rhetoric about the Polluter-Pays principle, effluent charges were not introduced. Manufacturing industries were encouraged to discharge to municipal sewage plants, and the Environmental Protection Act instructed the municipalities to offer subsidies for their construction, which meant that user fees did not reflect actual costs. In some cities, such as Copenhagen, user fees were not imposed until 1977; instead, sewage plants were financed out of the general revenue. This subsidy requirement had been copied from the Water Course Act of 1949 and the Sewer Act of 1907 without much new consideration. Except for the argument of ‘the general interest’ advanced in a Sewer Act proposal in 1901, no thorough argument for this reversal of the Polluter-Pays principle was presented.

Even where policy-makers intended to deviate from standard operating procedures, they fell back on a traditional programme design approach: ‘look at Sweden’. Swedish policies were in many ways seen as exemplary, and it was under this influence that a relatively independent Environmental Protection Agency was established. But the Swedes were also fond of subsidies, and Danish policy-makers did not question their approach. As a result, many public sewage plants were constructed in Denmark during the 1970s, and Denmark became a world leader in this sort of pollution control. Never questioned was whether public operation of end-of-pipe solutions would be more expensive than control at the source, or whether public responsibility was to be preferred to private pollution control. The Danish national policy style resulted in the public sector assuming responsibility for pollution management by constructing public sewage plants. Extending public institutions fit nicely with the standard operating procedures of Danish policy-making.

This policy was effective on its own terms, that is, in producing new sewerage treatment facilities, but highly ineffective from the broader perspective of reducing water pollution. Municipalities quickly expanded their local sewage plants, although not quite to the treatment level preferred by national authorities. The control of industrial pollution proceeded only slowly, however. Before requirements could be set for manufacturing industries, local authorities had to carry out the tedious process of water quality planning. Responsibility for this planning was vested in new county authorities, who lacked both the skill and data to carry out the task. When the counties released the first drafts of water quality plans, conflicts with municipalities arose on the targets. Consequently, it took more than 10 years before water quality plans were elaborated (Fenger and Jensen, 1977; Hansen and Rask, 1986; Andersen, 1989). In the meantime, there were few incentives for firms to reduce pollution on their own.

Local authorities were also reluctant to tighten discharge requirements or even to monitor compliance, so as not to lose jobs and tax income. In fact, the municipalities tended to use the environment as a competitive parameter to attract new firms, secure jobs, and increase tax revenues. Firms were granted discounts on waste water treatment, and controls exercised by the municipalities were relaxed.

As a consequence, gross industrial discharges were approximately at the same level in the late 1980s as at the outset, when measured in terms of oxygen-binding substances (BOD/COD) (see Figure 3). About 50 per cent of industrial discharges were treated at public sewage plants, which did have some effect in reducing pollution, but this was an expensive and essentially problem-displacing solution, as waste water was converted to sludge in increasing volumes.

(Figure 3 here)

## **B. France: River Basin Management**

The French policy tradition corresponds with its centralised system of public administration and has, especially during the Fifth Republic, assumed a somewhat technocratic character. The French administrative structure is complicated, with three levels of local government: regions, departments and communes (or municipalities). Both regions and departments have a dual character, that is, they are led both by a state appointed prefect and an elected council (Wright, 1989). The department is the most important entity, and the traditional ministries of industry and agriculture have branch administrations at the department level. A Ministry of the Environment had already been established by 1971, but it has remained small, without its own branch administrations at the department level. While the 'old' ministries recruit their officials from each of the traditional engineer corps, the Ministry of the Environment does not rely on such a single administrative corps, and lacks the internal and external hegemony that envelopes these corps (Larrue, 1992).

The Loi de l'Eau, passed in 1964 shortly after de Gaulle came to power, was in many respects exemplary, according to the views of both economists and technocrats (Nicolazo, 1989). Integrated water management was introduced, and a new system of River Basin Agencies based on effluent charges were established to lead water pollution control. Each of these six River Basin Agencies were supposed to take the responsibility for the management of ground and surface water in hydrological basins along the large French rivers. This new system was built on 'top' of the original water act of 1917, which had vested the Departments with the authority to grant discharge permits. However, because of the influential Association of Mayors, the River Basin Agencies were not allowed to manage actual pollution treatment, as envisaged in the draft act. The construction of sewage plants was to remain with the French communes.

Local authorities in France have not been reorganized since Napoleon, and France has more than 36,000 communes, which is more than one finds in the rest of the EU altogether (Ministère de l'Intérieur, 1991). The numerous and weak local authorities are the complement to the powerful state authorities. Ninety per cent of French communes have less than 2,000 inhabitants, and they have to cope with very restricted sources of revenue. Consequently, both water supply but also sewage plants are to a large extent managed by private contractors from the French water industry (Lorrain, 1991). The communes also depend on subsidies from the state, the departments, or the River Basin Agencies for water pollution control.

A system of effluent charges was introduced with the Loi de l'Eau, but not quite in accordance with the economist's textbook. The charges apply to all entities discharging to surface waters, and are based on specific pollutants. However, the River Basin Agencies have not been free to set these charges, but have been subject to control from the Ministry of Finance. Because of restrictions on tax burdens on the public, most pronounced during Mitterand's presidencies, the charges have been too small in themselves to induce any control of pollution. The revenue has been controlled by the River Basin Agencies, who have used the funds to support industries and communes that were willing to take measures to control pollution. In the 1970s, the Ministry of the Environment, which is without its own funds, created a system of Branch Contracts, where selected industrial branches agreed to reduce pollution if they received subsidies from the River Basin Agencies (Harrison and Sewell, 1980). Later, similar River Contracts that involved both industries and local authorities along certain sections of rivers were introduced.

The existence of River Basin Agencies that could levy effluent charges, in combination with the branch contracts developed by the Ministry of Environment in which effluent charge revenues were earmarked for pollution control, were responsible for most of the progress in pollution reduction. The

discharge permit procedures of the departments were not especially effective. A water quality planning system required by the EC, and similar to the Danish system, also proved to have little effect because the departments lacked data and qualified staff, and had to consult the River Basin Agencies (Holm, 1988).

Yet noting the progress made by the River Basin Agencies and the earmarked revenues should not obscure the fact that programme effectiveness has been undermined by a continuing struggle in France between centralised and decentralised powers. The status of the River Basin Agencies as independent bodies of decision-making has been challenged especially by the Ministries of Finance and the Environment, who have used numerous measures to control and influence their priorities. Too, institutionalised routines of policymaking, with delegation of powers to non-environment branch administrations at the department level and commune responsibility, impeded the operation of the new system. The reform of the Loi de l'Eau was not sufficiently extensive, and applied economic instruments only at the margin of existing regulations and authorities.

(Figure 4 here)

The achievements are mixed. With regard to industrial pollution, the concerted effort pertaining to specific industrial branches achieved in fact considerable reductions in discharges. From 1975 to 1987, discharges were reduced by 37 per cent, and reductions were especially significant in the pulp and paper industry and the chemical industry (see Figure 4). With regard to local sewage plants, results have been mediocre. In spite of France's impressive water industry, by 1987 only 52 per cent of the population was supplied by sewage plants -- a share lower than either Spain or the former GDR (OECD, 1991). The main reason is that the communes lacked the necessary economic resources. Contrary to the Danish municipalities, they do not collect substantial local taxes, and they depend for most of their income on the state. Although the French municipalities are forced to pay the levy for their discharges into surface waters, they are financially unable to prevent those discharges by constructing sewage treatment facilities. The effect is to nullify the incentives of the economic instruments.

### **C. Germany: The Branch Guidelines Approach**

Germany is a federal state, a situation that penetrates the policy-making process in general (von Beyme and Schmidt, 1990). With regard to water pollution, the constitution delegates competence to the Länder level -- a delegation that until 1972 also applied to other pollution control areas. For that reason, the federal level has only recently exerted influence over environmental protection.

The first Water Household Act passed in 1957 was a very broad framework act, based on the lowest common denominator. It capped more than fifty years of efforts to enact a national water act. Since the late 19th century, local legislation had applied to different stretches of the same rivers, e.g. more than 70 different regulations to the river Rhine (Wey, 1982). Other acts followed. Following Willy Brandt's Environmental Programme of 1971, the Water Household Act was amended in 1976, introducing a coherent system of industrial branch guidelines. A Waste Water Levy Act was also passed in 1976.

The federal level has thus assumed framework legislative competence, although federal law has to be incorporated in Länder legislation, causing delays and differences in the legal text as well as in practical implementation. The cornerstone of the new regulatory system that was introduced in 1976 was the branch guideline system, and the waste water levy was seen as a supplement to this (Freige, Henning 1984). The guidelines prescribe specific technological standards to be achieved in each industrial branch, and firms that cannot meet these requirements are faced with a waste water levy. Because of opposition to

the levy from Bavaria, a land especially keen on Länder competence in this matter, the levy was first introduced in 1981, and in some Länder even later.

The significance attributed to the waste water levy is thus substantially smaller than envisaged in the first draft of the new water pollution control legislation. In its 1974 report, the independent Council of Experts on the Environment had warned against the use of administrative policy instruments, and stressed the efficiency of economic instruments:

**"The Polluter-Pays Principle and the following charges would not only provide the missing incentives for pollution control. If correctly applied they would also make it possible to reduce total costs" (Rat von Sachverständigen für Umweltfragen, 1974).**

The federal government had intended to give the levy more prominence, but was forced to surrender to Länder reluctance. Furthermore, because of the constitutionally prescribed Länder competence in water pollution control matters, revenue from the levy is controlled by the Länder, even though the rate is uniform for all of Germany. Unlike France and the Netherlands, the Länder do not offer subsidies for industrial pollution control. Instead, revenue from the German waste water levy is used to subsidise the construction of public sewage plants by local authorities.

Except for three city Länder (Hamburg, Bremen, Berlin), there are two levels of local government in the Länder: counties (Kreise) and municipalities (Gemeinden). Larger cities are typically county-less municipalities (Kreis-freie Städte). Local governments in Germany have had a long and changeable history since reform in the early 19th century gave them basic autonomy (Gunlicks, 1986).

In pollution control matters, municipalities are responsible for the construction of sewage plants, and German local authorities were already quite active at the turn of the century. Sewage plants have been subsidised, to some extent by municipal revenue, but more importantly by Land and Federal sources. These subsidies, although violating the Polluter-Pays Principle, follow from the fiscal equalization principle (Finanzausgleich Prinzip) of the German Constitution, which intends to secure citizens in all of Germany approximately the same level of public services. As a consequence of local, Land and federal subsidies, it is estimated that German user fees for waste water treatment cover only 65-75 percent of the true costs of pollution control, relieving industries that discharge to public works of some of their costs.

Only industries that discharge directly to surface waters are required to pay the waste water levy. Payment is made on the basis of the amount of pollution discharged, but varies according to compliance with technological standards, that is, industries in compliance with branch guidelines can escape the levy. In 1986, the technological criteria were changed from a Generally Accepted Technological Standard to one of Best Available Technology (Mindestanforderung). Public sewage plants also have to pay the levy if they do not comply with emission guidelines.

The branch guidelines are negotiated in a special committee with Länder and federal environmental authorities. Because of constitutional delegation of authority to the Länder, guidelines then have to be approved in the Bundesrat. Thus, Germany is probably the only country where politicians actually approve technical standards -- something left solemnly to bureaucrats in other countries.

(Figure 5 here)

It is difficult to assess the effects of the effluent charge in Germany, despite the very detailed waste water statistics available. Emissions actually began to decline in 1981, the same year as the levy

was introduced and five years after the act was passed (see Figure 5). However, the economic instrument is a supplementary instrument to the system of branch guidelines, and because of the lengthy negotiation procedures on the branch guidelines, the first of these were also introduced in 1980-81. It makes little sense to separate the effects of the effluent charges and of the guidelines, since these have in practice been combined.

German water policy has become a hybrid of command-and-control regulations and economic incentives. The main reason is that regulations had to go through the wringer of German federalism, and became subject to the general power struggle between Länder and Federation. Although national authorities preferred more extensive use of economic instruments, they had to accept the sector guidelines approach to reach agreement with the Länder. Furthermore, the importance of countervailing institutionalised practices, such as the fiscal equalisation principle, was not understood, and ultimately they undermined the Polluter-Pays principle in the implementation phase.

#### **D. The Netherlands: The Legacy of Water Management**

The Netherlands is a unitary state, with a sense of centralism that is said to originate from Napoleon's occupation. Unlike Danish and German municipalities, but like French municipalities, Dutch municipalities have little financial autonomy, and depend more on the state for their income. With regard to water pollution control, an exceptional infrastructure for water management, the Dutch Waterboards, has come to play a significant role. Since medieval times, the Dutch waterboards have been responsible for dykes and canals, and water pollution control developed incrementally in the 1950s under the auspices of local Waterboards. In 1969, the Netherlands' first law on water pollution control, the Surface Waters' Pollution Act (SWPA), established a coherent system of economic instruments and gave the Waterboards an important function in pollution control (Environmental Resources Limited, 1982).

Water pollution issues are not managed by the Ministry of the Environment in the Netherlands. Since the implementation of Cornelius Lely's renowned plan to reclaim the Zuidersee, the Rijkswaterstaat under the Ministry of Transport and Public Works has been a state within the state in the Netherlands, and Rijkswaterstaat is responsible both for water quantity and water quality management. Rijkswaterstaat's scientific centre for water pollution control, RIZA (located in the city of Lelystad in what used to be the Zuidersee), has played a significant role in the national supervision of industrial pollution.

Following the conclusions from a study commission for water management, the Waterboards were given a prominent role in the control of water pollution. Rather than making the municipalities responsible, Waterboards were reorganised on hydrological principles (that is, on the basis of natural watersheds and river systems), and their traditions of user fees were transferred to pollution control. Formally, the Waterboards operate on the delegation of the Provinces (de Goede, 1982).

The Waterboards are dominated by farmers (and for this reason are sometimes called the "Boer-republics" of the Netherlands). A council headed by a dike-count is elected for each board. Both water quantity and water quality interests can elect or appoint members of the council. Their activities are financed by user fees. During the decision-making process on the SWPA, the Union of Waterboards requested that the government subsidise sewage plants, but this was refused. The Waterboards had already demonstrated that sewage plants could be financed by means of user fees, and besides, the government argued in 1965, the use of fees and charges would give incentives to reduce pollution (Rijkswaterstaat, 1990). The Waterboards became responsible for the local waters, and the Rijkswater-

staat for the so-called state waters, mainly the Rhine and the North Sea where the bulk of industry is located. Waterboards that discharge into state waters also have to pay the state water levy.

All entities discharging waste into surface waters are obliged to pay a levy, either to the local Waterboard or to the state. The funds from the state water levy are used to provide subsidies for companies that reduce pollution. Because the levies were set at a relatively high level, industries have been very interested in reducing pollution and seeking advice and subsidies from RIZA, and in fact 71 per cent of industrial investments for water pollution control in the Netherlands from 1970-1989 were supplied by means of the state water levy.

As local Waterboards increase their investment in sewage treatment, the bills to local industries also increase. Therefore, one could expect such local Waterboards to be as reluctant as local authorities in Denmark and France to disadvantage local industries by aggressively pursuing pollution reduction. This could result in insufficient pollution control, and pollution would then reach the waters of other waterboards. There are some counterbalances to this tendency. The Rijkswaterstaat, for example, may claim that a Waterboard acts 'insufficiently' and assess a levy for *all* the waters leaving the territory of the disobedient. This clause has only been used once, in negotiations, and in general the Waterboards have been keen to undertake water pollution control. Although it is not clear why this is so, it may be due to the professional attitudes of the Waterboard staffs and the value placed by farmers on clean waters for irrigation.

The system of economic instruments in the Netherlands is different from the other three countries because of the strict use of the Polluter-Pays Principle. There were no subsidies for public sewage facilities, and the levies applied to all dischargers, regardless of their location. The state water levies have, however, differentiated between fresh and salt waters, and it has generally been more moderate than the levies imposed by local waterboards.

The Dutch system of water pollution control is exceptional, and so is its success. Two important works by Dutch scholars have demonstrated how the levies provided a decisive incentive for industries to reduce water pollution (Bressers, 1988). From 1970 to 1987, pollution of oxygen-binding substances was reduced by 80 percent, in spite of increased economic activity (see Figure 6). Reductions were especially significant for companies discharging to state waters, a fact that can be explained only by the earmarking of revenues for pollution control and the activities of RIZA.

(Figure 6 here)

Furthermore, the Dutch system was cost-efficient, because it caused industry to control more pollution at the source, and thus reduced the need for costly end-of-pipe treatment at public sewage plants. As a result, the capacity of sewage plants in the Netherlands is substantially lower, measured per capita, than in Denmark, although in both countries more than 90 per cent of the population is connected to sewage plants. Figures also show that the gross discharges of Dutch industry has become substantially lower than Danish industry. The impact of levies in the Netherlands has been so forceful that some Waterboards have experienced problems of overcapacity, due to the quick reduction of discharges from industry. As we shall see below, the Dutch problem of overcapacity has been significantly smaller than what Denmark is experiencing now.

The legacy of water management helped the Netherlands establish a coherent and self-financing scheme of water pollution control. In a state where municipalities have little independence, institutionalised practices of water management provided an excellent infrastructure. The Dutch welfare



model is in general characterised by the use of special-purpose bodies for the delivery of public goods, and this model was successfully applied to water pollution control.

#### IV. COST-EFFECTIVENESS

A European Environment Agency was established only recently, and consequently the construction of comparable time-series on the emissions and costs of water pollution control programmes has been tedious. Despite comprehensive use of national environmental data and the assistance of national census bureaus, it has been possible to establish synchronous emission data on industrial discharges only from 1977-1987 (see Figure 7). Even though this figure excludes the early 1970s, when the Dutch programme was most effective, it is evident that the Netherlands has been the most successful among the four countries in reducing the load of oxygen-binding substances discharged by industry into surface waters. France is a surprising number two, while Germany began to decrease discharges during the 1980s. In Denmark, gross industrial discharges remain at the same level as in 1970.

(Figures 7 and 8 here)

When using national data to estimate pollution from the individual industrial branches, it is evident that Denmark still has the most polluting industries (see Figure 8).<sup>6</sup> The reason is that the Danish strategy was to accept public responsibility for pollution control, and to treat industrial pollution at public sewage plants. For this reason, investments in, and the capacity of, sewage treatment are substantially higher in Denmark, measured per capita, than in the other three countries (see figure 9).

One would perhaps expect that Danish industry, which was not encumbered with effluent charges, was consequently relieved of costs compared to industries in the other three countries. Figure 10 shows the share of industrial investments for water pollution control in relation to total industrial investments. Unfortunately, figures are not available for the whole period, since the Danish census bureau ceased to count industrial investments for pollution control after 1982. Until 1977, however, Danish industry had slightly *higher* investments than French and Dutch industry, while Dutch industry from 1977-83 invested slightly more than the other three. The relatively high Danish investments are explained by the fact that Danish industries had to support the financing of public sewage plants in terms of connection fees, and due to the large capacities constructed, these connection fees were substantial. In the other countries, and especially in the Netherlands and France, relatively more pollution was rectified at the source, keeping total costs at a lower level. The lenient treatment of Danish industries did not, as one could have expected, relieve them of costs.

(Figures 9 and 10 here)

There were costs for the public sector as well. In Figure 11, deflated public investments for the construction of sewage plants (excluding sewer networks) are shown for three countries (for Germany, investment figures are available only for plants and sewerage networks and are not included here). Investments are moderate in France, reflecting the modest extension of public sewage plants. The Danish investments are excessive when one considers the actual extension of services that took place in this period. From 1976-87, the share of the population connected to sewage plants increased from 75 to 95 per cent, while in the Netherlands it increased from 35 to nearly 90 per cent. During this period, Denmark invested

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<sup>6</sup> Comparable data at the branch level are not available for Germany.

114 US\$/capita, while the Dutch invested 71 US\$/capita in public sewage plants.<sup>7</sup> To put it simply, Denmark invested almost twice as much as the Netherlands, and constructed less than half the capacity.

(Figure 11 here)

It would require a very detailed study of technologies and costs to explain the difference between Denmark and the Netherlands appropriately. Although the Danish capacity is nearly 50 per cent higher per capita than the Dutch (see Figure 9), the difference in capacity cannot account for the whole difference in construction costs. The sewage plant market was overheated in Denmark in the 1970s, and profits were high. Furthermore, the Dutch Waterboards may have been more professional in tendering out the construction of sewage plants, than the smaller and often technically-insufficient Danish municipalities.

To sum up, it is clear that Denmark's approach to water pollution control was less successful than those countries which used effluent charges, both in terms of environmental achievements and social costs. As a result, Denmark now has substantial overcapacity in public sewage plants. But Denmark too is shifting toward economic instruments. A revision of the Environmental Protection Act that took effect in 1993 introduced user fees reflecting full costs of treatment, as well as a programme for Cleaner Technology to reduce pollution at the source. As a result, Danish industries are now reducing discharges, causing increasing problems of surplus capacity. If Danish companies are able to control pollution at the source to the same extent as Dutch industry, the resulting surplus capacity may become as high as 30-35 per cent (Andersen, 1991).

Embarrassed about the development, local authorities have in several cases offered more-or-less legal discounts to keep industrial pollution at the previous level. Thus, an "eco-industrial complex", interested in maintaining pollution rather than preventing it, has evolved and has become quite influential. This eco-industrial complex consists of local authorities, operators of sewage plants, and suppliers, who have incidentally merged into one company, Krüger, with a former EPA director as head of the board.

## V. INSTITUTIONS AND POLICY DESIGN IN ECONOMIC INSTRUMENTS

The three countries that introduced effluent charges have not been equally successful. There seem to be three major reasons why the Dutch policy has been more successful than German and French policies, and these relate to the context in which the economic mechanism was introduced.

Prior to 1969, the Dutch had no specific legislation on water pollution control, while both the French and Germans respected earlier legislation as they introduced effluent charge systems. Consequently, while the Dutch effluent charge system was not built on top of existing user fees for sewage plants, in Germany and France, such user fees were still charged, and were charged on a hydraulic basis, i.e. based on the quantity of water discharged, reflecting only in part the actual amount of pollutants. In the Netherlands, *all* discharges were covered by the Surface Waters' Pollution Act, and

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7. As sewer networks are excluded, the Dutch population density does not explain the difference as a matter of fact, plants primarily above 10,000 inhabitant equivalents, the level of large-scale benefits, were constructed during this period in both countries. Also, methods and levels of treatment were similar, biological treatment being the preferred technology.

levies were imposed on the basis of actual emissions, causing both discharges to public sewerage plants and directly to surface waters to be subject to effluent charges.

Secondly, the Dutch effluent charges were simply higher than the French and German effluent charges. Figure 12 shows the level of effluent charges in the three countries. In the Netherlands, the economic incentive to control pollution was considerably stronger than in the other two countries when firms considered their marginal abatement costs versus the rate of the levy. It is unexpected, however, when one considers the low French levies, that French industry has reduced pollution so much. In fact, most French observers claim that the French levies are too low, and that it is more profitable for firms to ignore the levy and continue to pollute. It is odd, too, that Dutch industries discharging to state waters, and thus subject to the smaller state water levy, have reduced pollution more than Dutch industries discharging at a higher rate to Waterboard waters.

(Figure 12 here)

The explanation for these oddities is the third factor behind the success of the Dutch policy -- the institutional factors. The economic instrument was not, as Baumol and Oates claim, a *single* policy instrument. Without the supervision of RIZA and the earmarking of the revenue, pollution would hardly have been reduced to the extent actually achieved. In France, it was branch contracts that secured pollution control at the source among the largest polluters in the pulp- and paper industry and in the sugar industry. In other parts of the food processing industry, there were no branch contracts and thus no response to the levy. This is reflected in the absolute pollution level of the French foodprocessing industry, which is almost equivalent to the Danish level (see Figure 8).

In Germany, on the other hand, revenue has not been not earmarked, and there has been no programme for cooperation between public authorities with know-how and private companies. Funds from the levy have been used by the Länder for other water pollution control purposes. Although it is difficult to assess the impact of the German levy (and despite differences also in the computation of discharges), reductions have not been so significant as in France and the Netherlands. The existence of branch guidelines meant that the levy was not a single instrument, but the interplay between more traditional command-and-control regulation and the waste water levy has been less successful than has the interplay between the Dutch/French water authorities and the use of effluent levies.

Germany is generally similar to Denmark in the importance attributed to the municipalities, although there are specialised water authorities in the Ruhr district. Municipal authorities seem to be more inclined to support local industries by subsidising their discharges, or to accept higher pollution levels, than specialised water authorities. While one would perhaps expect local government to offer a very balanced consideration of environmental protection versus employment, and water authorities to be more rigid, it is surprising that the economic burden on industry has been no smaller in Germany and Denmark than in France and the Netherlands. Local governments, keen to protect local employment (and tax income) have as a paradox been less efficient in their management of pollution control than those countries where pollution control authorities were special-purpose bodies.

This finding must be seen in light of the transboundary character of pollution. A local authority may choose to ignore the social costs of its policies that are imposed down-stream, while a water authority operating on hydrological principles will have to consider the total impact of its choice. The precarious question raised is whether local authorities are entities suitable for sustainable development, or whether environmental management calls for a stronger state, with special-purpose bodies of public management.

While such a conclusion may antagonise most environmentalists, the relative success of water pollution control in two relatively centralised political systems gives food for thought.

## VI. ASSESSMENT: IMPACT OF NATIONAL POLICY STYLES

Contrary to partial equilibrium analysis in which economic instruments are viewed as single policy instruments, political scientists have tried to generate theories of a broader array of policy instruments. Yet the results achieved so far are hardly promising. The focus has been, since Kirschen's classical article, on developing taxonomies and classifications of policy-instruments, and on generating hypotheses about the use and properties of certain groups of instruments (Kirschen, 1964). The taxonomy proposals vary predominantly with the national background of researchers, and no authoritative taxonomy has evolved yet. As Michael Howlett has accurately expressed it, the literature on policy instruments has thus unintentionally contributed to the discussion of 'national policy styles'. It seems to be difficult to understand the working of policy instruments when these are separated from their context -- the national policy style (Howlett, 1991).

This study of water pollution control policies shows indeed that the choice and implementation of specific policy instruments depends to a considerable degree on the national context, or what we have more accurately classified as the national policy style. Strategies for pollution control reflect deeply-rooted traditions of government intervention, and in particular, of the relationship between government and industry. As Vogel has put it: "Each nation regulates the environment in much the same way as it regulates a wide variety of other areas of corporate conduct" (Vogel and Kun, 1987).

Policy styles are the 'standard-operating-procedures' that nations have developed for making and implementing policies<sup>8</sup> (Richardson, 1981: 22). Each nation's regulatory style is thus a function of its unique political heritage (Vogel, 1988: 128). It requires comprehensive knowledge of constitutional, administrative, historical and cultural institutions to understand the opportunities and limitations arising from a particular policy style.

Institutions may be either formal or informal, and may affect policy-making as well as implementation (North, 1990). They do not determine policies, because it is individuals rather than institutions who make policies. Individuals act as rationally as they can on the basis of their surroundings, previous experiences and perceived interests.

However, policies are shaped through the interaction of many individuals with different interests and perceptions. Institutionalised patterns of policy-making may serve to reduce transaction costs associated with bargaining on policies. Such patterns facilitate decision-making by allowing individuals to follow standard-operating-procedures for policy-making and implementation, instead of bargaining on everything each time a new regulation is needed. Patterns of public administration are taken for granted and basic regulatory philosophies implemented. A constituent assembly is essentially a script writer, because it determines the institutional framework for policy-making for many decades or perhaps even centuries, when it settles the basic powers between national and local authorities, or between parliaments and presidents.

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<sup>8</sup>. Richardson, 1981: According to Richardson's definition, national policy styles are: "...the interaction between (a) the government's approach to problem solving and (b) the relationship between government and other actors in the policy process". Richardson makes a distinction between policy styles according to a consensual/imposing dimension and an active/reactive dimension, thus creating four categories of national policy styles, but fails to develop the concept into a broader and more sophisticated classification.

But even members of a constituent assembly are not free to choose "rationally" between different alternative solutions to the arrangement of the political system. Their choices will be restricted to incremental ones by informal institutions, such as historical events or cultural perceptions. One reason for French centralism that is often mentioned is the size and diversity of the country. As was evident during the fourth republic, France lacked internal coherency and a strong executive was created. However, Germany and the United Kingdom are also large countries, but have not resorted to centralism. German federalism seems to rest on the legacy of duchies and town governments, but this approach to coherency can only be understood by considering Germany's specific historical past. Informal institutions can also develop in a shorter time span, such as the egalitarian welfare ideology in the Nordic countries in the 20th century, or the general planning optimism that dominated in most Western European countries from 1950-1970. While formal institutions such as constitutions and principles of public administration are written and dated, informal institutions are somewhat more heterogeneous.

The four case studies of water pollution control show how policies were decisively influenced by formal and informal institutions during the process of policy-making. Perhaps the Dutch Waterboards are the best example of how the heritage of yesterday's regulations affects today's decision-making. It is interesting that neither Bressers nor Schuurman, the two Dutch scientists who have investigated the use of economic instruments in water pollution control policy in the Netherlands, have accorded much interest to the role of the Dutch Waterboards. In their analysis, the existence of this administrative infrastructure is seen as *ex ante*, an exogenous factor to the functioning of economic instruments. To the national observer, who does not compare, it is difficult to assess the significance of such a structure. Yet, it was precisely the existence of Waterboards, as self-financing entities, that assisted the Netherlands in safeguarding the Polluter-Pays Principle.

## VII. WHAT LESSONS CAN BE LEARNED?

For governments keen to introduce more economic instruments for pollution control as well as for other public policies, the water pollution control study offers interesting implications to consider.

Economic neo-institutionalists have pointed out that institutions are a precondition for markets -- clearly, without institutionalising property rights, market transactions cannot properly take place (Coase, 1988). However, institutions other than property rights are often implicitly treated as barriers to the free play of the market forces. According to this perception, regulatory reform is deregulation, that is, it consists simply of the removal of institutional barriers to competition.

In practice, however, de-regulation means re-regulation. Regulatory reform does not mean leaving the market to itself. Exclusive rights, quotas and planning are substituted by tenders, contracts and other economically-oriented instruments in order to enhance competition as well as overall welfare. In this process, too little attention has been paid to the importance of *basic* institutions of policy-making -- whether formal or informal. It would be unrealistic to pretend that governments have the liberty to shift completely from existing national policy styles.

A key lesson is that policy success depends on being more alert to the opportunities and limitations that follow from established policy styles, and being more attentive to basic properties and oddities of the nation's system of public administration. Institutions already in place may need to be modified or altered on an incremental basis to support the use of economic instruments. The system of local government responsibility in Germany and Denmark was particularly unfortunate, because the municipalities found it possible to cross-subsidise industry's pollution control costs, a practise institutionalised since

the turn of the century. Although hydrological water authorities existed in parts of Germany (and in south-western Denmark), these institutions were evidently too weak to be trusted with the task of water pollution control. A ban on cost-shifting and better coordination among local authorities could have facilitated a more coherent use of the Polluter-Pays Principle.

A related lesson from this study, then, is that the choice of an agent responsible for the implementation of a system of economic instruments, and the careful construction of incentives that support policy objectives, can be just as important as the introduction of economic instruments. In particular, substantial consideration should be given to the interests of agents to act in accordance with the purpose of the policy, as well as to the possible economic loopholes.

Unfortunately, economic instruments are often introduced on a *marginal* basis, that is, they are simply added to existing structures and policies in the hope that everything will work smoothly together. This approach clearly does not produce an appropriate understanding of the incentives at work at the level of implementation. Incentives that derive from programmes under the auspices of other ministries or sectors are neglected or inappropriately considered, and among officials accustomed to traditional legal instruments, there is often a defective perception even of the economic incentives accruing from the regulations under their own responsibility. In France, for example, it is useless to levy communes for their discharges, as the communes' limited financial resources offer them limited leeway to respond to the levy (an official in a River Basin Agency complained that communes were not willing to construct sewage plants even at a 80 per cent subsidy, but it appears that they have little chance of raising the remaining 20 per cent by themselves).

Because the use of economic and market-oriented policy instruments has become fashionable, some administrations are eager to increase their use of these policy instruments, regardless of their possible impacts. In this sense, the use of market-oriented instruments has become an institutionalised response to all kinds of regulatory problems. But to apply economic instruments thoughtlessly may quickly discredit this policy instrument. Since the experience of individual departments in the use of economic instruments is often limited, a specialised task force that could assist in reviewing and assessing the construct of economic incentives could be helpful for many governments. Although Ministries of Finance are often involved in the establishment of new economic instruments, their scope of interest is usually limited to possible revenues.

An appropriate institutional framework should be seen as an important precondition for the use of economic instruments. Governments should therefore consider how *existing* institutions could be used to directly facilitate the implementation of the programme. The existence of the Rijkswaterstaat is instructive; in itself a conservative and traditional body, its research facility RIZA provided information on control technologies to those subject to the effluent charges so that transaction costs were minimised. Economic instruments are important in providing incentives, but frequently the regulated -- whether individuals or firms -- lack the information, skills and know-how to respond in a rational way. Firms frequently miss information on how water and energy use is distributed among different parts of the production process, paying attention only to the final bill. To reduce costs, including taxes on energy and water use, firms must spend resources to investigate alternative solutions. Such transaction costs can impede the incentives to react to economic instruments. By building an institutional network of actors who can assist in lowering such transaction costs, more modest economic instruments are more likely to be successful, and at reduced social costs, than draconian economic instruments that are sufficiently high to outweigh heavy transaction costs.

The message of neo-institutionalism to policy-makers is that institutions matter. Markets cannot exist without institutions, and market-like regulations are even more dependent on institutional contexts. This lesson is perhaps even more evident in the Russian experience of creating a market economy. Some economic advisors pretend that a free market economy can be established swiftly, disregarding deeply institutionalised practices of policymaking in Russia. Neo-institutionalism, however, tells us that such a transition will succeed better if institutionalised practices are fully understood, and exploited to support the establishment of a more market-oriented economic system. Although regulatory reform in Western Europe is much less of a challenge, western governments must also acknowledge that policy-making takes place only within the context of formal and informal institutions that are key to success.



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These economic instruments are often contrasted to regulatory instruments, which refer to direct controls through quotas or bans in conformity with legislated standards and enforceable through administrative sanctions and/or litigation. The two mechanisms can in theory be used to equivalent effect. But in practice there are important differences. Regulatory controls are often preferred by policy authorities on the ground that the effects of regulation are more certain than those of taxes and other economic instruments. Individuals and business firms, too, tend to prefer regulations to the extent that the effects of regulation are more certain than those of taxes and other economic instruments. In early civilizations, water played a relatively simple role. It was needed for transportation and drinking and it provided a fishing and hunting source. Equally important is understanding how alternative economic policy instruments influence water use across different economic sectors as well as between local, regional and national levels and among households, farms and firms. For too long, many water managers have failed to recognize the connection between macroeconomic policies and their impact on, for example, technical areas such as irrigation. Macroeconomic policies and sectoral policies that are not aimed specifically at the water sector can have a strategic impact on resource allocation and aggregate demand in the economy. Economic policy in a modern economy is designed and implemented by government and its designated agents and institutions. To help achieve policy objectives, policy making authorities have at their disposal a number of policy tools, or instruments. These are: Demand-side policies. Fiscal policy, which involves changes in taxation or government spending. Monetary policy, which involves changes in interest rates or the supply of money. Exchange rate policy, which involves changes in the level of Sterling. Supply-side policies.