Regulating Industrial Pollution: The Case of Finland
REGULATING
INDUSTRIAL POLLUTION
The Case of Finland

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Preface

Writing a book is a long journey. This particular journey started when I joined the Finnish Environment Institute several years ago, although at that time I could not know what would follow from the change of my working environment. Now I am convinced that multidisciplinary regulatory research is very fruitful, though my journey to reach this goal has required much time and effort. Fortunately, I have not travelled alone. Consequently, I owe a debt of gratitude to a number of people.

I would especially like to express my thanks to Professor Erkki Hollo, my supervisor, who has advised me and commented my thoughts at different phases of my long journey of research. Although the multidisciplinary nature of my research may have been a surprise for Erkki, he has given me his full support, professional advice and encouraged me to bring my research to a successful conclusion.

I am most grateful to Professor Mikael Hildén, who has influenced this work in various ways. He hired me to the policy instruments research team and the atmosphere of the team has inspired me to move towards multidisciplinary research. More particularly, Mikael was leading a project on the evaluation of environmental policy instruments regulating the pulp and paper and chemicals industries. This project was particularly important for my work, since parts of this study originating from that project. Also discussions with Mikael and with the other members of the research group have significantly influenced my thinking. In particular, conversations with Per Mickwitz have been important and I am deeply grateful for these fruitful moments. Moreover, Per was leading a project on evaluation of air pollution policies which has stimulated my work and influenced this study.

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Contents

Chapter 1 Introduction, research questions and key concepts ........... 9
  1.1. Introduction ................................................. 9
  1.2. Research questions ........................................ 12
  1.3. Outline of the study ....................................... 15
  1.4. Theoretical approaches and concepts ......................... 17
    1.4.1 The concept of regulation ............................... 18
    1.4.2 Goals of pollution control regulation ................... 22
    1.4.3 Quality of regulation and evaluation criteria .......... 26
    1.4.4 Concepts of evaluation research ........................ 27
    1.4.5 Law and evaluation .................................... 29

Chapter 2 Pollution control regulation ................................. 34
  2.1. Regulatory instruments .................................... 34
  2.2. Traditional regulation ...................................... 41
    2.2.1. Instruments of traditional regulation .................. 41
    2.2.2. Standards ............................................ 42
  2.3. Traditional regulation in perspective ....................... 53
    2.3.1. Introduction .......................................... 53
    2.3.2. Effectiveness ...................................... 54
    2.3.3. Efficiency .......................................... 61
    2.3.4. Innovations and their diffusion ........................ 64
    2.3.5. Transparency and accountability ........................ 69
    2.3.6. Interplay between regulatory instruments .............. 73
    2.3.7. Concluding remarks on pollution control regulation .... 75

Chapter 3 Regulatory change ............................................. 77
  3.1. Evolution of regulation ...................................... 77
  3.2. Development of legislation ................................ 86
  3.3. Europeanization of regulation ................................ 94
  3.4. Change of regulatory instruments ........................... 101
  3.5. Relevance of alternatives to traditional regulation ....... 103
    3.5.1. Negotiated agreements and environmental management schemes .......... 105
    3.5.2. Taxation ............................................ 110
    3.5.3. Liability for environmental damage ...................... 112
  3.6. Concluding remarks on regulatory change .................... 115
Chapter 4  Traditional regulation ..................................................... 123
  4.1. Legal framework for sectoral pollution control ..................... 124
  4.2. Effectiveness and efficiency of standards ............................. 130
    4.2.1. Water pollution ......................................................... 131
    4.2.1. Air pollution control ................................................. 135
  4.3. Influences on technical development of water pollution regulation 141
    4.3.1. Purpose of the analysis ............................................. 141
    4.3.2. Material and methods .............................................. 143
    4.3.3. Relevant elements of permits ..................................... 144
    4.3.4. Emission limits ...................................................... 146
    4.3.5. Research and development obligations .......................... 156
    4.3.6. Concluding remarks on influences on technological change ... 160
  4.4. Integrated pollution control .............................................. 163
    4.4.1. Introduction .......................................................... 163
    4.4.2. IPPC policy .......................................................... 165
    4.4.3. The goals of integrated pollution control ....................... 167
    4.4.4. Legal framework for integrated permitting ..................... 170
    4.4.5. Mechanisms for increased effectiveness and efficiency ....... 175
    4.4.6. Evaluation .......................................................... 181
    4.4.7. Concluding remarks on integrated permitting .................. 189

Chapter 5  Past and future .......................................................... 196
  5.1. Path-dependent and incremental development ....................... 196
  5.2. Prospects for future regulation ......................................... 201

Sources
  Literature ................................................................................. 208
  Official publications ............................................................. 221
  Cases .................................................................................... 222
Chapter 1

Introduction, research questions and key concepts

1.1. Introduction

The importance of environmental problems has long been acknowledged. Governments have responded to this, particularly since the late 1960s by introducing an increasing amount of environmental regulation. The expansion of environmental regulation has meant that new activities have come under regulation and the range of matters pertaining to already regulated activities has become wider. Not only environmental regulation but also regulation in general has grown. The increased amount of regulation relates to the development of the modern state and started well before 1960s. However, the expansion of environmental regulation has been particularly strong during the last 30–40 years and it has become one of the broadest areas of regulation. New regulation continues to emerge each year.

While environmental regulation has expanded, it has also changed in qualitative terms. Internationalisation and the emergence of new regulatory instruments are among the most important trends. Internationalization has not, however, meant that the relevance of national regulation has disappeared; most of the regulation affecting individual firms or citizens is still national. Instead, it has meant that the stimulus for a regulatory change emanates more and more often from sources outside the national state. Globalisation, which refers to the globalisation of firms, markets and regulation as well as that of environmental problems, affects the development of environmental regulation in many different ways. The globalisation of firms may influence the ef-

1. Tala 1999, 2–7
fectiveness of previous regulation. Liberalization of trade requires new kinds of environmental control. Global environmental problems, climate change being a major example, require global responses and the increased importance of human rights is related to procedural aspects of environmental regulation. The notion that globalization affects the governance structures directly and indirectly has been captured by the concept of multilevel governance, which leaves a role for a variety of market, governmental and other actors at different levels. Until now international influences have been particularly strong with regard to substantial environmental matters, whereas procedures and administrative structures have been to larger extent in the hands of national governments. However, globalization has also advanced decentralization trends. In sum, globalization has many important and fundamental implications for national environmental regulation.

Global environmental regulation continues to be poorly developed in comparison to regional or national regulation. Though global international law has significantly expanded, there is no institution at the global level comparable to the European Union. No global institution has such extensive regulatory responsibilities with regard to the environment as well as other issues and no global institution produces new legislation at the same rate as the European Union does. For the member states of the European Union, the regulatory process at the European level has become increasingly important both in terms of ambition and basic structures of regulation. In substantial terms, new regulatory instruments, which aim to avoid the problems seen as inherent in old ones, are changing regulation. Some new regulatory instruments are based on better employment of market forces, whereas others rely on information and self-regulation. As a result, the variety of instruments in use has become greater than before.

At the same time as the rapid expansion of regulation, concerns about its quality have increased. The issues of quality of regulation have attracted increasing attention among various actors. The OECD has a long tradition of working in the field. In the European Union problems of regulation are treated as a part of good governance and have resulted in different kinds of activities. At the level of national government the improvement of regulation has long been a key topic. The increasing amount of regulation, which is common to many fields of regulation, is one reason behind quality problems. In addition,

7. See e.g. OECD 2003a.
environmental regulation can be assumed to be particularly vulnerable to quality problems due to the complicated nature of environmental problems, uncertainty of causal links between problems and responses, the highly technical nature of regulation, partly unforeseeable linkages between different pieces of regulation and long time-lags before eventual impacts take place. From this it follows that it is not easy to design perfect regulation and unintended side-effects emerge from time to time. Due to these problems quality issues have been and will continuously be on the regulatory agenda. The changing environmental problems—or changing perceptions of them—are one factor behind regulatory reforms, but new understanding of the quality of regulation also spurs regulatory reforms.

The worries about the quality of regulation relate to all stages of the regulatory process, the quality of the preparatory process, the regulatory texts and impacts regulation causes. It has, however, been noted that it is easier to achieve consensus on how regulation should be prepared and when the quality of regulatory texts are good than agree what the impacts are and whether they should be considered positive and desirable or negative and undesirable. This stresses the importance of investigating the impacts of regulation. Thus it is not surprising that in policy papers at all levels the need for evaluation of the impacts of regulation has frequently been stressed, in particular since the 1990s. This is true with regard to regulation in general as well as environmental regulation in particular.

Though the evaluation of impacts is stressed in policy papers, the impacts of regulation are rather seldom adequately anticipated during the preparation processes of new legislation. The insufficient amount of retrospective evaluations has long been acknowledged in Finland, and in 2003 the small number of evaluations, in particular retrospective evaluations, was still considered a problem. Only few evaluations of environmental policies were

15. Harrinvirta, Uusikylä ja Virtanen 1998, 79
made before 2000 although thereafter the number has increased. The research undertaken so far represents a variety of different approaches, though they all can be considered to belong to social environmental research. Despite the rather small number of evaluations of environmental policy, the literature on regulation in general is rich, and not least so in the field of environmental regulation. Both lawyers\textsuperscript{18} and other social scientists have contributed to this literature. Although the legal research tradition in Finland, as well as internationally in general, is mainly focused on issues related to systematization and interpretation of law, there are an increasing number of legal studies, where regulatory and empirical issues have been pinpointed.\textsuperscript{19} Furthermore, the distinction between the normative legal research and the regulatory approach towards law is not strict, because the perspectives are interlinked.\textsuperscript{20}

This study focuses particularly on the Finnish environmental regulation. Finland was rated number one according to the environmental sustainability index in 2005.\textsuperscript{21} Good air and water quality were mentioned as particular reasons for the excellent rating. The rating is based on indicators, which means that it does not give reasons why Finland has been so successful. Hence the rating leaves open whether the good quality of air and water, for instance, is due to governmental interventions or due to other factors, like low population density.\textsuperscript{22} This study aims to provide new insights on how the Finnish regulatory machinery has worked.

### 1.2. Research questions

The general theme of this study is the relationship between environmental regulation and its impacts. In particular, the research aims to identify and analyse how key features of regulation are relevant for the impacts. The issue of impacts is approached retrospectively which means that the focus is on the impacts already occurred. From this it follows that the research also covers regulation which has changed since the regulatory decisions relevant to the impacts have been made. Furthermore, it looks at the regulatory change to increase the understanding of what kind of regulatory instruments have been

\begin{footnotesize}
\begin{enumerate}
\item Parker \textit{et al.} 2004.
\item Yale Center for Environmental Law and Policy \textit{et al.} 2005.
\item In the executive summary of the report it is pointed out that all 5 top countries have substantial natural resource endowments and low population density. Yale Center for Environmental Law and Policy \textit{et al.} 2005.
\end{enumerate}
\end{footnotesize}
It actually used. It aims to improve our understanding of how the legal regulation in Finland works and has developed and so provide a better basis for future development. One may call this approach legally-oriented.

Impacts of regulation is a broad term referring to numerous issues. In this study, the focus is on three criteria of merit, namely effectiveness, efficiency and impacts on innovations. Effectiveness of regulation refers to achievement of policy goals. Effective regulation makes it possible to fully achieve the goals, whereas ineffectiveness of regulation means that the goals are not at all or only partially achieved. Efficiency has many meanings but throughout this research it refers to cost-effectiveness unless otherwise stated. Cost-effective regulation is regulation that “produces” desirable outcomes at least costs in relation to alternative types of regulation. Another way of using the term efficiency would be to use it to refer to allocative efficiency (or Pareto efficiency) which concerns the satisfaction of individual preferences. Regulation would be allocatively efficient if it created a situation where no change of regulation could be made to satisfy one person’s preferences at the expense of some other party. Impacts on innovations, instead, refers to technological change. Regulation may affect technological change in two different ways. It may induce new technological innovations or it may diffuse existing innovations.

The general research question is what implications follow from different forms of regulation in terms of effectiveness, efficiency and impacts on innovations. No doubt the three criteria are not the only criteria relevant for the discussion on the impacts of regulation, and some other criteria are even referred to in various places in the study. It is not possible to make an exhaustive list of possible criteria, and what criteria should be used depends on the context and purpose of evaluation.

After stating this, it can be noted that particularly effectiveness and efficiency are among the most commonly used criteria for evaluations of regulation. Effectiveness, the ability of regulation to foster environmental protection, and efficiency, the costs of regulation related to policy goals, have traditionally been considered crucial factors when the need for regulatory

23. To point out the differences of approaches to study regulation Kalle Määttä has made a distinction between economics orientated and legally orientated approaches. Määttä, K. 1997, 3.
24. Cooter and Ulen 2004, 15–17. An alternative for Pareto efficiency would be Kaldor-Hicks efficiency. This is based on an idea that situation B is preferable to situation A, if those benefiting from the change from A to B can give a compensation to others so that all will be better off in situation B. Kanninen, Määttä and Timonen 1996, 13.
25. Määttä, K. (1997, 15–19) uses environmental effectiveness, flexibility, efficiency and equity as criteria (though his language slightly differs. What I call evaluation criteria, he calls regulatory standards) and Baldwin and Cave (1999) use efficiency, legislative mandate, accountability, due process and use of expertise criteria whereas Hildén et al. (2002, 18) employ 10 criteria, which are relevance, impact, effectiveness, efficiency, acceptability, transparency and participation rights, equity, flexibility, predictability and sustainability.
reform has been discussed. The role of these criteria for decision-making has not always been and will not remain the same. Recently the role of innovations has increasingly attracted the attention of researchers as well as policy makers. This is based on a simple observation that in the long run both effectiveness and efficiency largely depend on the emergence of innovations making possible something that is not achievable today.

In terms of environmental problems, the core of this research lies in water and air pollution from industrial activities. Though the relative role of pollution from point sources has decreased in the last two decades in comparison to other sources of environmental harms, point sources still emit significant amounts of certain pollutants in certain areas. Furthermore, pollution control regulation is particularly interesting, because the diversity of regulatory techniques used to solve pollution issues is wide. It would be hard to find another field of environmental regulation which could give a better basis for the understanding of regulatory change.

To put traditional regulation in a wider perspective a literature review of environmental regulation research is carried out. The literature is explored from the perspectives of the above mentioned three criteria, namely effectiveness, efficiency and impacts on innovations. The focus of the review is on the critical analysis of traditional regulation. However, in order to have a point of reference, this type of regulation is compared to economic instruments. Furthermore, issues of transparency and accountability are briefly discussed. The literature review gives useful theoretical insights on how regulatory instruments work and is useful as such. Still, it remains an insufficient attempt in that only the basic models are analysed. The exact formulation of regulatory instruments in the real world may differ in various ways from the basic models, which are often relevant for the impacts of regulation. This is why the analysis of the detailed formulation of policy instruments in one country, now Finland, deserved to be explored.

The expansion of regulation and the change towards new instruments was observed in the introduction as a key element of general development. This change is relevant with regard to all three evaluation criteria used. The expansion of regulation is explored on the basis of material concerning annually adopted legislation. Furthermore, the extent to which new instruments have been adopted is relevant for this study, likewise the extent to which regulation has become Europeanized. The regulatory change alone does not tell to which extent it has cause a change. This is why the impacts of new instruments are explored using the results of empirical research.

27. On the development of air emissions, see Air Pollution Control Programme 2010, on the development of water effluents, see Finnish Environment Institute 2006, generally on pollution load, see Hakala and Välimäki 2003, 340–357.
The impacts of regulation depend in particular on what kinds of standards it employs and hence special attention is paid for the standards and their implications. Standards are analysed in two phases. First it is asked what kind of implications in terms of effectiveness, efficiency and impacts on innovations can generally be associated with certain kinds of standards? Thereafter, the standards used in the Finnish air and water pollution regulation are studied. The investigation covers sectoral air and water pollution standards prior to 2000 as well the integrated permit mechanism. The aim is to identify which are the key features of standard setting mechanism and discuss the implications of these features with regard to effectiveness and efficiency.

The impacts of regulation do not appear automatically and the actual impacts depend on how regulation is implemented and enforced and what the responses of those regulated and other actors are. Empirical material is used to complement theoretical analyses. This study employs empirical material related to standard-setting as well as the responses of industry. An empirical analysis of the influences of water pollution regulation on technological development is presented. The chosen field of industry is pulp and paper mills, which have traditionally been major sources of water pollution in Finland. Taking into account the different character of regulated industries, the findings related to this sector may not be directly applicable to other sectors. However, the sector is used as an example to show the implications of particular features of Finnish pollution control regulation. The integration of the permit mechanism in 2000 aimed to improve the effectiveness and efficiency of regulation. The basic mechanisms by which integration should increase effectiveness and efficiency are identified. The way in which the different traditions of water and air pollution control have modified the new integrated system is explored. The mechanisms for increased effectiveness and efficiency are assessed based on empirical material.

1.3. Outline of the study

The study is divided into three main parts. The first part consists of two chapters. In this introductory chapter research questions and key concepts are presented. The second chapter draws on the literature for key characteristics of different types of regulatory instruments. It works at a general level without specific reference to the Finnish regulation and aims to provide a theoretical basis for the analysis of regulation in one country in the coming chapters. Theoretical analysis and comparison do not produce final answers to regulatory problems, though they provide intellectual tools for research and a context

for observations. A typology of regulatory instruments is presented, different kinds of standards of traditional regulation are analysed and finally traditional regulation is compared to other regulatory instruments using three criteria mentioned as the basis for structuring the discussion.

The second part consists of two chapters, both focusing mainly on national pollution control regulation concerning point sources. While Chapter 3 starts from more general notions on the development of environmental regulation, it specifically aims to offer an understanding of the recent development of environmental regulation relevant to industrial pollution. Legislative development and variation in the amount of legislation in different environmental sectors, its Europeanization and regulatory shift towards new instruments are explored on the basis of statistical information since 1988. The issue whether the observed legislative change is relevant for the substantial goals of environmental policy is discussed. Thereafter on the basis of literature the extent to which the improved environmental performance of industrial activities in Finland can be associated with alternatives to traditional regulation is discussed. This helps to put traditional regulation—the instrument assumed to have the greatest impacts—in a broader context.

The focus of the fourth—and longest—chapter is on the environmental permit system, which is a traditional form of regulation concerning pollution control from point sources. This chapter, unlike Chapter 2, aims to reveal effectiveness, efficiency and innovations issues on the basis of the analysis of the legal regulation in one country, namely Finland. Before going to specific topics related to environmental permits, a general overview of the permit mechanisms is provided. The development of the legal framework for pollution control, with particular focus on air and water pollution, is presented. The examination covers previous sectoral regulation and ends up with integrated pollution control regulation. The first substantial topic is the implications of water and air pollution standards for effectiveness and efficiency prior to the adoption of integrated permit mechanism. The goal of this topic is to investigate how the legal framework modifies the general nature of standards and what implications follow from this in terms of effectiveness and efficiency. A second topic explored is the influences of permits on technological development. This investigation is limited to water pollution permits and is based on empirical material. The analysis is divided into two parts. First the key elements of the regulatory approach are explored and thereafter the impacts on the pulp and paper industry are evaluated on the basis of the material collected. The third topic is integrated pollution control and aims, in particular, to understand whether the goals of integrated permitting, namely increased effectiveness and efficiency, have been achieved. To accomplish this task the legislative material relevant for integrated pollution control is studied so that exact goals and mechanisms for how goals are intended to be achieved, can be identified. Also,
as a continuation of the first topic, the legal framework for standard setting under an integrated pollution control mechanism is explored, taking into account the previous analysis of sectoral regulation. Thereafter, the mechanisms to increase the effectiveness and efficiency of pollution control are discussed first on a general level and then on the basis of the material gathered. Finally, conclusions are drawn and the findings discussed.

The third part, namely Chapter 5, has two different goals. The first goal is to present the main results as a summary of previous chapters. The second goal is to discuss, in the light of the results obtained, the future development of environmental regulation with specific attention to environmental permits.

1.4. Theoretical approaches and concepts

Regulation is a multidisciplinary research topic. It has attracted the attention of scientists representing disciplines such as law, economics, sociology and political science. Each discipline even covers several approaches. Economic theory has remarkably influenced the research of regulation, though not all researchers of regulation would like to commit themselves to all the assumptions and concepts of this research tradition. Some scholars prefer to speak about a theory of legislation instead of a theory of regulation, though in terms of research questions, multidisciplinary approaches and methods used, there seems to be much in common between the theory of regulation and that of legislation. The proximity of the concepts becomes clear, when one thinks of the general purpose of research and uses the results. A significant part of the ‘better regulation’ discussion relates to the question how (hard and soft) law could be improved, and, for example, in this context it may be difficult to make a meaningful distinction between these two theories. However, theory of regulation may be—as will be discussed later—restricted to a certain kind of legal regulation and theory of legislation, instead, excludes non-legislative means outside its interest. An attempt to apply legal theory to the study of legislation has also been made. This attempt calls itself legisprudence and aims, unlike jurisprudence, to look at law from the perspective of the legislator.

32. The approaches of regulatory research have invaded many fields of law. An example of using ‘regulatory lens’ to study law which traditionally is considered non-regulatory is Collins’s analyses of contract law (Collins 2004). The book, in which Collins article was published, gives a good overview of how regulatory lens can be used to study different branches of law (Parker et al. 2004).
33. Wintgens 2002. It still remains unclear what kind of a contribution legisprudence could provide to solve the problems that a legislator faces, which is different from that of a conventional research based on the concepts developed in legal theory provides. For a critical view of legisprudence, see Tuori 2002b.
The issues of effectiveness and efficiency are at the core of regulatory research, though regulatory studies are by no means limited to these issues. Public interest theory of regulation and private interest theory of regulation aim to understand the emergence and development of regulation. However, it is also possible to explore the impacts of regulation without trying to explain why the regulation has taken the form and content it has. Within another multidisciplinary research tradition, namely evaluation research, specific methods and approaches to assess impacts of policy has been developed. This research tradition should not be seen as an alternative to regulatory studies, but as a complement. Seen from the regulatory studies point of view, evaluation research has developed theoretical concepts and tools, which are useful for an analysis concerning the impacts of regulation. The evaluation literature does not aim to produce a theoretical understanding of the phenomenon studied, like the behaviour of regulated firms, although evaluators, as representatives of multidisciplinary research, may partly base their questions, methods and conclusions on traditional disciplines, such as economics. Instead, the concepts and tools of evaluation research have mainly a methodological role—they aim to help to design and implement a research project. The understanding of the phenomenon studied is, in this research tradition, based on empirical observations. The problem with the empirical approach may be that the empirical data accessible is not necessarily sufficient to establish causal links between causes and consequences. This may be due to various reasons, such as the impact problem, which will be discussed later. Availability of data may also impose restrictions on empirical research. It may be difficult to obtain all the necessary documents from private companies, not to mention information which never achieved written form. When the empirical data is insufficient, theoretical analysis may help to interpret weak signals arising from the material. In the case of a lack of any empirical results a theoretical analysis may be the only alternative. In other words, theoretical approaches, like those of law and economics, which aim to analyse the general features of regulation based on economic reasoning, may contribute to empirical evaluation. Regulatory studies aims to benefits from both types of research.

1.4.1 The concept of regulation

The concept of regulation is a flexible term with many definitions. Selzenick has often been considered to capture the essential meaning of regulation by defining regulation as a ‘sustained and focused control exercised by a public agency over

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35. On evaluation see e.g. Vedung 1997 and Rossi, Freeman and Lipsey 1999.
36. See e.g. Mitnick 1980, Chapter 1.
activities that are valued by a community. The expression ‘valued activities’ aims
to exclude the issues of criminal law and justice from the concept of regulation.
Manufacturing, for instance, is something society values, though it causes
pollution and, thus, needs to be controlled. ‘Control’ indicates that regulation
aims to direct the behaviour of those regulated towards desirable goals. Thus, this
can be seen to in contrast with the facilitative functions of private law.

Regulation is often divided into economic and social regulation, which
is an appropriate distinction so long as Selzenick’s definition of regulation is
followed. Economic regulation aims to guarantee the functioning of markets.
For example competition law is part of economic regulation. Instead, the regula-
tion aiming to foster public interests, like health and safety, environmental
protection and consumer protection is called social regulation. Market
failures are broadly considered an economic justification for both types of
regulation, whereas regulatory failures may prevent the achievement of optimal
environmental outcomes of regulatory activity. The insufficiency of private
law to effectively define rights and responsibilities can be considered to be
an institutional origin of environmental problems and environmental, often
public law based, regulation is a response to this deficiency. However, through
the materialisation of private law the borderline between public and private
law has somewhat dissolved. Private law may recognize and reflect, albeit with
reservations, public interests.

Hilson has made an attempt to define environmental regulation based on
Selzenick’s general definition. He identifies three main problems in Selzenick’s
definition with regard to environmental issues. First he notes that environmental
regulation covers some non-valued activities (fly tipping) and may employ non-
regulatory criminal law. Secondly, though “sustained and focused control”
implies continuity common in environmental regulation, there are also “one-
off” activities controlled by environmental law. Furthermore, Hilson would
like to include self-regulation, which is another tool to deliver regulatory goals,
under the concept of regulation. Hilson ends up with a definition of regulation

38. Ogus 1994a, 257–261. On the other hand, scholars drawing on law and economics do not have
difficulties in including tort law under their concept of regulation, see e.g. Faure 1998, 457.
41. There is a great deal of literature concerning the role of property rights for environmental
problems and Coase (1960) has significantly contributed to this discussion. While it
is undeniable that the economic analysis of property rights has significantly changed the
understanding of how regulation can be used for the management of environmental problems,
one should note that the concept of ‘property rights’ in the economic literature is often used
differently from the way it is used in legal practice and literature, Cole and Grossman 2001.
42. Stewart 2002, 7–9.
which also includes the European dimension, and is as follows: regulation means “control exercised by a non-police public body over the activities of individuals, firms or member states in order to achieve defined goals; or control by firms of their own activities to achieve such goals.”

Often regulation is seen as something that government does. This view is challenged by a decentred understanding of regulation, which is connected to globalisation and pluralisation of regulation in terms of actors, techniques and goals. According to Julia Black, decentred understanding stems from regulatory failure related to five factors: complexity of causal interaction between actors, fragmentation of knowledge, but also power and control, interdependencies between social actors as well as between them and government, autonomy and ungovernability of actors, and rejection of a clear distinction between private and public. Decentred regulation ‘happens’ in the absence of formal legal sanction. According to Black, regulation does not aim solely to correct market failures but also aims to pursue other goals, like legitimacy, and/or the achievement of social justice. The notion that regulation does not need to be a governmental activity puts also activities carried out solely by private actors, namely self-regulation, under the concept of regulation. The Responsible Care programme is a well known example of self-regulation. It is a sustained and focused attempt to alter environmentally harmful behaviour, and entails the use of rules and other means.

Regulation and, in particular, regulatory law as concepts are bound to a socio-linguistic community, namely that of the English-speaking world. As Julia Black notes, ‘there is often no parallel word or even concept’ to ‘regulation’ outside English-speaking countries. While explaining the concept, Ogus points out that regulation relates to the aims of the state to correct market failures in order to meet collective or public interest goals. According to him, in some countries there is a special field of law which governs the instruments used for this purpose, namely *Wirtschaftsverwaltungsrecht* in Germany and *droit public économique* in France, though in English legal culture the expressions ‘regulation’ and ‘regulatory law’ are used instead. The German and French expressions suggest that the comparable Finnish branch of law could be *talousoikeus* which, indeed, has existed. Furthermore, this field of law has

44. Hilson 2000, 1.
45. Based on these notions Black proposes a new definition of regulations as follows: ‘regulation is the sustained and focused attempt to alter the behaviour of others according to defined standards or purposes with the intention of producing a broadly identified outcome or outcomes, which may involve mechanisms of standard-setting, information gathering and behaviour-modification.’ Black 2002.
47. Black 2002, 2.
a link to environmental regulation. *Talousoikeus* covers a broad area of issues, including *maa- ja vesioikeus* (land and water law), and modern environmental law has its roots in land and water law.\(^{49}\) However, there has been little research and discussion under the label of *talousoikeus* for a long period of time.\(^{50}\) Hence, it would be artificial and unnecessary to use this as a comparable concept. In fact, Finland seems to be among those countries not having a good parallel term or concept for ‘regulation’ or ‘regulatory law’ as it is used by Selzenick and others. However, the content of the concept seems also to vary among English speakers\(^{51}\) and ‘regulation’ could be broadly translated into ‘sääntely’.\(^{52}\)

To me environmental regulation (*ympäristösääntely*) refers to an attempt by a public authority to alter or maintain the behaviour of others in order to protect the environment. Environmental regulation can be seen as a governmental response to market failures. Though its primary goal relates to the protection of the environment, it must also meet requirements related to democracy and *Rechtstaat*, which may or may not be in conformity with an effective and efficient response to market failures. In this sense, it can be said that it also serves other public goals. There is no need to link environmental regulation solely to business activities by definition; though in practice it is usually economic activities which are regulated. Environmental regulation may take the form of private law depending on the intention of the legislator. If a legislator\(^{53}\) intends to use liability as a means to promote the protection of the environment, then it can be considered as a regulatory instrument for environmental policy.

For the purposes of this study, non-governmental regulation is excluded from the scope of regulation. Regulation is here understood as an attempt made by a public authority. This means that self-regulation in its pure form is beyond the concept, unless government is involved by giving a legal framework or otherwise. A major justification for this is that principles such as transparency, accountability and justice do not apply in a similar way to non-governmental regulation as they do to governmental regulation.

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\(^{49}\) Kuusiniemi 2001a, 48. Nowadays is common to speak about environmental law instead of land and water law. Kuusiniemi 2001a, 56–58, see also Hollo 1995a, 256–258.

\(^{50}\) A symbolic expression of this is the fact that in a legal encyclopaedia, where the concept is defined, references are made to more literature, which is now more than 60 years old, Hollo 1995b, 557.

\(^{51}\) Baldwin and Cave 1999, 1–2.

\(^{52}\) See Tala’s comments on the concepts of ‘sääntely’ vs. ‘regulation’, Tala 2004, 381.

\(^{53}\) The main purpose of the European environmental liability directive has been to reduce environmental harms. See the white paper on environmental liability (European Commission COM (2000) 66 final). The proposal, however, was developed from tort law into a public law instrument before its adoption by Directive 2004/35.
1.4.2 Goals of pollution control regulation

Pollution control regulation aims to prevent and reduce pollution as stated in EC Treaty and many other legal documents. The notion that pollution should be prevented whenever possible and reduced in any case to an absolute minimum to avoid harmful effects still leaves open what the desirable level of pollution in a specific situation should be. Although pollution may have effects which are not acceptable regardless the costs (like serious health effects), in many cases the question of what the absolute minimum is, is open to debate. Next I briefly overview matters relevant in the finding of desirable pollution levels.

Perhaps it would be wrong to argue that all environmental policy measures are based on natural science. However, all policy measures aiming to solve environmental problems need information on ecology as well as on technological possibilities to prevent or diminish those problems. Some sort of information and understanding between causes and effects is required before a problem is even identified as an environmental problem. The causal relationship between anthropogenic sources of pollution and ecological effects might, in a simple case, be linear, which means that one unit increase of pollution causes one unit increase of damage without other implications. In this case, there is no qualitative change and information about the causal relationship does not make any level of pollution more desirable than any other. Less pollution would always be better. However, natural science may provide information about focal points to which policy goals might be linked. Ecological thresholds, which have defined as “the points at which there is an abrupt change in an ecosystem quality, property or phenomenon, or where small changes in an environmental driver produce large responses in the ecosystem” are examples of such focal points. The concept of critical load, used in the context of the Convention on Long-range Transboundary Air Pollution, is an example of an ecological threshold. However, though this kind of knowledge about qualitative changes is useful, while the level of environmental protection is decided, it does not show what the level should be. It is not possible to draw normative conclusions from scientific facts. In other words, nature does not tell humans what to do. Neither does technological information on the possible ways to reduce environmental pollution show what the level of environmental protection should be.

The precautionary principle, deeply rooted in the existing law and policy, has changed the role of scientific facts in decision-making. The lack of full evidence of the existence of detrimental environmental effects should not prevent the taking of environmental protection measures. In practice this

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55. Groffman et al. 2005
means a move towards probabilistic approaches, where it is accepted that policy can be based on best but still somewhat uncertain scientific facts. This further stresses the notion that natural science can not provide full basis what the desirable pollution level should be.

One could claim that efforts to reduce pollution should be increased so far as the benefits from the reduction of pollution to society at large outweigh the costs of such efforts. This is the approach adopted by economists.\(^{58}\) They consider that an optimal level of environmental protection would be one where marginal costs are equal with marginal benefits. This refers to a situation where perfect allocative efficiency is achieved. So far as marginal costs are less than marginal benefits an increase of effort to reduce pollution causes more benefit than it requires costs. As a point of departure, the idea of having a balance between costs and benefits is a step in the right direction and, in practice, it has had major implications in the making of environmental policy. However, there are a number of problems which make it difficult to know when marginal cost and benefits are equal.\(^ {59}\)

Economic analysis tends to use market information as a basis for valuation. With regard to the costs of environmental protection, market exists; environmental protection requires the adoption of new technologies and technologies have a market price. This gives a basis for the assessment of costs. However, it does not mean that the assessment of costs is always correct. It has often been noted that ex ante assessment of costs tends to be higher than ex post assessment, although the opposite may also turn out to be true in individual cases. One of the reasons for the tendency to overestimate costs is that the emergence of technological innovations is difficult to predict, not to mention the price of not-yet-emerged technologies.\(^ {60}\) Other reasons, like omission or inaccuracy of data or accuracy of it, and the strategic behaviour of regulated industries, also contribute to this.\(^ {61}\)

In some cases, the uncertainty of environmental effects may make the assessment of costs next to impossible. If one does not know what the actual environmental effects of pollution are, knowing the costs of measures intended to reduce possible undesirable effects becomes an extremely complicated matter. Climate change is a case in point. There is sound evidence that the temperature will rise due to climate house gases, but estimates of what will follow from this in terms of human economy vary from negligible to significant changes, which could involve an increase of extreme weather conditions, significant impacts on the agricultural patterns, a rise in the sea level and large scale.

\(^{58}\) Arrow et al. 1996.
\(^{60}\) Bailey et al. 2002, 254, see also Harrington et al. 2000.
migration. At this level of uncertainty cost estimates, which also cover the costs of adjustment, cannot be precise. Uncertainty of predictions does not mean that economic assessments are not valuable, as two recent examples clearly show. The former assessment indicates that the costs of the technologies required for the implementation of climate change policy are not high, and the latter that the benefits of decisive and timely action far outweigh the economic costs of not acting. No doubt these are valuable contributions to the political discussion, but they do not show what the exact level of pollution should be.

The estimation of cost may be challenging, but that of benefits is even more so. The main reason for this is the fact that there is no market for public goods and hence no market prices for them. This makes the evaluation of the benefits of environmental protection much more difficult than that of costs. Despite this, methods for evaluation have been developed, like contingent valuation, which is based on surveys to elicit the willingness of respondents to pay for environmental protection. This method, however, is only the second best alternative, and it does not abolish the fact that there are no prices for public goods. Respondents may respond in strategic ways to surveys and their response is not only dependent on the values of different people but also on the information available to them. Values that do not directly benefit anybody (like the protection of the habitats of no well-known species) could be particularly underrated.

Although costs and benefits could be assessed, a cost-benefit analysis does not necessarily tell what the desirable level of pollution is. Assessment of costs and benefits often happens at aggregate level. This means that the variation in how costs and benefits are distributed between different social groups or regions remains unclear. Although economic analysis may be able to show geographical variation of costs and benefits, it is not possible that a desirable level and fair distribution of pollution could be found in this way. For example, an assessment of the effects of pollution on the property rights in different parts the Baltic Sea could show that the impacts of pollution measured in economic terms in those areas which are already polluted (and inhabited by poor people) are not so significant as in those areas which are not polluted (and inhabited by rich people), because property values vary. If such were the result, it would not be clear whether the most allocatively efficient policy option should also be considered fair and just with regard to those people who are living in polluted areas and whose property values have already fallen due to previous pollution or

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63. Stern 2006.
64. Portey 1994, 3. Contingent valuation is only one method, see Määttä and Pulliainen 2003, 103–111.
other reasons. Hence, the issues of social justice—or those of environmental justice as they often are called—are involved in decision-making. The notion that other means of public policy (like progressive income tax) than pollution control regulation may be better tools to promote social justice does not solve the problem. The decision-makers still need to find the right balance between environmental policy measures and other measures.

Another economic approach would be that of cost-effectiveness evaluation. As noted above, efficiency is used in this study to refer to cost-effectiveness. Cost-effectiveness analysis aims to produce information about the efficiency of alternative regulatory instruments. Hence, it does not produce information what the goals of regulation should be, but what means should be used to achieve the given goals.

In sum, we are in a situation where neither natural science nor economics can provide definite answers as to what the desirable level of pollution should be. From the notion that there is no unique, uncontested method to produce information for the determination of pollution levels it does not follow that all information is useless. The notion presented by economists with regard to cost-benefit analysis that it “has a potentially important role to play in helping to inform regulatory decision-making, although it should not be the sole basis for such decision-making” can be applied to other kinds of information producing methods as well. In fact, there are even more disciplines, including legal analyses, which are able to produce useful information for practical political solutions. Special reference needs to be made to evaluation research, which deliberately sets out to provide information to improve governmental intervention. Retrospective evaluation may produce information relevant for the determination of goals of future regulation, if its results show, say, that the goals already set have been achieved with fewer resources or, alternatively, with greater side-effects than expected. Despite the fact that numerous different disciples may turn out to be useful for the determination of goals of environmental regulation, the final decision is and will remain a political judgement which involves not only facts but also moral and political considerations.

One can approach the role of different kinds of information using the idea that a public policy process is understood as a process consisting of several stages in never ending succession. The stages include initiation, preparation, policy decision, administration, output, outcome and then—after feedback—again initiation, preparation, policy decision and so on. From this perspective

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66. A lecture by Professor Hans Christian Bugge in Stockholm Conference on Law and Justice, September 6—9, 2006, drew my attention to this.
68. Viscusi 1996.
one could think that ecological knowledge often precipitates the initiation of intervention, whereas ex ante evaluation is used at the preparatory stage and retrospective ex post evaluation as a part of a feedback mechanism after the decision is made. This is, however, idealisation in the sense that in reality new information of whatever kind may influence the governance process at any stage. Governmental intervention and retrospective evaluation can be seen as two different subprocesses of the larger political-administrative governance system, where evaluation is a part of general administrative control. One could extend the idea of the subprocesses of the general governance system to other information producing systems than policy evaluation. Information produced prior to decision-making under different disciplines, such as natural science and economics, could also be seen as subprocesses of the overall governance system. What the exact role of different kinds of knowledge will be for the determination of pollution level is a context related matter and it is not possible to draw universal conclusions in this regard.

1.4.3 Quality of regulation and evaluation criteria

A general societal justification for regulatory research is that it can help to improve the quality of regulation. This clearly is not the only justification—as noted in the introductory part of this chapter—though perhaps the most commonly used. The quality of regulation is, however, a complex notion. International organisations, like the OECD and the World Bank, national governments and academics have developed different sets of principles to define what quality means. There is no overall consensus on this matter and the sets of principles used to assess quality in different contexts may vary substantially. Partly this is because the purposes of the sets of principles vary. In particular, laying down principles for the quality of future regulation is a different endeavour from defining criteria of merit for the retrospective evaluation of regulation, which has existed for long time. In the case of long existing regulation, low level of effectiveness or major side-effects can easily be considered signs of its poor quality for contemporary society, though the same item might have been considered to be of excellent quality at the moment of its introduction due to lack of sound information of the effectiveness of regulation. Furthermore, the quality of the rule-making process is a part of an overall quality of regulation and principles and criteria suitable for the process evaluation may differ from those focusing on the outputs of the process.

Different sets of principles of regulatory quality can be seen as reflecting different values. The Mandelkern Report, which was prepared for the EU Laeken summit of the European Council, identified necessity, proportionality,

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70. Vedung 1997, 15–16.
71. For an overview of this discussion, see Centre for European Studies 2004, 10–24.
subsidiarity, transparency, accountability, accessibility and simplicity as the principles of quality for (new) regulation. This set of quality criteria can be understood to reflect certain value judgements intended to direct the making of future regulation. The Mandelkern Report is a policy paper, where a normative approach can be taken as a natural point of departure. One could expect that value judgements have a different role in research than in policy papers. However, it is important to stress that even in research-based retrospective evaluations it is impossible to avoid value judgements, though the research is not intended to be normative. Even the selection of evaluation criteria involves a value judgement, though the use of an explicit criterion may also be seen as a precondition for a rational discussion. The notion that suitable evaluation criteria vary from one situation to another does not ease the problem, because the nature of the problem may not alone determine what criteria should be applied. The values and perceptions behind evaluation criteria may vary from one person to another, but they may also generally change over time. For example, at the moment the issue whether and how regulation fosters innovations is considered more important than previously.

In sum, there is no single concept, criterion or principle which covers or could cover all aspects of quality. Hence, decision-makers often face the situation where the quality of regulation can be assessed on the basis of numerous criteria. Were this the case, then decision-makers must also decide what weight each criterion will get. This again requires a value judgement. This value judgement can, however, be understood as a political endeavour, which is not a task of scientific research. Basically, I think—along the lines of Vedung—that the role of research is not to decide how a balance should be struck between different criteria. Research may produce analyses using different criteria and present future ideas how regulation could be developed to better meet given criteria, but the final conclusion is to be left to political decision-making.

1.4.4 Concepts of evaluation research

Evaluation aims to produce knowledge on the effects of regulation. The side-effects evaluations model developed by Vedung is a useful tool to make a distinction between impacts and direct the research question as well the gathering of material. In this model effects are divided into three levels of categories: on the first level there are two categories of effects, namely anticipated and unanticipated, on the second level both anticipated and unanticipated

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75. Centre for European Studies 2004, 10–24.
effects are divided into effects occurring in the target area and outside it. On the third level effects are still divided into beneficial and detrimental effects. The concept of target area is flexible. For example, in the case of environmental permits, the reductions of emissions of regulated pollutants are effects in target areas. Because emissions of different pollutants may be interlinked, a reduction of one pollutant may result in a reduction of another. But the opposite may also be the case; an abatement method of one pollutant may increase emissions of another. However, all these effects take place “in the target area”, though they may be anticipated or unanticipated and some are beneficial and others detrimental. Not all effects take place in the target area. Improved know-how and decreased employment are examples of possible effects outside the target area of environmental permitting. Because the judgement of whether an impact is beneficial or detrimental, in particular with regard to unanticipated effects, is not always easy to make, this model has been used in a slightly simplified way in environmental evaluations.78

The so-called impact problem79 refers to a challenge hard to avoid in any empirical retrospective evaluation of regulation. The causal relationship between environmental regulation and its impacts is not often easy to establish. The reduction of emissions from industrial plants may be a result of many different kinds of causes. Regulation, technological development and economic cycles, for instance, may all either decrease or increase emissions. Furthermore, the final outcome (changes in the state of the environment) may also depend on other factors than emissions from the regulated industry. Furthermore, different factors may affect each other. Regulation may or may not foster technological innovations. The regulated industry may develop technology in order to find solutions for anticipated requirements, but it may also be that the conditions of environmental permits only reflect the development that already occurred for other reasons. Impact problem refers to the fact that many factors other than regulation may also affect policy outcomes, like the state of the environment.

One of key notions of evaluation research relates to the idea behind the concept of ‘intervention theory’. Intervention theory has been defined as “all empirical and normative suppositions that public intervention rests upon.”80 The idea behind the concept of intervention theory has become popular in recent years in the evaluation literature8 as well as the social science literature generally, though different authors term the idea slightly differently. Basically

80. Vedung 1997, 301.
81. In particular a book written by Huey-Tsyh Chen has contributed to this development among evaluators. Chen 1990.
the same thing has been called policy theory, programme theory, programme logic, programme theory of action and theory of change. The aim of an intervention theory can be said to describe how the policy is intended to be implemented and function. It shows what measures are assumed to be taken in what order and what is assumed to follow from the measures taken. An intervention theory includes different kinds of assumptions: assumptions of impacts at different stages of the causal chain and their causal relationships, as well as assumptions on the relationship between impacts, goals, various actors and moderators, i.e. contextual factors. In evaluation an intervention theory is used as a point of reflection: the observed reality is compared to the intervention theory. However, it is also possible to assess the rationality (coherence of the logic) of an intervention theory on a theoretical basis without empirical evidence.

Several intervention theories may apply to one state intervention. This is because different stake-holders (industry, environmentalists, administration) or individual members of a stake-holder group may see different assumptions behind the regulation, which means that the ways in which they understand an intervention to produce outcomes are not the same. Hence it is possible to construct several intervention theories based on (partly) different assumptions. One way of constructing an intervention theory is to base it as far as possible on the official material available produced for law-making, as is done in this study. Taking this into consideration, an alternative expression to ‘intervention theory’ could be ‘the logic of law’, though I will stick to the more common ‘intervention theory’.

1.4.5 Law and evaluation

A major part of governmental regulation comes in the form of law. Though regulation is in a sense more than “pure” law, referring also to other than legal instruments and activities carried out within the legal framework, much of it is based on (hard or soft) law. Though the issue of evaluation of the impacts

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82. Hoogerwerf 1990.
84. Lenne and Cleland 1987
86. Pawson 2003, 473.
89. Rossi, Freeman and Lipsey 1999, 174–188.
90. As Black notes, law can also be seen to be more than regulation, because regulation does not perform all functions of law (like dispute resolution, stabilising and adapting expectations and allocating authority) neither do regulatory studies aim to answer similar question as jurisprudence. Black 2002, 22–26.
of laws has drawn the attention of legal and other social scientists, specific issues related to law are not discussed too often in the evaluation literature and legally-orientated evaluation is rather rare. Hence, it might be useful to make a few points about the role of law in the context of evaluation.

The first point is the obvious notion that the role of law varies from one policy area to another. Much of evaluation research has traditionally been carried out in policy fields like criminology, teaching, health and social work. With regard to criminology and criminal law the legality principle is particularly crucial and the link between certain behaviour and its (legal) consequences is defined in detail in law. In branches of social policy the role of law is, instead, often limited. Law creates the administrative framework and sets a general goal and lays down certain principles and rules, but it tends to leave a wide discretion to the authorities. In this sense the means used to implement the general policy goals are decided at a lower level. Hence, with regard to impacts, much depends on other variables than legal ones. However, the case of environmental law is different from criminal law as well as from social policy law. Though environmental law employs more general and abstract expressions than criminal law—and hence leaves the final decision to be made at individual level—it determines the means to be used as well as how they should be used in a more detailed manner than law regulating teaching, health and social work.

The role of law does not only vary from one policy sector to another, but also from jurisdiction to jurisdiction. With regard to Finland the role of law seems to be of particular relevance. This notion has a link to the doctrine of Finnish administrative law, where administrative decisions have traditionally been divided into two different categories: those based on free discretion and legally bound decisions. With regard to the first category law sets framework and rough limits to decision-making, but leaves a wide degree of discretion to the administration. In the latter category the hands of a decision-maker are much more bound. As Tuori puts it: “administrative authorities, when assessing what means to employ in order to achieve their aims, can rely only on legally relevant arguments.” Hence, in the case of legally bound decisions the decision-making is closer to the adjudication of courts than in the other

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91. In the Finnish legal research tradition Jyrki Tala in various books and articles has developed a methodological approach to evaluate law. See in particular Tala 2001. Other examples of lawyers interested in the evaluation of laws are Winter H. 2002 and Oksanen 2003 and Ervasti 2004 (see 31–33).
92. Criminal law and criminology, however, are clear exceptions to this. In these fields there are an established traditions to use empirical research and interaction between doctrinal legal research and empirical studies has been intensive. See e.g. Tolvanen 2005.
93. It goes without saying that law still determines the basic social rights, which may in some cases also be very strict, see Tuori 2004, 149–.
case. The distinction has been criticized, though not denied. According to the criticism, the distinction is too crude. Actually there is a great variety of different kinds of decisions on a continuum starting from free discretion and ending up with legally bound decisions.\textsuperscript{96} In any case a large portion of environmental decisions can be described as legally-bound according to Finnish legal doctrine.\textsuperscript{97} This applies, for example, to environmental permits. Though permit authorities have a degree of discretion, which stems from the use of flexible concepts, principles and rules in law, they still are allowed to use in their reasoning only in such arguments which are legally relevant. In principle, the use of other arguments, however rational they may sound, is excluded from the decision making.\textsuperscript{98} The notion that the concept of ‘legally relevant argument’ is itself flexible (emergence of new sources of law may cause changes), does not change the overall picture.

As a point of departure, the central government in Finland has no direct means to intervene in the environmental decision-making of lower authorities, not before, during or after the actual decision of an administrative body. Typically, if the central government thinks that a lower environmental authority has made a bad decision, it cannot immediately influence this decision. With regard to future cases, it must either persuade the lower environmental authorities that there is a need for change through informative means or it must change laws. Another legal characteristic relevant in this context concerns the review of administrative decisions. The review is nowadays solely the task of special courts (administrative courts). In the past a general starting point was what a superior administrative body reviewed the decisions of lower authorities.\textsuperscript{99} The role of legally bound decisions together with the lack of direct means of superior authority to intervene in the decision-making of lower authorities means that the formulation of law has a particularly important role in environmental regulation in Finland.

An example underlying the relative significance of decisions made by environmental bodies and the courts reviewing the decisions, is that concerning the construction of a very large artificial lake (Vuotos) in Northern Finland with extraordinary wide environmental as well as economic consequences. Though the permit authority (then called the water court) did grant a permit for the construction of the artificial lake, the Supreme Administrative Court rejected the permit on the basis of its wide environmental consequences.\textsuperscript{100} The

\textsuperscript{96} Mäenpää 2000, 352–357.
\textsuperscript{97} See e.g. Kuusiniemi 2001b, 276–278.
\textsuperscript{98} This does not necessary mean that the administrative practice completely follows the doctrine. See Chapter 4.3.
\textsuperscript{99} On the development, see Mäenpää 2006, 143–146.
\textsuperscript{100} KHO 2002:86. The key legal issue was whether the decision should be made on the basis of weighing interests (Section 6 of Chapter 2 of the Water Act, 264/1961) or on its significant and extensive detrimental environmental consequences (Section 5 of the same chapter as amended by law 467/1987).
ministers of the government were not pleased, but they could do nothing. As a response, the government is now pondering whether the law (the Water Act) should be changed in such a way that the government has the final word in such cases. This would be an exception from the main principle described above, as are some other cases.\footnote{101}

The second point concerns internal and external perspectives on law. This distinction is often used to make a distinction between legal and social sciences. Though legal and social sciences may both be interested in law, their focus is not necessarily the same. Tuori stresses that legal and social scientists understand law differently and points out that “for legal scholars, the law appears as a symbolic normative phenomenon, as a legal order, whereas social scientists are interested in … legal practices … and … the beliefs the members of a society have of legal norms and which causally influence their behaviour.”\footnote{102} In other words, legal science has adopted an internal perspective, where law is approached using its own concepts, whereas most social scientists tend to see law from an external perspective. Kornhauser has described the internal perspective as follows: “An internal theory (of law—JS) uses the concepts available to participants in the practice that the theory explains; an external theory, by contrast, uses whatever concepts best explain the practice in question whether the participants have or do not have those concepts.”\footnote{103}

Both perspectives of law may be useful for an evaluation exercise, though the external perspective has a dominant role in the sense that law itself can never alone explain its impacts. However, understanding the limits resulting from ‘the use of legally relevant arguments’; or ‘the concepts available for participants’ helps to understand why decision-making procedures produce such results as they do and why different actors do what they do. Furthermore, the understanding of legal concepts, principles and rules and their relation to “outputs” helps to identify what could be changed, if anything, to overcome the problems identified in evaluation. In particular, legal concepts, principles and rules (an internal theory of law) can be crucial for the construction of an intervention theory and they can be seen as elements of an intervention theory. After all, a general assumption behind the regulation is that the participants are following legal principles and rules and, furthermore, the achievement of goals is associated with compliance with regulation. Though other factors than compliance with law certainly also affect goal achievement, most people accept the idea that non-compliance tends to reduce the rate of goal-achievement.

\footnote{101} E.g. permission in principle to nuclear power plants is given by the Parliament and the Council of State decides, whether a project having detrimental effects on the Natura 2000 will be carried out.

\footnote{102} Tuori 2002, 297.

\footnote{103} Kornhauser 2004.
An example may clarify my argument. Let us think of an intervention theory concerning regulation based on environmental permits. A key legal concept for law governing the process through which environmental permits are granted, is best available technology principle (BAT principle).\textsuperscript{104} Emission limit values are, as a point of departure, defined on the basis of this principle and emission limits, in turn, define what those regulated should do. However, the principle can be understood in different ways and these ways may have significant consequences in terms of impacts.\textsuperscript{105} Furthermore, the principle is not valid for all cases,\textsuperscript{106} its interpretation may have crucial consequences, and occasionally other rules are even more important for the design of emission limits. Hence, ideally to construct a complete intervention theory would require understanding when this principle is applied, what other rules are applied and what it the essential content of the principle. In other words, a proper understanding of key features of law is required.

By this, I do not claim that an intervention theory could be constructed on the basis of law and legislative material alone. As noted above, constructing an intervention theory requires that the assumptions (e.g. concerning causal relationships) behind the rules are made explicit. However, not all such assumptions can be found through legal analysis or from legislative material. A Government Bill for an Act or an explanatory memorandum for a Directive is not just an explanation, but also a justification for a proposal. Thus, it would be rational to assume that a legislator tends to make explicit arguments and assumptions favouring the acceptance of the proposal and avoiding using those which call it into question.\textsuperscript{107} It has been claimed that legal draftsmen and decision-makers rarely point out in their legislative material how they think the new legislation will produce desirable outcomes, even though an impact assessment is required as a part of the legislative process.\textsuperscript{108}

\textsuperscript{104} The key legal definition of this principle is to be found in Article 2 of the IPPC Directive, though the Directive uses the expression ‘best available techniques’ instead of ‘best available technology’. The Directive requires that the emission limit values shall be based on the best available technique. The best available techniques means the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, when that is not practicable, generally reduce emissions and the impact on the environment as a whole.

\textsuperscript{105} The relevance of different interpretations with regard to impacts of the BAT principle comes clear, for example, in Pearce and Brisson 1993.

\textsuperscript{106} For example, in a case concerning a gas station, the use of BAT technology was not required, because “no relevant detrimental effects to health” could be proven. KHO 2004:38.

\textsuperscript{107} Similä and Hildén 2003, 10–13.

\textsuperscript{108} Salovaraa and Tala 2003, 11.
Chapter 2

Pollution control regulation

This chapter analyses and discusses pollution regulation on a general, theoretical level. The aim is to provide a basis for the analysis in the coming chapters of regulation in one country. Theoretical analysis does not produce final answers to regulatory problems, though it provides intellectual tools and a context for observations. First, a typology of instruments of governmental regulation based on intervention theories is presented. In the typology legal instruments are distinguished from non-legal and thereafter legal instruments are divided into three groups of traditional regulation, economic instruments and procedural instruments. Secondly, different types of standards used for traditional regulation are identified and their features analysed from the perspective of impacts. Distinctions between verbal and technical, general and installation specific as well as different kinds of quality and source standards are presented. Throughout this discussion examples from EU regulation are presented. Finally, the criticism against traditional regulation as well as its defence is discussed on the basis of selected evaluation criteria, namely effectiveness, efficiency and impacts on innovations. In the final section the issues of transparency and accountability, which are themes of democratic governance, are also discussed in order to provide a broader perspective for regulatory discussion.

2.1. Regulatory instruments

While the amount of pollution control regulation has increased remarkably during the last 30 years, also the diversity of regulatory strategies and techniques used has increased. The diversity of instruments available for environmental regulation has inspired many researchers from many different disciplines to classify them.109 The motivation for such a classification varies and it does not necessarily have any other purpose than to facilitate discussion and teaching. However, a research-based justification for classification often stems from an

assumption that there are common features within a class of strategies and
techniques, which can be extrapolated into other similar kinds of cases.\textsuperscript{110}

Despite many efforts of various scholars there is no consensus on what kind
of typology of instruments should be used. Partly this is because researchers
coming from different fields make classifications from different perspectives
and for different purposes. However, there is a certain amount of agreement.
First, practically all make a distinction between traditional regulation and
economic instruments, although the expressions for the categories vary. There
are also differences in details, meaning that though the titles of categories
may resemble each other, different instruments are located in the categories.
Furthermore, it is often, though not always,\textsuperscript{111} acknowledged that there are
still other forms of regulation than traditional and economic ones. However,
there is no agreement as to whether these instruments should be grouped into
one or several categories and what name(s) the category(-ies) should have. Thus, the practical solution of the OECD to refer to these instruments as ‘other
instruments’ certainly reflects the discussion,\textsuperscript{112} though at the same time it
can be noted that calling the third category information-based instruments
has become quite popular. This follows the idea of Vedung that government
has only three basic approaches available for public policy, namely the stick
(regulation), the carrot (economic means) and the sermon (information).\textsuperscript{113}

The making of a clear-cut typology is not necessarily easy. Though it would
be possible to make a typology which looks simple and logical, locating different
instruments to these categories might be difficult and now and then scholars
openly admit that their taxonomy is “somewhat artificial”.\textsuperscript{114} In order to avoid
the difficulty of following any definition, it has been proposed that instruments
be classified by an explicit enumeration.\textsuperscript{115} However, an explicit enumeration of
different instruments without any criterion for typology does not serve analytic
purposes. A criterion (rationale) is needed for a classification, because it helps to
structure research and discussion on regulation. The rationale of the typology
used in this study—following Vedung and Ogus\textsuperscript{116}—aims to make a distinction
between instruments on the basis of how intensively and directly they intervene
in the private sphere. In order to see the differences of instruments in this

\textsuperscript{110} Vedung 1997, 122.
\textsuperscript{112} OECD 1997a, 9–11.
\textsuperscript{113} Vedung 1997, 121–136. He defines public policy instruments as a ’set of techniques by which
public sector authorities wield their power in attempting to effect social change or eliciting
\textsuperscript{114} Gunningham and Grabosky, 1998, 38. Despite this, their classification is informative and often
used.
\textsuperscript{115} With regard to economic instruments, e.g. Opschoor and Vos 1989, 13.
\textsuperscript{116} Vedung uses the criterion ’degree of authoritative force or constraint’ as a basis for typology
(Vedung 1977, 126) and Ogus speaks about ’degree of intervention’, which—I assume—means
roughly the same (Ogus 1994b, 26–27).
regard, their intervention theories (i.e. the assumed chains of influence by which instruments produce desirable outcomes) need to be outlined. The intervention theories of the instruments belonging to one category of instruments have common features and these common features justify grouping them together, though each instrument has its own intervention theories. Hence, though the intervention theories of one permit mechanism differ from those of another, they can be assigned to the same category, because they also have similar features.

Regulation, as noted in Chapter 1, can be governmental or non-governmental. Governmental regulation, which is the focus of this study, is divided here into legal and non-legal regulation, though this distinction is not clear-cut. Legal regulation is based on specific legislation, whereas non-legal regulation is based on the general competences of authorities. One could point out that the rule of law,\(^\text{117}\) which is a basic principle of all democratic societies, means that all actions by public authorities are framed by law, if not specific then general. However, the fact that general competencies of public bodies does not allow intervention into the private sphere, justifies making a distinction between legal and non-legal regulation. Most environmental regulation is based on specific legislation. However, at least the following governmental measures relevant for environmental policy though not based on specific environmental legislation can be identified: (1) voluntary agreements between public and private actors; (2) use of public resources (infrastructure, scientific research \textit{etc.}) (3) persuasion, information production, and guidance; and (4) threat of invoking legal instruments.\(^\text{118}\) Of these voluntary agreements in various forms and permanent efforts to provide information comes closest to “sustained and focused attempt to alter the behaviour of others”, whereas other means of influence may fall beyond the concept of regulation, if they are not used in a sustained manner.

Regulatory instruments, which come in the form of law, can be divided into three categories, which are as follows: traditional regulation, economic instruments and procedural instruments. I call the first category ‘traditional regulation’, though it could also be called as ‘command-and-control regulation’. ‘Command-and-control regulation’ has a slightly negative connotation,\(^\text{119}\) thus the expression ‘traditional regulation’ is preferred. In this study regulation refers generally to governmental measures, whereas some others use the expression for a category of policy instruments which is equal to the category of ‘traditional regulation’ in this study.\(^\text{120}\)

\(^{117}\) Section 2 of the Finnish Constitution.

\(^{118}\) Talás similar though not environmental specific list is used as a source of inspiration, Tala 1999, 78–84.

\(^{119}\) According to Gunningham and Grabosky the expression has been adopted by neo-classical economists for critical purposes. Gunningham and Grabosky 1998, 39.

\(^{120}\) On the different uses of the concept of regulation, see Vedung 2003, 13–14.
<table>
<thead>
<tr>
<th>Legal</th>
<th>Non-legal</th>
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<tr>
<td>Traditional Regulation - E.g. Permit</td>
<td>Based on general competences of public authorities</td>
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<tr>
<td>Economic Instruments - E.g. taxes</td>
<td>- E.g. information campaign</td>
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<tr>
<td>Procedural Regulation - E.g. Environmental management and auditing system</td>
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**Figure 1. Instruments of environmental regulation.**

With regard to traditional regulation, the desired outcomes (goals) are achieved, if what is regulated behaves as determined by standards of environmental regulation. Traditional regulation may prohibit or restrict behaviour detrimental to the state of the environment or it may require active measures to be taken. These instruments govern the relationship between the public authority and firms or citizens and mainly belong to the sphere of administrative law. An environmental permit is a typical instrument of this category.

In the case of economic instruments, the desired outcomes are assumed to be achieved, because a certain course of action is made economically more attractive than others. However, those regulated have the freedom to choose the course of action they deem best. Hence they may even continue to take less desirable action if they are willing to pay the full cost of it. The public authority may make a certain course of action more attractive than another in several ways. One way is to take or give financial benefits for example in the forms of taxes, charges and subsidies. However, the public authority need not to take or give financial benefits to make a certain course of action more or less attractive. Instead, it may by means of law modify the relationships between private actors and the desired impacts are produced through dynamics, which follows from the modifications. No doubt taxes, charges and subsidies also indirectly modify relationships between private actors (as does traditional regulation), but they are not specifically intended to do so. An example of an economic instrument of this sort would be liability for environmental damage. In this case public administration, as a point of departure, has no role in the implementation of legislation. If negotiation between private parties related to damages results in nothing, the injured party must take the case to a court to obtain compensation. From the effectiveness point of view, monetary compensation (as opposed to compensation in kind) has, however, a secondary function. The effectiveness

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121. Fairly often the expression ‘market-based instruments’ is used as a synonym for ‘economic instruments.’ Tietenberg 1990, Baumol and Oates 1988 and Sprenger 2000, 3–6.
of environmental regulation refers to environmental outcomes and if damage has occurred, then the outcome in the particular case is negative. Dynamics (preventive effect) are assumed to be created by the threat of compensation, which is crucial for effectiveness. Besides making a polluter liable for damages, the public authority may by many other means modify the relationships between private actors, for example through market creation (tradable permits).

Liability for environmental damages can, as proposed above, be located to economic instruments. The expression ‘liability’, however, has many meanings and it is used in several different contexts in environmental law and policy. The roles of markets and public authorities vary from case to case and some regulatory instruments, which could for some reasons be called ‘liability instruments’, actually have many features which justify locating them to traditional regulation. The Environmental Liability Directive (2004/35) is a case in point. Markets do not have an immediate role in the implementation of the Directive. The Directive requires an operator as defined in Article 2 to avoid causing certain kinds of environmental damage and take, when necessary, preventive or remedial action. The Directive sets public law obligations and from the mere fact that an operator may be liable in financial terms for preventive or remedial actions does make this a market-based instrument. An operator of an installation under traditional environmental permit mechanisms, as regulated by the IPPC Directive122, also bears the compliance costs. Public authorities have a crucial role in the implementation of the Environmental Liability Directive, and the role of public authorities is in many ways equal to that of the IPPC Directive. The Directive can, however, be considered an innovative form of traditional regulation in the sense that it at least aims to limit the amount of bureaucratic work in comparison to instruments requiring prior authorization. Ideally the operators avoid causing any environmental damage (as defined in the Directive) or a threat of it. If this were the case, there would be no need to involve public authorities in the implementation.

Another variant of liability relates to contaminated soil. The first rules on contaminated soil were adopted into the legislation in 1987 in Finland, though this reform was largely a codification of existing administrative practice. The operator, or in some cases the occupier of the land, was made liable for the purification of contaminated soil. This variant of liability also belongs to the sphere of public law; it is public authorities who impose the obligation to purify contaminated soil and who decide what is to be considered contaminated. Hence, it belongs to traditional regulation.

Regulatory instruments belonging to the third category take the form of procedural rules. Instruments like access to information, environmental

impact assessment, environmental management and auditing systems, pollution
registers, corporate environmental reporting and product certificates are all
procedural in nature. They may be mandatory or voluntary in the sense that
private actors (companies) may themselves decide whether they would like to
benefit from the instruments. Access to information is an example of mandatory
and eco-label of a voluntary instrument. There are also non-legal variants of some
these instruments, though then there naturally is no mandatory element in them.
Often procedural instruments are open-ended in the sense that no substantial
environmental goals are set. Hence, a law concerning access to information
or an environmental management and auditing system may be established
without explicit references in the law itself or any preparatory document to
desirable environmental outcomes. The procedural instruments influence
through transfer of information, for which reason they are sometimes called
information based instruments. In other words, the outcomes are assumed to
emerge because participants produce, provide and/or receive new information.
However, the main role of the public authority is to create a procedural system
where information is created and disseminated, not to produce information.
Often information is produced and disseminated by other actors, though the
public authority may also have some role in this respect.

Many real world instruments are often hybrid instruments, meaning that
they have features which relate them to two or even more categories. For example,
tradable permits have the common feature with traditional regulation that a
public authority sets a behavioural standard, a pollution limit. This is certainly
something which could be called a ‘stick’. However, in the traditional permit
system the permit limit (stick) is applied to an installation, in a tradable permit
scheme to a (possibly very large) group of installations, whereas an operator of an
individual installation has freedom of choice either to buy allowances or reduce
pollution. The possibility to reduce costs by reducing pollution and selling extra
allowances is clearly ‘a carrot’. Some tradable permit schemes use markets only
after the initial allocation of allowances, whereas others even also use markets for
the initial allocation through auctioning them. Initial allocation by authorities
(grand-fathering) come very close to traditional permitting and it may even be
based on existing traditional permits. In addition monitoring emissions and
control of trades requires the involvement of authorities as with to traditional
permits. Hence, tradable and traditional permits have many similarities and
this also applies to the European tradable permit scheme on CO\textsubscript{2} emissions,
which is the world’s largest tradable permit scheme. Accordingly, some scholars
call tradable permit schemes ‘a mixed instrument’. Furthermore, it could
be possible to create a company-wide permit, which in practice would allow

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trading (or similar arrangements) within the company, though the law would be silent on such an opportunity. It would also be possible to design a bubble-based permitting mechanism for a number of installations without regulated trading. In this case the bubble could be allocated to individual installations through negotiations, not through markets. However, this, too, could to some extent increase the efficiency of pollution reductions in comparison to installation specific permits, because negotiators (=different companies) have better information on marginal costs than the government. This regulatory technique would not, however, totally eliminate the problem of asymmetry of information. It is possible that even the polluters are unaware of the costs of other polluters unless there is a market which shows the price. Still, the opportunity given to industry to decide where pollution reduction is to be done could be understood as ‘a carrot’. In fact, a mechanism created by the LCP Directive\textsuperscript{125} is rather close to this. Hence, the variety of instruments can be understood as a continuum with no strict boundaries between categories and where different kinds of mixes are possible. Having stated this, I prefer to discuss tradable permit schemes under economic instruments, partly to stress the difference between tradable and traditional permits and partly to follow the mainstream in the literature.

Furthermore, the regulatory web created upon one regulatory instrument may have many elements and often it is a matter of judgement whether different elements of this web should be considered as own instruments or a part of a single instrument. The regulatory web linked to environmental permits is a case in point. As a point of departure it is a most classical example of traditional regulation. However, environmental permits in modern societies are closely linked to impact assessment and mechanisms aiming to ensure access to information, which sometimes are presented as separate instruments.\textsuperscript{126} However, they may be formally and substantially so closely incorporated to traditional permits that distinguishing the impacts they cause may be difficult. The results of environmental impacts assessment feed the permit procedure and access to information provisions often becomes meaningful while environmental permits are granted. Another situation where it may be possible either to speak about a single instrument or two interlinked instruments is the combination of compensation for environmental damages or of pollution charges and environmental permits. Formally speaking, they may be determined through the same process as emission limits\textsuperscript{127} and their

\textsuperscript{125} Directive 2001/80.

\textsuperscript{126} E.g. Kimber 2000, Sairinen 2000, 38. In Finland, the general (not environmental specific) law on access to information is well developed with long historical roots (Mäenpää 2000) and seeing this as an instrument of environmental regulation is artificial. Environmental impact assessment comes closer as an instrument, because it has at least a specific procedure (Act 10.6.1994/468).

\textsuperscript{127} As is the case with regard to damage caused by water pollution under the Environmental Protection Act (86/2000).
effectiveness or lack of it may be due to this combination. Environmental agreements in the Netherlands have been considered ‘an innovative version of command and control’,\textsuperscript{128} because the use of environmental agreements is incorporated into environmental permitting in a way that makes it difficult to totally separate them. Similarly, environmental management systems could be incorporated with environmental permits, though they can be understood as separate instruments as well.\textsuperscript{129}

\textbf{2.2. Traditional regulation}

\textbf{2.2.1. Instruments of traditional regulation}

Traditional regulation is based on the idea that a public authority influences people by means of rules and directives, which often are backed by administrative and/or criminal sanctions.\textsuperscript{130} There is a great variety of instruments of traditional regulation if all the nuances in decision-making procedures and the formulation of obligations are taken into account. Still, these are variants of rather a few basic options. Kloepfer and Winter identify four different basic options of traditional regulation to direct the behaviour of those regulated: supervision, prohibition and rules, the obligation to notify and the permission requirement.\textsuperscript{131} All of them have the common feature that they aim to enforce laws that prescribe standards. Kloepfer and Winter apparently consider supervision an independent instrument, because supervision not only aims to control the lawfulness of different activities but also has a more general function for continuous environmental monitoring, which serves the planning and preparation of further administrative measures. However, I consider supervision as a subordinate function, not an independent instrument, though the form and intensity of supervision may be of crucial importance for the impacts of regulation.

Prohibitions and rules have a direct legal effect without a mediating administrative decision. The prohibition to pollute soil in the Environmental Protection Act (86/2000) is an example of this. The prohibitions or rules work, in principle, according to either-or logic, though the exact content of them may be open to various interpretations. The prohibition to pollute soil can be used as an example of this as well, because it is not necessarily clear when a discharge of a substance results in the prohibited consequences referred to in

\begin{itemize}
  \item\textsuperscript{128} Gunningham and Grabosky 1998, 41.
  \item\textsuperscript{129} Buoma discusses whether environmental management systems and audits should be considered as alternatives or complementary to other regulation and comes to the conclusion that they are complementary, though not only to permits but to other regulation as well. Buoma 2000, 131–132.
  \item\textsuperscript{130} Vedung 2003, 13.
  \item\textsuperscript{131} Kloepfer and Winter 1995, 47–63.
\end{itemize}
Section 7 of the Environmental Protection Act. As a response to this problem more elaborate standards in the form of sub-legislation and soft law can—and have—been produced.

The use of a notification procedure makes it possible for the operator to commence a regulated activity before any administrative decision has been taken. Kloepfer and Winter identify two functions for notification; either the procedure aims at replacing permitting procedure or it is established purely for purposes of supervision. In the former case a public authority intervenes in the form of an administrative decision, where specific conditions are laid. In the latter case the procedure only ends up with registration without any additional conditions. If the information provided in the notification shows that the activity concerned violates the law, then the public authorities may intervene. However, if the activity has already commenced, it may be rather difficult for a public authority to impose conditions which would require radical changes. On the other hand, through notification procedure unnecessary delays, which may be a side-effect of permitting, are avoided.

Environmental permits are granted before the commencement of the activity. The permitting procedure includes an inspection of the activity or installation and results in the setting of permit conditions. Thus, it enables tailored decision-making. Permitting is often reactive in the sense that permit authorities have only limited opportunities to influence the basic technological alternatives adopted by the applicant in the permitting process, though in terms of environmental impacts the basic technological alternatives may have a crucial role. The permit authorities are often in a better position to influence end-of-pipe technologies, i.e. reactive measures.

2.2.2. Standards

Substantial standards are a crucial part of any pollution control strategy. The concept of standard is flexible and should not be reserved only for strategies based on traditional regulation. Not all responses linked to a standard are administrative orders or criminal sanctions; they may also be charges or taxes. In tradable permit mechanisms (‘a cap and trade’ scheme) the ‘cap’ can be considered a standard though it is not directed at individual sources of pollution but at groups of sources. It is even feasible to say that liability law includes a ‘due care standard’. The exact content of what is ‘due care’ in a specific situation may be left to be decided by the general principles and rules of liability law, or it can be anchored to substantive technical sub-legislation or soft law. Though it is possible to construct open-ended instruments without any binding

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132. On the distinction between reactive and proactive environmental policy, see Cederlök, 41–43.
133. A distinction between substantial and procedural standards can be made, though next the focus will be solely on substantial ones.
substantial standard, like certain kinds of taxes or environmental management systems, some kind of (non-binding) standards are also needed in these cases to reflect the desirable level of environmental outcomes.\textsuperscript{134} Thus, the question is not whether there is a need for standards, but what kind of standards should be used and what role they should have. According to Faure and Skogh,\textsuperscript{135} economists have traditionally argued that the law should limit itself to setting target (or quality) standards. Traditional regulation, instead, (also) employs standards directed towards individual activities or products and the type of sanctions used is mainly administrative and criminal.

The concept of standard has many meanings. Sometimes it is understood to refer to something to be found in legislation which guides the future decision-making of administrative bodies. Then the output of the administrative process (e.g. the permit decision with its conditions) is excluded from the concept. This is the way the expression ‘standard’\textsuperscript{136} is often used in the Finnish legal literature.\textsuperscript{137} Other authors, instead, use the expression to refer to substantial requirements faced by those regulated.\textsuperscript{138} The substantial requirements may be imposed by administrative bodies, but a standard may also be adopted through a legislative act. Different uses of the concept relate to the dissimilarity of the purposes of analysis. For understanding the impacts of regulation the standards imposed on the regulated industry are essential, whereas for understanding what kind of decision a permit authority should make, the standards—as well as other legal principles and rules—guiding administrative decision-making are what matters. The difference in the uses of the concept becomes clear when asking whether the best available technology principle is a standard or not. According to the Finnish legal research tradition it is a standard,\textsuperscript{139} whereas others consider it a principle guiding standard-setting.\textsuperscript{140} In sum, it is possible to speak about standards as guidance for decision-making, or alternatively as legal obligations.

I will use the concept in a broad way, referring to both uses. I try to be clear in which sense the concept is used. In order to accomplish this, I tend to speak about ‘guidance’ instead of standards, when it is not a question of something which directly binds polluters. However, because the expression of quality standards is commonly used, I will use it, though a quality standard rarely directly binds an individual polluter. In those cases when there is a need

\begin{itemize}
\item \textsuperscript{134} Winter 1996, 113.
\item \textsuperscript{135} Faure and Skogh 2003, 189–190.
\item \textsuperscript{136} ‘Standardi’ in Finnish.
\item \textsuperscript{137} See e.g. Vihervuori 1998b, Kuusiniemi 1995a, 244–246 and Kokko 2003, 149.
\item \textsuperscript{139} Kuusiniemi 1995a, 244–246.
\item \textsuperscript{140} Faure and Skogh 2003, 195–198.
\end{itemize}
to stress that it is question of something which binds individual polluters, it will be pointed out.

The goals of environmental regulation may be seen as a hierarchal system, where the lower level substantiates the upper level, as Westerlund has pointed out. This means that the most general goals, like sustainable development at the highest level of the hierarchy of goals, can be divided step by step into more concrete goals and standards. Westerlund shows that, starting from causes of pollution and ending to the final effects of pollution, there are a number of stages to which a standard could be linked. Seeing it from this perspective, standards binding individual polluters are a substantiation of quality standards or more general policy goals.

Standard-setting is a complex process, which involves many factors with many phases. One could say that standard-setting does not start from an enactment of law, but from the technical and political discussion preceding the legislative phase. In addition, standard-setting often does not end with a legislative act, but requires an administrative decision. In this case, however, the law tends to give guidance, which may be very detailed. The legal guidance for standard-setting may be either verbal or technical. Verbal guidance, as the name suggests, expresses in verbal terms the logic of decision-making, whereas technical guidance gives a technical reference value to which the final decision is to be based. However, technical guidance often leaves a certain degree of discretion to the decision-maker, who imposes the final legal obligations. Typically technical guidance is medium-based: it may, for example, define the maximum concentration of a pollutant in water, air or soil. Verbal standards—like the BAT principle—can be constructed so that they cover all media, though their implementation usually requires distinguishing between media.

Flexibility of legal guidance for standard-setting is often an advantage. The standards binding individual polluters, instead, should be precise and clear so that they can be easily followed and monitored. Hence, they should and are often technical in nature. The flexibility of the guidance allows tailored decisions for individual installations and may thus help to avoid efficiency problems related to the rigidity of general technical standards. Furthermore, flexibility also has the advantage that final standards do not so easily become out-dated due to technological development, as can happen with law-based technical standards. In addition, not all environmental problems can easily be turned into measurable quantities at a general level. This applies in particular to issues

142. Kokko has applied this model to biodiversity law, Kokko 2003, 147–150.
143. Kuusiniemi (1995a, 244–246) makes distinction between technical and legal standards, when he apparently means the same. I reserve the expression 'legal standards' for all standards adopted by a legislator as opposed those produced by other actors than a legislator, like European Committee for Standardization (CEN).
like landscape and biodiversity protection and to a lesser degree to pollution control. However, flexibility may also be a problem. The costs of sufficient, not to talk about perfect, information needed for translating general guidance into concrete installation specific standards may be disproportionately large due to the complexity and uncertainty of environmental problems. This applies both to the cases when the costs are borne by public authorities and when they are borne by those causing environmental harm. The use of technically precise guidance can remarkably reduce the costs of decision-making, because the information is gathered collectively and thus provides information basis for a number of cases. Many environmental problems of modern societies are of such a complex nature that it would be rather demanding for officials with limited time resources available to assess the amounts of all pollutants from each individual source, the impacts of pollutants and technological possibilities to reduce pollution. In addition, technical guidance has another function: to create a more stable competitive environment for different companies through standardization of environmental requirements. Technical guidance increases the predictability of regulatory machinery, which may create economic advantages. Predictability is considered a factor conductive to innovations.

The information basis for standard-setting is multi-faceted. It could be claimed that understanding of the effects of pollution and the technological options for preventing and restricting pollution always precede to setting of standards. However, it would be unrealistic to assume that only this kind of scientific information is relevant. According to a more realistic approach economic and political considerations are equally involved in all standard-setting. Cost-benefit analysis is the main vehicle to include economic considerations and the political model is based on discursive deliberation. These approaches are not necessarily mutually exclusive. It would be possible to use all these approaches simultaneously for a standard-setting procedure, because they draw attention to different aspects of the issue.

Quality standards define, directly or indirectly, the desirable state of the environment. This may be done in many ways, such as using concentration of pollutants in waters and air or ecological characteristics of the environment. Critical load is an example of using ecological characteristics as a basis for defining the desirable target level of pollution. Another example is the

144. Ogus 1994a, 208.
146. See also Hilson 2000, 69–99.
148. The concept of critical load has not been adopted into national law in Finland. From the Finnish perspective, it belongs to the sphere of international law, though it has significantly affected national law and policies. Kuusiniemi 2001a, 65.
National Emission Ceilings Directive (2001/81), which sets national targets, although letting the member states choose the means of implementation. The option to use the total emissions from certain sources as a standard opens an avenue towards tradable permit schemes or bubbles, though more traditional forms of regulation are also available for the implementation of this kind of quality standard. There is a number of pieces of environmental law defining the allowed/desirable maximum concentration of pollutants in waters belonging to a certain category\textsuperscript{149} and in air.\textsuperscript{150}

In addition to legal and political factors, the geographical scope of quality standards depends on the environmental issue at stake. Health-based standards may be the same in different waters or regions. Ecology based standards often take the natural state of the environment as a point of reference and because it varies geographically, standards, too, should vary. With regard to water policy, most of the EU quality standards have been health based. However, ecological considerations have been acknowledged in some directives, like the Freshwater Fish (78/659) and Shellfish (79/923) Directives, which established water quality objectives. Furthermore, ecological considerations were particularly important for the Urban Waste Water Directive (91/271) and the Nitrates Directive (91/676).\textsuperscript{151} The first one established standards for the collection, treatment and discharge of urban waste water and control over the disposal of sewage sludge. The latter, instead, was directed towards nitrate pollution from agricultural sources, including measures like the Action Programmes for Nitrate Vulnerable Zones and Codes of Good Agricultural Practice. However, due to the piecemeal approach at EU level, the main responsibility for taking into account ecological considerations has been left to member states until the adoption of the Water Framework Directive (2000/60). Prior the adoption of this Directive, the EU water standards were mainly based on health considerations. The Water Framework Directive makes it possible the setting of differentiated ecological quality standards according the characteristics of different waters. Generally, the Directive aims at good water status of waters throughout the EU and makes a distinction between environmental objectives, water quality standards and emission limits values. The objectives defined in Article 4 of the Directive are rather general, whereas water quality standards are defined to mean the

\textsuperscript{149} In EU law the Framework Directive 76/464, Article 6, set a system of quality objectives to be defined in daughter Directives. Quality objectives have been defined for bathing waters (76/169), shellfish waters (79/923), fresh fish waters (78/659), surface drinking waters (75/440). See Jans 2000, 341–59 and Krämer, 2000, 183–192.


\textsuperscript{151} Directive concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676)
concentration of a particular pollutant or a group of pollutants in water, sediment or biota, which should not be exceeded in order to protect human health and the environment (Article 2). The Water Framework Directive will gradually replace a major part of existing European water pollution law, including water objectives set in other Directives. The formulation of ecological quality standards has been noted to be a particularly complicated issue due to various problems as those related to ecological valuation.\textsuperscript{152}

The use of quality standards as guidance for the setting final standards has an advantage in comparison to technology-based guidance. Quality standards allow pollution from different sources, whatever they are and however the pollution is mediated, to be taken into account. Source related decision-making may allow the accumulation of pollutants without violation of the standard. They may also ignore certain types of sources.\textsuperscript{153} However, the implementation of quality standards also requires source-related measures and in this process significant information problems may emerge.\textsuperscript{154} The quality standards do not contain information on how to allocate the needed reduction of pollution among polluters if the standard is exceeded. It may be complicated to link directly any sort of legally binding obligation or right of an individual polluter to a specific quality standard—unless the standard is not linked directly to the property of a single polluter, as a standard of the noise level in a factory is.

Apart from economic instruments, like tradable permit schemes, there are two main ways of linking quality standards to source related decisions: either a quality standard is a factor which is taken into account while installation specific standards are set; or violation of a quality standard initiates an administrative (planning) process, which aims to allocate pollution reduction objectives to different sources. Of the European standards the former group includes, for instance, many air quality standards, which define the desirable quality of air, which are meant to be achieved through a number of administrative decisions like permits, land-use plans and traffic plans, which would be taken in any case. The latter group includes, for instance, alert thresholds for ozone in ambient air (2002/3). Under this regime the competent authority is obliged to inform the public if the limits are exceeded. Another example would be the Water Framework Directive. The programme of measures referred to in Article 11, structures the future policy measures to be taken. Though member states have a fairly large degree of discretion as to what kind of new measures will be carried out, Article 11 of the Directive sets minimum criteria for each programme, which makes it possible to assess the sufficiency of the measures.

Standards binding individual polluters can be divided into product,
process, and performance standards. Product standards are always the same for a category of products, but process and performance standards can either be uniform or differentiated. Product standards define characteristics which each product of a certain category must meet. They may regulate, for instance, the concentration of pollutants in fuels. Process standards define the characteristics of the process to be carried out. They require the operator to employ certain production methods, practices, protection measures or raw materials. A simple example of this kind of standard is the height of the chimneys of energy production plants or factories. Another example would be the requirement to adopt a certain type of purification plant.

Among performance standards emission limits are apparently the most typical. There are a number of types of emission limits, such as binding maximum limits, target limits or guideline limits. Emission limits may be expressed in different ways, like amount of pollutants in releases, specific amount of pollutants in releases, or as a purification effectiveness requirement in percentage terms. At the moment the BAT principle is perhaps the most important guiding principle with regard to the emission limits regulating industrial activities. Emission limits based on technological possibilities do not determine the technology, only the amount of pollution. Thus, the polluter is free to choose whatever means he wishes as long as emissions limits are met. In addition to the emission limit values, there are other techniques, like reference technology, available for the description of the required level of performance.

Installation specific standards are easy to implement and monitor in comparison to quality standards, because they are clearly addressed. The precision in the formulation of standards facilitates their enforcement and monitoring. However, occasionally the formulations of standards remain rather abstract and consequently difficult to monitor. In addition, abatement technologies may be complicated and manipulative, which may obstruct the authorities from seeing what is happening. All kinds of standards of traditional regulation may be problematic with regard to innovations, but in particular the process standards do not provide an incentive for a polluter to develop its

156. Emission limits are set, for instance, in the Dangerous Substances to the Aquatic Water Directive (74/464) and its daughter directives (both concentration and total amounts). In the Directive on Emissions from Industrial Plants (84/360) a framework was set for another set of daughter directives, where emission limits values for asbestos, large combustion plants, municipal waste incinerators and hazardous waste incineration were adopted. In the Directive (1999/12) on Volatile Organic Compounds from Industry emission limits values are adopted, though it also includes alternative approaches (reduction schemes or national plans). As a whole the adoption of new daughter directives has been considered a slow process and only a minority of substances intended to be regulated are covered by the daughter directives. Grant, Matthews and Newell 2000, 152–176 and McCormick 2001, 193–207.
technologies or practices. In fact, the process standards may constitute obstacles to the adoption of better technologies and practices, though the polluter would like to find more effective and efficient solutions. Performance standards, depending on their use and design, leave greater room of freedom for a polluter to find the right solution and hence are more innovator-friendly. Accordingly, the option to use process standards is restricted by the IPPC Directive\(^\text{158}\) and emission limits are the most typical standards for pollution control. However, there are still other fields of environmental protection (like waste management), where process standards are quite common. In sum, process standards are often considered problematic\(^\text{159}\) and, due to this, preference is given to performance standards. With this in mind it is interesting to note that Davies asserts on the basis of USA experience that the use of “pure” performance standards has proven difficult, also within programmes specifically designed for that purpose. Based on other research he claims that five barriers to developing performance standards have been identified, namely statutory requirements, industry reluctance to give up “guaranteed technology standards”, insufficient resources to develop and update performance standards, inadequate mechanisms to ensure compliance with performance standards and issues of compatibility with federal requirements.\(^\text{160}\)

Standards regulating individual polluters may be either uniform or differentiated. Uniform standards are the same for each activity or installation belonging to a category. Differentiated standards, in turn, vary from case to case. Differentiation may be based on a number of factors, like prohibition to cause health effects, BAT principle and/or another principles guiding standard-setting. Differentiated standards have the advantage that they make it possible to take into account the differences between regions, local needs and individual plants or even the preferences of the public,\(^\text{161}\) though only as far and so far as the rules of discretion determine. In practice the difference between uniform and differentiated standards disappears if the degree of discretion is very strictly defined. This may result in a situation where standards concerning polluters belonging to the same category are in practice similar, though they may differ in principle. Differentiated standards can easily be adjusted to the technological development, which is not the case for uniform standards. Uniform standards can be based on the best available technology of the date of their issuance, but upcoming technological developments would require frequent changes in the legislation. The option to take into account features of individual activity increases the cost-effectiveness of differentiated standards in

\(^{158}\) Article 9 para 4.
\(^{159}\) Ogus 1994b.
\(^{161}\) Faure and Skogh 2003, 201.
comparison to uniform ones. The amount of benefits depends, among others, on the amount of variety between individual installations. However, uniform standards also have advantages. Setting differentiated standards require information on environmental effects, technological possibilities and the costs of adopting technologies in each individual case. Often all this information is not immediately available for regulators and apart from environmental effects, they may find themselves in a situation where the only source of information is the regulated industry itself. Furthermore, the administrative costs required for gathering the necessary information may outweigh the benefits of differentiation. In other words, uniform standards are relatively speaking easy to formulate and enforce. Uniform standards are generally applicable and hence they make it possible to avoid using a resource-intensive permitting procedure. This would, instead, mean that there would be fewer opportunities for public participation at individual level. Public participation of the local community is in particular justified if the environmental impacts of regulated activity are local and their relevance varies from one locality to another. However, if the standards used in practice do not differ to any significant extent, a counter-argument would be that participating in decision-making, which always results in similar decisions, is a mere show, not democracy.

Another distinction to be considered is that between rate-based and mass-based standards. Rate-based emission standards limit the amount of pollution per unit of activity. Mass-based standards, instead, limit the total mass of pollution. In practice, rate-based standards have been employed more frequently than mass-based standards. In the case of rate-based standards the total amount of pollution will increase if the production increases. Mass-based standards instead force polluters to find more effective solutions if they want to produce more. According to Driesen, mass-based standards “provide a built-in economic dynamic that rate based limits lack.” By this, in particular, he means that mass-based standards provide a stronger incentive for technological development in comparison to rate-based standards. In addition, rate-based standards needs more repeated regulatory decisions, whereas a mass-based decision, if founded on sound quality standards and assuming that new polluters do no appear, may work for a longer time. No doubt strictly applied mass-based standards also have disadvantages, because they may prevent an industrialist from expanding his production.

Standards can be determined at different levels of government. Seeing the issue from the perspective of a non-federalist member state, there are typically three levels of government involved: European, national and local. For the

162. Faure and Skogh 2003, 201.
member states with federal administrative structures, there is one level more to consider. Currently, the most important choice of decision-making level relates to that between the European and national ones. Based on the subsidiarity principle laid down in Article 5 of the EC Treaty, general preference should be given to the national level, though this is not necessarily the case in political reality. Most uniform standards or standard-setting principles are determined at the European level, the national government transposes European standards to the national legal system with some modification and local authorities have the crucial role of setting installation specific standards. The subsidiarity principle can be supported by the notion that national government knows better the local needs and circumstances according to the lines of the theory of optimal specificity. Furthermore, a certain degree of freedom at the national level enables different regulatory approaches and these, instead, may provide valuable lessons on how to develop further regulatory machinery.

Three main arguments in favour of European-wide standards are evinced. Firstly, some activities may have impacts on another member state or activities may be of an international nature (like international shipment of waste). Secondly, national standard setting may result in what is called the race to the bottom, i.e. member states may lower the ambition level of standards in order to attract business. Thirdly, it could be argued that the European Union should ensure good and equal environmental conditions for all European citizens. With regard to the first argument (international nature of certain environmental problems) there is a general consensus on it, although there may be disagreement as to whether the argument applies to a specific environmental problem or not. The second argument, ‘the race to the bottom’ argument, is valid if the costs of environmental regulation are so high that they affect the location of companies. Faure and Lefevere seem to doubt this argument on the grounds that there is a lot of evidence available suggesting that environmental costs do not significantly affect the location of business. Thus, member states do not have sound economic reason to take part in the race to the bottom. However, though one would agree with this notion, it could be argued that the problem is not merely the facts, but the perceptions. The competitiveness argument is frequently used in political debate and public administration may take these arguments seriously, though the research would not support the argument. With regard to the last argument it should be pointed out that it favours European-wide standards, but of other kinds than the race-to-the-

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168. Faure and Lefevere 1999, 104–105 and the literature referred to by the authors.
bottom argument. If the European Union (politically) commits itself to ensure equal environmental conditions for all Europeans, this can be best achieved through European-wide quality standards, whereas response to race-to-bottom requires European-wide source standards. Because environmental conditions vary across Europe, common quality standards may mean differentiated source standards and this, again, can open the race to the bottom discussion. Hence, there is a tension between the arguments.

A further consideration to be taken into account while making a choice between European and national standards relates to the size of market. As is known, the rationale behind the first European environmental standards in the 1970s was related to the promotion of an internal market. Different national environmental standards hampered trade and it was acknowledged that common standards would create better competitive conditions. The increase in the size of the economy, which is an intended consequence of common markets, is often associated with negative consequences for the environment, and this is why common European standards have a contested nature in the eyes of environmentalists. The size of the economy, however, also has another side. One could argue that common European standards give a greater incentive for those developing environmental technologies in comparison to standards applicable to small national markets only. The potential of a bigger market to develop technologies is far greater than that of small market. Hence, European-wide uniform standards could foster technological development and, hence, environmental protection. However, there is also a counter-argument, which relates to political dynamics. If standards-setting at the European level were slower in comparison to a system where the member states make the final decisions within a legal framework regulated by EU, uniform standards may slow down the process. This, in turn, could have negative impacts in the long run.

2.3. Traditional regulation in perspective

2.3.1. Introduction

Traditional pollution control regulation has been heavily criticized, though also defended. Criticism implies a comparison between traditional regulation and its alternatives (deregulation being one of them), which is often limited to economic instruments. This may be because traditional regulation and economic instruments are more often considered alternatives to each other, whereas procedural instruments or non-legal instruments are often seen as complementary rather than alternatives to traditional regulation. In political discussion, deregulation can also be seen as an alternative, though research-based criticism typically assumes that the same ambition level of environmental protection can be achieved through other means. On these grounds the discussion in this section will focus on differences between traditional regulation and economic instruments.

Many arguments used in this discussion relate to effectiveness, efficiency and impacts on innovations, i.e. the main topics of this study. Naturally, these arguments will be discussed. However, regulatory governance, based on the wider democratic governance model, also includes themes like transparency (or open government) and accountability, as noted by the OECD and others. Hence, some notions on transparency and accountability are justified in order to achieve a more balanced view of the discussion on regulation. The form of regulation employed may have important consequences in terms of transparency, accountability and public participation. These implications are noteworthy regardless of the effectiveness, efficiency and impacts on innovations of the regulation. A political decision-maker may consider advantages related to transparency, accountability and public participation so crucial that they outweigh possible other disadvantages of a given instrument.

Undoubtedly, there would be still more themes which are generally relevant for regulatory governance and may have implications for the issue of what instruments should be preferred. One of them is environmental justice. Environmental justice has its roots in an empirical notion originating in the USA that environmental harms are greater in regions inhabited by the underprivileged. Conceptually the idea of environmental justice implies that the distribution of benefits and burdens of environmental regulation should be

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The so-called hot spot problem, which means that regulation strengthens the concentration of environmental problems in a certain region, typical for economic instruments, has promoted discussion on environmental justice. Though drawing final conclusions on fairness may require a strongly normative approach, an assessment of the distributional effects does not necessarily need a normative starting point. An analysis of environmental justice may focus on the distribution of benefits and burdens between regulated entities, between regulated industry and the public affected and distribution of benefits between different segments of the public affected. Furthermore, distributional effects may vary in many different ways, such as by region or between rich and poor. The impacts of regulation are often controversial in terms of environmental justice. Environmental taxation may be well grounded on the basis of the polluter pays principle, though the economic burden of such taxation is often harder for the poor than the rich. This view, however, is disputed by others. Hahn and Stavins note that environmental policy generally has redistributed welfare from lower income groups to higher income groups, but he rejects the view that economic instruments would be substantially more regressive than other forms of regulation.

2.3.2. Effectiveness

Effectiveness is often defined as the degree of achievement of the goals of a regulatory instrument that the instrument has produced. Hence, in its simplest form the evaluation of effectiveness can be done by comparing the outcomes affected by the regulatory instrument to the goals. Despite the principal clarity of the concept, the use of it is not always easy. The goals are often stated in a general and abstract way, without specific measurable statements which could be observed without fundamental difficulties. Jyrki Tala points out many difficulties in finding the goals of laws. He notes, for instance, that the information on the goals available is often insufficient, the goals are determined at a general level, they may be vague and controversial with a strong rhetorical element involved. Laws may also be intentionally open-ended in the sense that they do not even aim to define goals in substantial terms but only procedures. The regulation of an environmental management system is a typical example of procedural environmental regulation. Another example of open-ended instruments is liability for environmental damage—or

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175. See e.g. Baumol and Oates 1988, 235–.
any instrument governed by private law. For open-ended instruments, it may be very difficult to say what kind of environmental changes must occur before it can be claimed that an instrument is effective. However, also with regard to these instruments, it is crucial to understand whether they produce any substantial environmental outcomes. Perhaps due to such problems, it has been proposed that the effectiveness of law should ‘be read widely to refer to the impact of law in real life’. This definition, however, is too flexible, particularly because it does not make a distinction between intended and non-intended effects or positive and negative effects. There should be no leap from the practical difficulty of finding the goals to the use of intellectually unclear concepts.

Another factor, which may also complicate the use of the standard definition of effectiveness, is the ambition level of the goals defined. It is possible that the goals of regulation are so loose that any instrument will result in achieving them, or the goals may be so strict that no instrument could achieve them. In both cases a very straightforward way of interpreting the results of effectiveness may provide an incomplete picture of the instrument concerned. With regard to Finland, a former head of the environmental protection department at the Ministry of the Environment, has claimed that the setting of environmental goals has been very realistic indeed, or even cautious in Finland and, as a result of this, achieving them has not been difficult. Regardless of how close this comes to the truth, it at least implies that high effectiveness may be achieved at the expense of ambition level. This, of course, has important consequences with regard to comparison of the results to other countries or instruments.

Comparing outcomes to goals, which might be either very easy or very difficult, is only a starting point for effectiveness evaluation. It is at least equally important to identify the features of regulation which either promote or prevent effectiveness. Though it would not be possible to compare environmental outcomes to goals of open-ended or framework type regulation, it still may be important and possible to identify features of regulation, which either promote or impede the protection of the environment. Though the ultimate goal of open-ended instruments, such as environmental management and auditing systems, may not be expressed in quantitative and measurable way, it would be meaningful to ask whether, how and why this instrument has—or has not—contributed to the protection of the environment.

Effectiveness has two sides. Many authors writing about the effectiveness of environmental law focus on the implementation and enforcement processes. Then the question may be, for instance, what kind of decision-making

183. E.g. Grant, Matthews and Newell 2000.
structures are effective, have the goals of the environmental regulation been implemented through imposing binding requirements on individual plants, how is the monitoring of the installations organized and what kind of sanctions are effective. All these questions are relevant for the issue of effectiveness. However, it is also possible that regulation which is fully implemented and enforced does not achieve its goals. Waters may remain polluted though new legislation intended to clean them has been adopted, fully implemented and enforced. This may be due to a variety of reasons, like lack of understanding of human impact on nature, which, in turn, has affected how regulation is constructed. In the policy studies the difference between these two different sources of ineffectiveness is often described using concepts like ‘policy formulation problem’ and ‘policy implementation problem’, whereas in the evaluation literature apparently the same distinction is described by using expressions ‘implementation failure’ and ‘theory failure’. Implementation problem, as its name suggests, refers to problems of implementation and enforcement processes and the cure for this disease is the improvement of these processes. Policy formulation (or theory failure) refers to more fundamental problems of regulatory design, which cannot be overcome through better implementation. A policy formulation problems may, for example, mean that the output of decision-making (i.e. permit, ban, rule etc.) itself has features which make it difficult to achieve the goals of policy-instrument although the law is fully implemented and enforced.

Traditional regulation is often considered effective in comparison to other instruments. Partly this relates to the dependability of traditional regulatory instruments. Dependability refers to the formulation of policy and it means that the nature of instruments affects how the goals are set. Dependability implies that environmental policy-making is not a two-stage process, where the first step is the design of goals and the second step the selection of appropriate regulatory instruments.

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187. Rossi, Freeman and Lipsey, who clearly have in their mind other than environmental policies, define implementation failure in the following way: “The program (read: regulation—JS) does not adequately perform the activities specified in the program design that are assumed to be necessary for bringing about the intended social improvements. It includes situations in which no service, not enough service, or the wrong service is delivered, or the service varies excessively across the target population.” Theory failure, instead, is defined as follows: “The program is implemented as planned but it services do not produce the immediate effects on the participants that are expected or ultimate social benefits intended or both.” Rossi, Freeman and Lipsey 1999, 78.
189. Määttä notes that this is the way environmental policy-making is often seen, Määttä K. 1997, 20, based on Jacobs 1991, 119–.
Due to the very nature of traditional regulation, the reactions of those regulated can be foreseen with greater clarity than the reactions of those regulated by some other instruments. This is because traditional regulation forces each installation or other unit either to fulfil certain minimum requirements or to face the threat of sanctions, but economic instruments leave a greater degree of discretion for industry. If the goals of environmental policy are set first and then the instrument is chosen, the predictability of outcomes is certainly a good feature. The advocates of traditional regulation strongly emphasize the predictability of it in comparison to economic instruments. On the other hand, if formulation of the goals is heavily dependent on the chosen instruments, then effectiveness criterion loses some of its relevance.

The uncertainty of economic instruments with regard to effectiveness is due to the fact that they are based on decentralized decision-making. It is not the government but individual polluters whose decisions determine the concrete amount of discharges and emissions from each individual source of pollution. In the case of tradable permits the government decides on the total amount of pollution reduction, but its spatial distribution is uncertain. In the case of environmental taxes both the total amount of pollution reduction and its spatial distribution are uncertain.

Though the general acknowledgement that traditional regulation is effective (or dependable), critics of it claim that the very nature of traditional regulation leads to effectiveness problems, which may be either due to formulation or implementation problems. As examples of policy formulation problems particularly associated with traditional regulation can be mentioned the following: Traditional regulation is considered particularly vulnerable to regulatory capture, asymmetry of information confuses decision-making, traditional regulation does not provide any incentive to go beyond the imposed level of protection, old polluting installations are used longer than they otherwise would be used and the rigidity of regulation makes it difficult to handle changing conditions. The following, in turn, are examples of implementation and enforcement problems associated with traditional regulation: the complexity of regulation leads to negative consequences, there are severe delays in implementation, lack of resources makes implementation and monitoring impossible. Sometimes critics assert that traditional regulation may be effective with regards to certain environmental problems, but ineffective with regard to others.

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191. See e.g. Latin 1985, 1271 and Wagner 2000, 100–103
One problem associated with traditional regulation is asymmetry of information between decision-makers and regulated industry. The asymmetry of information relates to technological and economic possibilities as well as to costs of reducing pollution. The regulated industries are better informed about technological and economic constraints and opportunities than the regulatory authority. Naturally, there may also be other information problems such as scientific problems concerning the causal link between pollution and its health and environmental effects, but these problems are common to all policy instruments. In particular this criticism is focussed on technology-based standards (performance or process standards), which have an important role in traditional regulation. The best available technology principle is, perhaps, the most import basis for emission limit values imposed in environmental permits, and emission limit values are crucial for the overall ambition level of pollution control. The critics claim that though regulators may have good information on end-of-pipe solutions, they have much less information on process technologies than the regulated industry. The point is not only to know the general technological options but also to know the technological and economic options and costs of each individual installation, which vary from one case to another. Furthermore the formulation of technology-based standards is a complicated and resource-intensive matter. In addition, even if the regulators once get the technology-based standards right, technological and economic development may soon out-date them. It has been claimed that one of the most important results from a change from traditional regulation to other instruments is the dramatic decrease of technological assessment by regulators.

The existence of asymmetry of information on technological options is generally acknowledged and hard to deny. However, its relevance varies depending on the technological complexity of polluting activity. With regard to small and medium-sized enterprises, the level of technological knowledge of permit authorities may even be higher than that of operators. In addition, asymmetry of information does not always make a difference between instruments. To the extent the environmental standard can be drawn from health or ecological effects, there is no need to know much about the technological options of each individual polluter. An extreme case is a pollutant which is so dangerous that its use in any quantity should be prohibited. But in other cases, too, information on health or ecological impacts may have a dominant role in standard setting. Hence, the asymmetry criticism is limited in particular to situations where there are several sources of pollution, the effects of any particular source are not critical and sources of pollution differs

197. See also Steinzor 1998, 115.
from each other in relevant ways from a technological point of view. No doubt these conditions are sometimes, albeit not always, met.

Lack of incentive to go beyond the legally binding limits, is another problem frequently associated with traditional regulation,\textsuperscript{198} and clearly it holds in principle. However, some additional notions are worth taking into account. First, lack of incentive to go beyond legal limits does not necessarily mean loose limits or lack of gradually tightening environmental limits. A strict and continuous pressure for improvement of environmental performance is possible through short intervals between permit cycles. The second notion concerns the fact that real emissions are typically well below the level imposed. This has been interpreted in two different ways. Driesen argues that firms emit less than required in order to ensure that they consistently comply with the standards.\textsuperscript{199} In other words, in his view the part of emission reduction that goes beyond legal limits is also at least partly due to regulation. On the other hand, Ollikainen considers the same fact to show that there are other factors than regulation which determine the real level of emissions.\textsuperscript{200} I find it difficult to make a conclusion on this matter applying generally to traditional regulation. To me traditional regulation may or may not motivate the regulated industry to go beyond the legal limits depending on the exact design of the regulation and other context related matters. Furthermore, in certain circumstances the whole argument may lose its relevance. If the environmental technologies to be adopted by regulated industry are of the 'once-for-all' type, the relevance of continuous incentives may be rather low for the environmental effects as a whole. Generally speaking, the argument does not apply to situations where a polluter must make a categorical choice: take it or leave it. Furthermore, lack of incentive is not only a problem of regulatory instruments. For example, in the case of target load taxes\textsuperscript{201}, environmental incentive disappears (and is intended to disappear) when the (individual) target is achieved. In addition, a tradable permit scheme does not motivate the industry as a whole to go beyond the overall limit, i.e. the so-called cap of the scheme. Finally, it can be noted that from a conceptual point of view a lack of incentive to go beyond is not a problem for effectiveness so far as the (aggregated) goal is anyhow achieved. If the set limits ensure the achievement of ecological thresholds\textsuperscript{202} or other policy goals with a large enough safety margin, one may ask why regulated industry should go beyond.

\textsuperscript{198} See e.g. Connely and Smith 1999, 161.
\textsuperscript{199} Drisen 1998a, 305.
\textsuperscript{200} Ollikainen 1995, 312–313.
\textsuperscript{201} Määttä, K. 1999, 24–25.
\textsuperscript{202} Ecological thresholds can be defined as “the point at which there is an abrupt change in an ecosystem quality, property or phenomenon, or where small changes in an environmental driver produce large responses in the ecosystem”, Groffman et al., 2005.
Another criticism of traditional regulation concerns the distinction between old and new sources. It is claimed that traditional regulation, which often imposes more stringent requirements on new sources of pollution than on old ones, makes the regulated industry unmotivated to replace old installations by new ones due to the high costs of environmental investments. Thus, industry may use old installations causing more pollution longer than they otherwise would have done due to regulation. Hence, the differentiation of environmental standards between new and old installations may lead to perverse outcomes. On the other hand economic instruments do not distinguish between old and new sources and, hence, do not have this problem. Again, this criticism holds in principle. However, in cases where abatement technology has a positive impact on the efficiency of production or if the proportion of the environmental cost of total costs are insignificant, this effect is not likely to be remarkable.

The effectiveness of a regulatory instrument may vary over time. If socio-economic conditions change an instrument which has earlier been effective may become ineffective. It is argued, for example, that a regulatory technique which employs site-specific standards is not able to control the market if the situation changes. Thus, if the number of installations increases due to changes in the market situation, the overall pollution increases. Instead it is thought that an instrument which set a cap for the overall pollution of an industrial sector, is better equipped for such changes. This may be true in certain circumstances, though a system based on numerous installation specific decisions may also be able react to increased pollution. The tightening of environmental policy may even, depending on the political situation, be easier through routine periodic reviews of permit conditions than through high profile decisions on overall cap. In addition, traditional regulation often contains a number of mechanisms to modify decisions even before the end of their validity if serious environmental reasons so require. No doubt, once effective regulatory instruments may become ineffective over time for a variety of reasons, but this claim applies to all kinds of instruments.

In addition to the problems discussed above, which mainly relate to the formulation of regulation, implementation and enforcement problems may affect the effectiveness of a regulatory instrument. Some researchers see traditional regulation as particularly problematic from this perspective. Ackerman and Stewart argue that tradable permits offer greater ease of enforcement in comparison to best available technology strategy. This argument is based on the assumption that marketability would eliminate most of information-processing tasks of environmental bureaucracy as

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well as litigation inherently related to best available technology strategies. Furthermore, it is argued that most of the traditional regulatory regimes lack adequate resources and, thus, are not fully implemented. A regulated industry may oppose enforcement of a regulatory instrument (litigation) and thus make it difficult to implement the regime and cause long delays in implementation.\textsuperscript{206} Moreover, economic instruments are said to encourage firms to monitor each other’s pollution in a given market.\textsuperscript{207} However, many scholars do not agree with the approach presented above. Enforcement of traditional regulation generally and technology-based standards particularly is by some scholars seen to be easier to implement than their alternatives.\textsuperscript{208} Other instruments also need a mechanism for monitoring and this mechanism is not necessarily more effective than that of regulatory instruments. Lack of resources may complicate enforcement of any regulatory instrument whatsoever.

An additional type of criticism of traditional regulation relates to the changing nature of environmental problems. A particular regulatory instrument may be suitable for solving certain environmental problems while other instruments are better equipped with respect to others.\textsuperscript{209} Traditional regulation is often considered to be an ineffective instrument for problems caused by diffuse, non-point sources of pollution or transitory, mobile or remote operations due, for example, to problems related to implementation and monitoring.\textsuperscript{210} Furthermore it is claimed that increased eco-effectiveness or changes in consumer behaviour cannot be achieved through traditional instruments. On the other hand, traditional regulation has been seen preferable for environmental problems causing only or mainly local or threshold effects.\textsuperscript{211}

\section*{2.3.3. Efficiency}

Efficiency as a general term refers to allocative efficiency and cost-effectiveness as explained in Chapter 1. Allocative efficiency refers to both benefits and costs and hence would entail valuing the environmental benefits, which is often considered problematic. The cost-effectiveness approach focuses purely on the costs of regulation and compare the costs of policy alternatives in relation to given goals.\textsuperscript{212} One could also include dynamic effects (changes over time), such as technological development, in the concept of efficiency.\textsuperscript{213} Here, the focus will, however, be on the static side. Innovation effects will be discussed in the next

\begin{thebibliography}{99}
\bibitem{206} Gunningham and Grabosky 1988, 45.
\bibitem{207} Hahn and Stavins 1991, 13.
\bibitem{208} E.g. Driesen 1998a, 305–307 and Wagner 2000, 100–103.
\bibitem{209} Gunningham and Grabosky 1998, 44 and Määttä, K. 1999, 56.
\bibitem{210} Stewart 1996, 588–589.
\bibitem{211} Hahn and Stavins 1991, 14.
\bibitem{213} van den Berg, Jeroen 1999, 313–318.
\end{thebibliography}
chapter. In this study the term of ‘efficiency’ is used to refer to cost-effectiveness unless otherwise stated. In the meaning of cost-effectiveness an instrument can be said to be inefficient if there is another, cheaper way to achieve the same outcome. Alternatively, an instrument which directs the abatement measures to be taken at the cheapest sources can be considered efficient. \(^{214}\) The latter definition is more limited in the sense that it refers only to the cost of those regulated, not the cost of regulators.

Apparently the most common critical argument against traditional regulation relates to cost-effectiveness. It is considered inefficient in comparison to its alternatives in many circumstances.\(^{215}\) Unlike economic instruments, traditional ones do not include a mechanism which minimises the aggregate costs of achieving the desired level of environmental protection, because it is unable to completely distinguish between the marginal abatement costs of different firms. A consequence of this is that those polluters whose marginal costs are high are required to do as much as those whose marginal costs are low, though optimal efficiency would require that the marginal costs of different companies should be the same. On this basis particularly economists, but also others,\(^{216}\) have claimed that economic instruments are more efficient than traditional regulation.

Even many proponents of traditional regulation basically accept that the critics have their point, though only with reservation. As Driesen puts it “efficiency critique is correct, but incomplete.”\(^{217}\) Proponents admit in particular that in many cases it is likely that the compliance costs of traditional regulation based on uniform standards will be higher in comparison to the alternatives. Proponents claim, however, that the criticism partly goes beyond the point. Uniform standards do not have so dominant role as the criticism assumes. Particularly in Europe differentiated standards are commonly used. Driesen argues that this is also the case also in the USA.\(^{218}\) Through differentiation of standards according to firms, regions or sectors it is possible to increase the efficiency of regulation in comparison to uniform standards. However, because it is unrealistic assume that public authorities would ever know the (marginal) costs of firms, no differentiation made by public authorities can be completely efficient. Due to asymmetry of information it is not likely that even well designed ways of differentiating will lead to optimal efficiency, although it is a step in the right direction.

Though the line of reasoning of critics is accepted at least to a certain

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extent, there are contradictory understandings about the empirical evidence for efficiency. Cole and Grossman claim that only one out of ten studies, which Tietenberg in his seminal article considers empirical, is in a true sense empirical, others are simulations or predictive studies based on models. According to Cole and Grossman, there is no empirical evidence to show that traditional regulation is inevitably less efficient than economic instruments. In addition they argue that traditional regulation—or command-and-control regulation as they called it—have in certain circumstances been more efficient than its alternatives. No doubt there is also research to support the inefficiency argument of traditional regulatory instruments in certain circumstances. However, the critics have overstated the efficiency of economic instruments, particularly that of tradable permits, by not acknowledging the problems inherent to them. Davies notes that in the construction of models for tradable permits, the following costs and drawbacks are often overlooked: (1) transactions costs for firms to find potential buyers of their surplus credits, for the agency to keep track of the trades, and to maintain a stable system in general; (2) uncertainty about the actual emissions reductions achieved and the value of a given permit (i.e. imperfect information), about the definition of property rights, and about the conditions under which such rights could be weakened or strengthened; (3) socio-economic consequences and societal opportunity costs resulting from the institution of a tradable permit system. Furthermore, efficiency is, after all only one criterion among many, and the overall picture may be different when other criteria also are taken into account.

With respect to administrative costs, the views of critics and proponents seem to differ. Some critics of traditional regulation claim that the administrative costs of it are higher than those of economic instruments. Proponents argue that the opposite may be the case. The role of administrative costs may be crucial for the overall conclusion. Cole and Grossman have shown in their

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220. Tietenberg 1990.
222. Schmalensee et al. 1998. However, Carlson et al. found the benefits of alternatives to “command-and-control” to be relatively modest. Carlson et al. 2000, 21–22.
224. Toshiyukidrury, Belliveau, Kuhn and Bansal present an extreme argument according to this line of reasoning, when they write with regard to tradable permit scheme in Los Angeles the following: “Although the (tradable permits—JS) programs have succeeded in saving money for industry, they have not effectively reduced emissions and have not promoted technology innovation or public participation. Instead, they have further concentrated the region's pollution in lower income communities and given industry a “free ride” from otherwise obligatory emissions reductions schedules.” Toshiyukidrury, Belliveau, Kuhn and Bansal 1999, 251.
226. Driesen 1998a, 307
analysis based on an economic theory that in certain circumstances economic instruments are more efficient than regulatory instruments and *vice versa*. They claim that “standard economic account of the comparative efficiency of alternative regimes are insensitive to historical, institutional, and technological contexts. Most importantly, they tend to assume perfect (and, incidentally, costless) monitoring, or they assume that monitoring costs are the same regardless of the control regime that is chosen.” In contrast to the foregoing Cole and Grossman show that while institutional and technological costs are taken into consideration, traditional regulation can be relatively the most efficient alternative. This particularly is true in cases involving high monitoring costs.²²⁷

Another aspect of the efficiency discussion is the nature of environmental problems. The nature of an environmental problem may significantly affect the potential efficiency gains of different instruments. There are environmental problems which require that local conditions, like varying ecological thresholds of waters, are taken into account. If an economic instrument is used to tackle such a problem, it may require changing tax rates or a weighted trading scheme. Adding these features to economic instruments may, however, make them complex and inefficient. With regard to wastewater control from pulp and paper mills in the Nordic countries, where the ecology of waters varies significantly, a group of economists came to the conclusion that theoretical gains from using a tradable emission permit are unlikely to be realized, because so many balancing measures would be required due to differences in natural conditions.²²⁸ Traditional regulation, which uses decisions directed at individual installations, may be more suitable to tackle location specific problems. On the other hand, efficiency gains of economic instruments become particularly evident in the case of global problems like climate change. For climate change, unlike for many traditional environmental problems, it is the same from where the cuts of greenhouse gases are made. Only the amount of the cuts is relevant from the environmental point of view.

2.3.4. Innovations and their diffusion

A technological innovation has been defined to be the first commercially successful application of a new idea. An invention is the development of a new technological idea and diffusion of an innovation refers to the adoption of an innovation by those who did not develop it.²²⁹ Often the distinction between an innovation and an invention is not so clear in practice.²³⁰ Nor is the line between

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²²⁸ Brännlund et al., 1996.
²³⁰ Nelson and Winter 1982, 236–266.
an innovation and diffusion so clear, because new users of an innovation usually modify the original one.\footnote{Ashford and Heaton 1983, 110.}

Markets give a continuous incentive to make and adopt innovations. However, their relevance for the promotion of social goals, such as environmental protection, can be neutral, negative or positive in a sporadic way. To make a distinction between different kinds of innovation Stewart calls product and process innovations that create benefits gained by firms through the sale of goods and services ‘market innovations’, whereas ‘social innovations’ refers to innovations that create social benefits. These two types of innovations are not mutually exclusive; a social innovation may reduce the compliance costs of the regulated industry or give a competitive advantage, if it enables cheaper production or if the innovator gain revenues from the sale of the idea or the technology.\footnote{Stewart 1981, 1279.}

Economic instruments are often considered to be better at inducing innovations because they provide an incentive to innovate regardless of the level of pollution\footnote{Driesen 2003, 77–78.}, whereas traditional regulation has been criticized for hampering innovations.\footnote{Milliman and Price 1989.} According to some authors traditional regulation, unlike other instruments, provides no incentive to innovate, but do not obstruct the emergence of innovations. Rehbinder writes that “traditional command and control regulation does not contribute to the development of technology but assumes that it develops of itself.”\footnote{Rehbinder 1999, 98–99.} The logic of the criticism is that the standards of traditional regulation may be a barrier to adopting new kinds of technological solutions and provide no incentive to develop technologies. The barrier argument applies in particular to those standards defining the products or technologies to be used. If only a specific product or technology is allowed to be used, then alternatives are excluded, even though they might enable the same environmental outcome. Due to asymmetry of information, public authorities tend to draw attention to the end-of-pipe technologies and neglect the options related to future process technologies (clean technologies). Because process and end-of-pipe technologies can be interlinked, an obligation to use specific end-of-pipe technologies works as a barrier to the development of process technologies.

\begin{thebibliography}{9}
\bibitem{231} Ashford and Heaton 1983, 110.
\bibitem{232} Stewart 1981, 1279. Driesen uses slightly different terminology. He makes a difference between environmental and material innovations. Material innovations do not serve the social goal of environmental protection, whereas environmental innovations do. Driesen 2003, 77–78.
\bibitem{233} Milliman and Price 1989.
\bibitem{235} Rehbinder 1999, 98–99.
\end{thebibliography}
Technology-based performance standards, such as those based on the best available technology principle, do not define the technologies to be used. They merely define the level of performance and, hence, an industrialist is then free to choose whatever technology she deems to be appropriate. Still it is argued that technology-based standards discourage technological development. If the regulated industry develops new technologies and delivers this information to the public authorities, this might result in the setting of higher standards, which, in turn, may increase the compliance costs. Hence, the regulated industries have only an incentive to develop technologies enabling the achievement of the existing standards at lower costs.236 This is why Sunstein has labelled the best available technology principle a regulatory paradox. He claims that it has pervasive impacts with respect to its primary goals. Sunstein also rejects the possibility that suppliers could have an incentive to innovate by arguing that there is are well-functioning markets for pollution control technology. This—according to him—is because outsiders lack the relevant information, the regulated industry in unwilling to co-operate with them, and regulation is continuously changing.237 Stewart considers that the unpredictability of regulatory policy (“moving targets”) reduces the incentive of suppliers.238 These arguments, however, are theoretical, and empirical research has shown that the relationship between regulation and innovations is more complicated. In addition, the criticism concerning the use of specific technologies is partly wrong, because most of the real-world standards do not require the use of defined technologies. Many standards are health-based standards, which define only the target and the technology-based standards do not require that reference technologies are used.239 One can also note that the relevance of the distinction between process and end-of-pipe technologies may have been over-stressed. Berkhout, based on a study of two industrial sectors, namely pulp and paper and PVC production, claims that though “process change is a significant driver for environmental performance, …abatement continues to be an important way for process industries to achieve improved environmental performance. … There is little evidence that process change really generates more rapid improvements … than abatement.”240 This diminishes to some

237. Sunstein 1990, 420–421. Sunstein, however, does not provide any evidence why suppliers might be badly informed and polluting industry unwilling to co-operate with the supplier. One can note that at least the suppliers believe that the tightening of regulation creates new markets from their products and services. The European Committee of Environmental Technology Suppliers Associations demands “strong” environmental regulation that is “consistently” enforced. Furthermore, it argues in favour of the introduction of tax incentives by the EU. ENDS 1 March 2001 Issue 942.
238. Stewart 1980, 1283.
extent the weight of the asymmetry of information –argument, which tends to be most serious with regard to process technology.

Perhaps the strongest claim on the positive relationship between regulation and innovations is presented by Porter and Linde and has been labelled the *Porter hypothesis*. They argue that regulation may signal potential technological improvements, focus on information gathering and create pressure to innovate, and in these ways contribute to technological development and the competitiveness of an economy.\textsuperscript{241} According to the *Porter hypothesis* strict environmental regulation may result in innovations, which generate gains for first-movers, which may even over-compensate the costs of the adoption.\textsuperscript{242}

Though the *Porter hypothesis* as a whole lacks sound evidence, there is at least evidence that regulation has spurred innovations. It has been shown that even a most straightforward intervention in markets, like banning the production and use of a product, may work as an innovation stimulus. Often a ban on use or production of a substance results in the development of its substitute by regulated industry or others. Based on a study concerning the responses of regulated industry to bans on certain products under chemical regulation it has been concluded that “the review confirms that product regulations tend to call forth product innovations, that component or pollutant regulations tend to elicit process innovations, and that the stringency of regulation is an important determinant of the degree of technological innovations.”\textsuperscript{243} Of course, an appearance of a substitute does not prove that the overall impact of state intervention has been positive from the technological development point of view. It is also possible that the innovation effects induced are outweighed by other costs of regulation.\textsuperscript{244} However, it shows that not only carrots but also sticks may work as innovation stimuli. More recent studies have also established that traditional regulation has spurred innovations even though standards are set on the basis of existing technologies\textsuperscript{245} or a standard is loose at the moment when it finally enters into force.\textsuperscript{246} These studies stress that the anticipation of future regulation can influence the development of technology.

The foregoing points out that the possible superiority of alternatives to traditional regulation in terms of innovations is not categorical but a relative matter. Even the relative superiority has been challenged. Driesen acknowledges that economic instruments, like emission trading, are often more cost-effective in comparison to traditional regulation, and therefore preferable. However,

\begin{itemize}
  \item \textsuperscript{241} Porter and Linde 1995, 98–100, see on the criticism of their article, see Palmer, Oates and Portney 1995.
  \item \textsuperscript{242} Jänicke and Jacob 2005, 183.
  \item \textsuperscript{243} Ashford, Ayers and Stone 1985, 429.
  \item \textsuperscript{244} Jaffe, Newell and Stavins 2000, 26–34.
  \item \textsuperscript{245} Kiivimaa and Mickwitz 2004, 361–362.
  \item \textsuperscript{246} Hyvättinen and Hildén 2004, 488–501.
\end{itemize}
unlike others he is unable to see emission trading as generally superior to traditional permits in terms of innovations. He argues that emissions trading does not give any incentive to continue reducing emissions after equilibrium (=efficient allocation of resources in relation to a given goal) has been reached. In fact, he goes even further and claims that “emission trading probably weakens net incentives for innovations … by shifting reductions from high-cost to low-cost facilities” 247 The main argument of Driesen is not that emission trading or any other economic instrument does not foster innovations, but that a comparable traditional regulation could do the same—or even more. Because innovations may turn out to be much more important in the long run, impacts on innovations may be considered an even more crucial feature of regulation than its cost-effectiveness.

Though one would not accept that traditional regulation is generally superior to economic instruments, a real-world economic instrument may promote innovations to a lesser degree than a real world traditional regulation. Analysis based on theoretical models has been criticized for not taking into account the political reality, where regulatory instruments are prepared. Kemp claims with regard to environmental taxes that the tax rates are usually so low that they tend to have smaller impacts on the technological development than traditional regulation. 248

Environmental regulation is not the only type of regulation which may affect environmental innovations. 249 Foster et al. claim that traditional regulation may induce significant innovations only if it is complemented by other policy measures, such as research and development programmes and education. They further argue that the impacts of environmental regulation depends on many non-environment related contextual factors, such as the general technological level of companies and similar kinds of regulation do not necessarily have similar impacts in different countries. 250 In addition, it has been pointed out that the major technological changes relevant for environmental performance have been due to other than environmental factors. 251 Seen from this perspective, the evaluation of the innovation impacts of regulation is even more demanding than that of effectiveness and efficiency. Still it is important to stress that environmental regulation may influence innovations and their diffusion either positively or negatively, and the technological effects of environmental regulation are a crucial issue for the development of future regulation.

247. Driesen 2003, 64.
249. On the relationship between intellectual property rights and environmental innovations, see Derzko 1996.
250. Foster et al. manuscript.
251. Berkhout 2005, 70.
2.3.5. Transparency and Accountability

Traditional regulation has also been challenged by claims related to the decision-making process. Some researchers prefer economic instruments instead of traditional regulation, because they believe that democratic values can so best be fostered. Traditional regulation has been seen as problematic on the grounds that it directs political discussion to complicated matters of means instead of ends, reduces accountability and increases vulnerability to regulatory capture. It is the overall amount of allowable pollution which should be at the heart of political debate and decisions on technological means to reduce pollution should be left to the polluting industry. Ackerman and Stewart argue from the US perspective that traditional regulation and BAT as a key concept of such regulation focus political discussion, as well as administrative and judicial proceeding upon arcane technological questions, “which rapidly exhaust the time and energy that most politicians, let alone the larger public, are willing to spend on environmental matters.” As an alternative Ackerman and Stewart present tradable permits, which make it possible for the public to focus on a different question: how much the total amount of pollution should be decreased every year.252 Sunstein253 concurs with Ackerman and Stewart. He claims that economic instruments offer a better decision-making framework because the weighting between different values must be done explicitly and openly.

Other scholars reject the view that economic instruments increase transparency and direct decision-making to essential matters. Heinzerling, based on a case analysis, rejects that trading schemes have in practice opened up a larger discussion on “the ends of environmental policy” by elected bodies. Her overall conclusion is that “democracy’ cannot be counted on the side of pollution trading.”254 Generally speaking, it can be noted that in the case of traditional regulation there is also a need to decide on ‘the ends’ of environmental policy and this can be done in the form of a overall pollution reduction objective. This is certainly not an easy task, taking into consideration the problematic balancing between environmental and other values (like competitiveness), but in this respect traditional regulation does not differ from other kinds of regulation.255

In a democratic country, public decisions are made by democratically elected bodies or the public administration accountable to them. The means and needs of accountability vary from one policy instrument to another. Advocates of economic instruments argue that there will be fewer decisions in need of accountability in the framework of economic instruments. There is no

252. Ackerman and Stewart 1985, 1353.
255. Hilson 2000, 123–126
need to make a decision on environmental standards, for example, at the level of individual installations either in the case of environmental taxes or tradable permits, and all major decisions can be made by democratically elected bodies. Thus, the number of decisions in need of accountability is reduced remarkably. This argument is opposed by noting that the reduced number of decisions does not reduce the need for accountability. The need for accountability in the case of the major decisions, like the overall cap for a tradable permit scheme, is much stronger than any individual decision of the numerous decisions made under a traditional permit mechanism.\textsuperscript{256} In addition, installation specific decisions do not necessary disappear under a regime of economic instruments, although their nature is changed. Installation-specific decisions may be needed for a variety of reasons, like the need to take local conditions into account.

The fact that traditional regulation employs installation-specific decision-making is also seen, contrary to the critics of traditional regulation, as an advantage. The very existence of installation-specific decisions makes it possible to have an \textit{ex ante} accountability mechanism.\textsuperscript{257} Due participation of the public, transparency of procedures and accountability of authorities are seen as merits of traditional regulation based on administrative law.\textsuperscript{258} Economic instruments, instead, do not provide opportunities to build participation mechanisms and the members of the public have difficulties in obtaining information on where and what kind of decisions are made and how much individual companies are polluting under such a regime. In addition, the general public are not consulted when decisions in the framework of an economic instrument are made at the level of an individual company.\textsuperscript{259} This means that differences in the opinions of people in different regions are not incorporated into decision-making. In addition to the safeguards preceding the decision-making, the traditional regulation offers an opportunity to create effective judicial review. Economic instruments do not always offer such a possibility. Rehbinder has even doubted whether macro-level decisions on economic instruments—like the cap of pollution under a tradable permits scheme—could be subject to judicial review.\textsuperscript{260}

The dispute, if the existence of installation specific decision-making procedure is a value of its own, comes back to the theory of democracy employed. If the main emphasis is put on the role of democratically elected bodies, the conclusion may be different than if it is put on the position of citizens affected. Thus, the advocates of economic instruments may, at least to

\textsuperscript{256} Hilsson 2000, 123–126.
\textsuperscript{257} \textit{Ex ante} accountability refers to participations of the public at large in decision-making before the decision is made.
\textsuperscript{258} Bosselmann and Richardson 1999, 2. Rehbinder 1999, 93.
\textsuperscript{259} Toshiyukidrury, Belliveau, Kuhn, and Bansal 1999, 278–79.
\textsuperscript{260} E.g. Rehbinber 1999, 99–100.
a certain extent, defend their position by claiming that the strengthening of the position of those individuals affected is of minor relevance in comparison to strengthening the position of democratically elected bodies and *vice versa*. Hence, transparency and accountability differ as an evaluation criterion from effectiveness, efficiency and innovation in the sense that the question of which instrument is preferable does not depend only on the impacts of the policy instruments, but also on the democratic values used.

Each constitution is based on certain democratic values. Hence, one may ask what the values of a constitution are in a particular country and if the constitution could guide the choice of forms of regulation. As Rehbinder has indicated, the constitution may set some limits to the development of regulation. He writes: “The question is then whether the State is under an obligation based on constitutional law, or at least an obligation derived from basic political value judgements, whereby it has to tackle environmental problems primarily by administrative regulations.”261 In the Finnish discussion it has been stressed that the constitutional right for the environment (Section 20 of the Finnish Constitution) requires the maintenance of the achieved level of environmental protection. Furthermore, it has been called into question whether it would be possible in the name of the development of regulation to lower the existing level of environmental regulation.262

Some limits may, indeed, follow from the Constitution. As Rehbinder notes, a risk to human life and a risk of severe or irreversible harm to human health, may belong solely to the sphere of administrative regulation, because such impacts should not be allowed at all. Furthermore, it can be agreed that an essential lowering of the level of environmental protection could violate the Finnish Constitution. However, the problem is to define what the deterioration of existing environmental regulations really means. If the choice is to be made between regulation of high a environmental ambition level and regulation of a low ambition level, the answer may be clear. However, even in this case new evidence on the health or environmental effects may change the picture. Furthermore, the answer to the question which of alternative ways of regulating is “the best”, may depend on the evaluation criteria used. A change of regulation does not necessarily mean a change of the (aggregated) environmental goal, although it may affect efficiency, innovations and procedural values. One might also ask if the judgement should be made at the level of individuals (the public, installations, protected species) or at aggregate level (industrial sectors or ecosystems). If evaluation criteria point in different directions, judging whether the overall impact of a change of regulation is an attenuation or an improvement of existing regulations, may become difficult. In particular, with the exception

of immediate health effects, it is extremely difficult to give a general preference to a certain form of regulation and claim that replacement of this or that form of regulation by other forms is not possible. Hence, it is most demanding to draw general conclusions on how the Constitution limits the choice of regulatory instruments, though this aspect may turn out to be relevant with regard to a specific regulatory reform.

Regulatory capture, i.e. unjustified influence of special interests, may affect the design of instruments in various ways, such as exceptions to the main rule or even as specifications of measuring techniques. Critics of traditional regulation claim that it is particularly vulnerable to regulatory capture, because the relationship between regulators and the regulated is too close. There is some evidence showing that the interests of certain groups have influenced the formulation of regulation, though sound evidence showing the difference between different forms of regulation seems to be lacking. Some regulatory capture theories claim that all regulatory instruments are equally prone to capture, whereas other theories combine legal techniques and vulnerability to capture. According to the latter group, if the law leaves a wide discretion to local authorities, the system is more vulnerable to regulatory capture than in the case of legal technique, which leaves a limited role for the decisions of local authorities. Because the discretion of local authorities is generally greater in the case of traditional regulation than in the case of economic instruments, it follows that instruments of traditional regulation are more prone than economic instruments to regulatory capture according to these theories. In this context, one might note that there are also differences between instruments of traditional regulation as well. If regulatory technique is based on uniform standards, the amount of discretion of the administration implementing the regime is smaller than in the case of differentiated standards. Uniform standards may have other disadvantages, as discussed earlier, but with regard to regulatory capture of lower authorities they can be seen as safer.

The problem of regulatory capture is not necessarily limited to lower authorities. According to Rehbinder, economic instruments are particularly vulnerable to regulatory capture just because there are only few important decisions within the framework of economic instruments, like the overall cap of emission in the case of tradable permits and the tax rate in the case of taxes. He asserts that it would be easy for industry to exert all possible pressure on these decisions in order to achieve favourable decisions. Interestingly, many environmental taxes are rather low, contain many exceptions and have different

264. Ackerman and Hassler 1981.
266. Rehbinder 1999, 97.
kinds of rebate mechanisms, all of which make the life of certain groups easier. Whatever the exact role of special interests is for these, at least it would be irrational to exclude the possibility that there is a regulatory capture behind this.

As can be seen from the discussion above, the approaches of different researchers towards capture have varied widely. No one has managed to present a convincing argument that the possibility of regulatory capture, i.e. undue influence of special groups, is more likely in the case of a certain kind of regulation than in the case of some other kind. The regulatory technique used has a role to play mainly in the sense that the sensitive stages in decision-making procedures vary from one instrument to another. In each case some public authority must make substantially relevant decisions and it cannot be ruled out that special interests are then taken into account. Hence, I tend to agree with those who take the view that regulatory capture is possible with regard to all instruments, though regulatory technique may affect how it could take place.

2.3.6. Interplay between regulatory instruments

Hardly any environmental problem is nowadays regulated by a single instrument alone, but by a policy mix. In practice, the number of regulatory instruments in use has increased and hence also the potential constraints between the instruments. Though one could agree with an argument that there are only few circumstances when the use of single instrument is the most effective way of regulating an environmental problem, not all combinations of instruments are necessarily effective.

While thinking of the interplay between instruments from the impacts point of view, three factors in particular should be taken into account: the target groups, environmental problems and impacts mechanisms of each instrument. No doubt policy mix is often understood to refer to instruments regulating the same environmental problem and the same target group. However, the links between instruments go beyond this situation. Even two instruments regulating different problems and target groups may be interlinked if the environmental problems are interlinked. For example, there is such a link between greenhouse gases and traditional air pollutants (SO₂ and NOₓ). If climate change policy succeeds in reducing greenhouse gases, it, luckily, will most likely also reduce other pollution (like SO₂ and NOₓ emissions). The situation is not always this good, and negative spillover into other policy areas is also possible.

Instruments which regulate the same target group and the same environmental problem may be complementary or counter-productive. The intervention theories of instruments may be so alien to each other that their simultaneous use distort their combined outcomes. In this case instruments

can be considered to be counter-productive; in the opposite situation the relationship is complementary.

Generally speaking, economic instruments leave greater space of freedom for the target group to choose the way of behaviour considered appropriate for individual actors than does traditional regulation. In fact, the relative advantage of economic instruments is based on freedom of action. This is not to say that economic instruments are always a good solution to manage environmental problems, but if this is the case, then the freedom of action of individual actors is an important feature of intervention theory. Therefore a traditional regulatory instrument which limits this freedom, also reduces the relative advantages, like efficiency, attributed to economic instruments. However, from the notion that the freedom to make decisions is important for the functioning of economic instruments it does not follow that all kinds of restrictions of this freedom would adversely affect the functioning of economic instruments. Hence, it is important to find what kind of restrictions are counter-productive and what kind not. I approach this issue by two examples. The first concerns the relationship between emission trading and permitting.

Well-functioning permit markets are at the heart of emission trading schemes. Public authorities determine the total amount of allowances and make the first allocation of allowances, either through auctions or grand-fathering. Thereafter the distribution of allowances (and real emissions) is left to the markets. One factor which may distort the functioning of an emissions trading scheme is a parallel traditional regulation. It is not possible to say whether the relationship between emission-trading and traditional permits is generally counter-productive or complementary, but it depends on the details of the instruments. Certain kinds of permit conditions of traditional regulation may be counter-productive, whereas others are not. If the functioning of markets is distorted, it will mean that efficiency gains are (at least partly) lost, although it would not have impacts on the total amount of allowances. Thus, emission trading scheme and traditional regulation, like environmental permits, are counter-productive to the extent that the permit conditions used distort the allowances markets. In the opposite case then, traditional regulation may be complementary in relation to an emission trading scheme. For greenhouse gases most permit conditions regulating other pollutants than the greenhouse gases are not a priori counter-productive, whereas permit conditions concerning these gases are. Energy efficiency requirements are a borderline case. A requirement to carry out an energy audit is complementary to trading, because it aims to improve the information basis, not to determine what the industry should do. A requirement to invest in energy efficiency equipment may, instead, be counter-productive, because it ties the hands of what has been regulated.

Another example concerns the relationship between environmental taxes and traditional permits. Environmental tax is planned to serve as an
incentive. Its effectiveness is based on the idea that there are alternative courses of action available and the target group is free to choose any alternative, though tax makes one alternative economically more attractive than others. This should lead to efficient use of resources in relation to a given goal, where some polluters choose to pay tax and others to reduce pollution. In the case where the same environmental objective is pursued through the mandatory requirements of traditional regulation, there is the threat that tax will become punitive. However, tax and environmental regulation, if rightly designed, can also complement each other. This is the case if the tax is directed to reduce pollution which exceeds the mandatory level. The use of uniform standards for a sector as a part of policy mix is preferable, because the use of differentiated standards may lead once again to punitive taxation and differentiation based on the principle of the best available technology principle, would reduce efficiency gains of (additional) taxation.

2.3.7. Concluding remarks on pollution control regulation

In this chapter the relative strengths and weaknesses of traditional regulation in comparison to economic instruments have been discussed. Often different evaluation criteria point in opposite directions. It could be possible to draw the general conclusion from the discussion that traditional regulation is often effective and provides good opportunities for public participation, whereas economic instruments tend to outweigh traditional regulation in terms of efficiency. With regard to impacts on innovations, it is more difficult to draw a general conclusion. However, the reality is much more complex. Firstly, what instruments should be preferred depends partly on values, like those related to democracy. Secondly, there is not sufficient evidence on various points. For example, it is unclear what the relationship is between the choice of instruments and regulatory capture. Thirdly, the role of context-related factors, such as the nature of the environmental problem in question, exact formulation of an instrument, technological possibilities, socio-economic constraints and the legal-administrative environment, is significant and relevant for the choice of instrument. Traditional regulation is not always effective and economic instruments are not always efficient, depending on the context-related factors.

Often general conclusions regarding preferability of an instrument are based on ideal types of regulation and hence the conclusions are limited to those ideal cases. In sum, drawing of general conclusions apart from the notion that

269. Apparently many authors referred to in this chapter have had in their minds a comparison between traditional pollution control regulation, like environmental permits and economic instruments for pollution control, like tradable permits (e.g. Ackerman, Driesen, Hahn, Hilson, Latin, Sunstein, Rehbinder, Stewart and Wagner). This leaves open to what extent it is possible to extrapolate the features found in these types of regulation into regulation tackling other issues.
traditional regulation is not a cure for all environmental problems,\textsuperscript{270} is difficult. As Hahn and Stavins write: “No single approach will be ideal for all problems. The real challenge is to identify the right policy for each specific situation. The best set of policies will typically involve a mix of market and more conventional regulatory processes. Design and implementation of improved policies will require policymakers to adapt, rather than abandon, present programs.”\textsuperscript{271} Why, then, is it valuable to compare different forms of regulation. The answer to this question is simple: it helps to identify the potential problems and draw attention to important issues related to different regulatory instruments. Theoretical comparison is not the final answer to which kind of regulation is preferable, but it gives an analytical basis, a framework of interpretation, to make research on concrete regulation. As noted in Chapter 1, empirical evidence on regulation is often incomplete due to data problems and difficulties in establishing a causal link between regulation and outcomes. The point in this chapter is to show some of main features, strengths and weaknesses, of traditional regulation so that the following analyses in coming chapters concentrating on the experience from one country, could be seen in a broader perspective.

\textsuperscript{270} Alm 1992, 6–11.
\textsuperscript{271} Hahn and Stavins 1991, 5.
Chapter 3

Regulatory change

In this chapter the evolution of environmental regulation is explored. National traditional pollution control regulation is set in a broader context before the following chapter, which concentrates solely on this type of regulation. The development of regulation is studied from different angles in order to gain a variety of insights. The chapter begins with theoretical notions on the recent development of environmental policy, regulation and law. This part of the chapter is based on the literature and not directly linked to Finnish environmental legislation. Thereafter the national legislative development is explored on the basis of quantitative data concerning legislative change. The data gathered covers the years from 1988 until 2003. Part of legislative change, though concerning environmental regulation, is irrelevant for substantial environmental policy and the relative size of manifestly irrelevant legislation will be discussed. Trends in legislative change, such as variation in new legislation between sectors and how Europeanization has affected development will be explored. Furthermore, the issue of regulatory shift in terms of instruments will be tackled. Trends and quantities of new legislation may give an incomplete picture on regulatory change. Therefore the relevance of new policy instruments in solving environmental problems is explored using research related to Finnish instruments in order to better understand how regulatory shift has affected the pollution control of industrial activities.

3.1. Evolution of regulation

The evolution of environmental regulation is not an isolated phenomenon, but a part of a larger societal change. Among environmental sociologists and political scientists it has become popular to understand the recent change in industrialized societies through the theory of ecological modernization, though the societal process of ecological modernization does not limit itself to the issues of regulation or interventions taken by government. Although

different authors see the role of regulation differently, there is a consensus that change of regulation is either one factor affecting the change or a result of change. Regulatory reform is frequently seen as a part of ecological modernization.

The concept of ecological modernisation273 has many meanings: it can be seen as a sociological theory concerning the relation between industrial society and the environment; as a conceptualisation of a new paradigm of environmental politics and policy; as a concrete programme of environmental policy.274 It includes analytical and normative dimensions. Partly it aims to serve as a theoretical model to describe and understand the on-going change and partly the theory can be seen as a model of how society should be changed so as to respond to the changing challenges of environmental problems.275 It must be recalled that the basic criticism of any normative theory is that it rather reflects the wishes of the promoters of the theory than what is happening in the real world. Ecological modernisation theory represents optimistic (as opposed to apocalyptic) understanding of the relationship between society and the environment. The optimism is based on the assumption that economic development and the protection of the environment can be combined in such a way which leads to win-win situations. In addition, it includes an idea that a reform of institutional structure is possible (although not necessarily always successful), unlike the most pessimistic analyses, which were more popular still 1970s and 1980s.276 The theory also suggests that the change has already started, though only to an insufficient extent.

In the ecological modernisation literature two important turning points in recent environmental history have been identified dividing the development of environmental policy into three waves. The first turning point is located in the late 1960s and early 1970s by promoters of ecological modernisation theory as well as many others.277 Although environmental issues, in particular nature conservation, was an already important issue before this (during the first wave), the environmental discourse thereafter became more controversial and many environmentalists started to demand radical changes in the socio-economic structures in order to avoid serious consequences to society as a whole. However, the demands made during the second wave did not result in significant institutional transformations and the societal environmental

273. On the concept of ecological modernization, Sairinen 2000, 76–.
275. The major contributions to the development of the ecological modernisation theory have been made by scientists coming from a small number of western European countries (in particular from the Netherlands, Germany and the United Kingdom). This has caused a discussion to what extent, if any, it is applicable to other societies either in Europe, other OECD countries or third-world countries. See reflections on this by Mol, one of the major contributors to the theory, Mol 2003, 65–70.
276. Mol 2003, 47–70.
discussion of that day was dominated by social scientists with very pessimistic views on the ability of capitalist society to react to environmental challenges. The second turning point, which started the third wave, is of crucial importance for ecological modernization theory. The promoters of the theory see it as the dominant sociological theory for the third wave. This change can be located roughly in late 1980s and early 1990s, between the publication of the Brundtland Report in 1987 and the Earth Summit in Rio de Janeiro in 1992. There are two important differences between the second and the third waves. The third wave meant “the commencement of actual environment-induced transformations of the industrial order of the modernity” and the emergence of ‘global change’ issues. The transformation process also means different kinds of institutional changes. The roles of science and technology, the market, nation-state and social movements are changing and new ideologies are emerging. For the evolution of law and regulation, the transformation relates, in particular, to the changed relations between the state and market as well as the state and citizens. The changed relationship between the state and markets means a new kind of market-orientation and the use of markets, whereas the changed relationship between the state and the public means more participation in policy-making and its implementation. In addition, concepts and policy principles like ‘proactive’ or ‘preventive approach’, ‘the precautionary principle’, ‘the polluter pays principle’ ‘public right to know’, and ‘shared responsibility’ have been associated with ecological modernisation. This is, however, misleading in the sense that many environmental principles have roots which go back far beyond the late 1980s. Though the temporal distinctions between different waves may not be sharp, they can been as illustrations of the ideological evolution behind the actual environmental policy.

Regulatory reform, a part of the overall transformation of different social institutions, has been seen as a necessary, albeit not sufficient, precondition of ecological modernisation. Indeed, a ‘fundamental transition’ in environmental policy is seen to be taking place. The references to the changes of regulation

278. Theory can also be understood an ideology, see e.g. Rinkevičius 2000.
286. The OECD is a major organisation promoting regulatory reform towards increased market-orientation, see e.g. OECD 1997a and OECD 1997b.
in the ecological modernisation literature are numerous. In essence, this is seen to mean the emergence of new instruments (called 'New Environmental Policy Instruments’ NEPI) and a diminishing role of traditional regulation. Jordan, Wurzel and Zito, who name as NEPIs eco-taxes and other market-based instruments, voluntary agreements and informational devices such as eco-labels, have found indications that the rise of new policy instruments is a world-wide phenomenon, not something related to individual countries or regions like Europe. They claim that the total number and diversity of environmental policy instruments has grown generally and in some countries amazingly fast. Another related change concerns the increasing relevance of the integration of environmental requirements into other policies.

The theory of ecological modernisation concerns societal change at large and it assumes that a large number of social institutions is changing. A societal change of the magnitude that the theory suggests cannot take place without extensive changes of law as well. Hence, it is not surprising that observations similar to those presented in the discussion on ecological modernisation are also common among legal researchers. There are similarities between the ‘waves' of the ecological modernisation theory and the evolutionary stages of the curative model, the preventive model and the anticipatory model presented by de Sadeleer. New kinds of state-market relationships and increased market-orientation have been considered a challenge for legal development in general and environmental law in particular. The change has long been particularly obvious with regard to pollution control regulation. The changing relationship between state and citizen requires the finding of a new balance between environmental demands, human rights and the protection of the traditional rights of individuals. The development of increased legal safeguards for the health environment has well documented. The new balance is seen to be achieved through the on-going process towards a Rechtstaat of Sustainable Development (Rechtsstaat der Nachhaltigen Entwicklung) or Eco-social Rechtstaat.

A profound change according to the lines of ecological modernisation does not touch only (administrative) environmental law, though the develop-

290. On the development at European level, see Krämer 2000, 262–276.
297. Määttä, T. 2001, 303
moment, where this branch of law becomes more effective and efficient, is a part of it. It is clear that apart from environmental law in a strict sense, environmental considerations have increasingly become in-built in many branches of law, which regulate economic activities related to the use of land or natural resources, like agricultural or forestry law, during the last twenty years or so. The change, however, seems to be even greater than this, also touching such traditional branches of law, as liability law, company law and contract law. If law is to be ecologically modernized it requires changes in the domains of legislation, legal practice as well as theoretical thinking (legal science). The most influential single changes with regard to the impacts on the environment can be assumed to take place through changes in legislation. However, if legal doctrine (legal thinking) would stick to the old traditions and legal practice (partly as a consequence of less developed legal thinking and, thus, lack of intellectual tools to tackle with new problems) interpret law in a conservative way, this certainly would influence the modernisation process. More radical interpretations of law and well-developed legal thinking could accelerate the modernisation process even if the legislative development is slow. The evolution of law is typically a combination of all of these, where changes in legislation, legal practices and doctrine follow each other and give stimuli to new changes in different domains. Tuori, based on his model of three levels of law (surface of law, legal expert culture, deep structure of law) sees the development of law taking place at all three levels, but at different speeds. The most fundamental changes are those which through sedimentation from above happen at the level of deep structure, which to large extent consists of human rights.

De Sadeleer in his book on environmental principles links the development of environmental law to the more general development of law from modern to post-modern. He is not alone, while stressing a significant increase in the number of sources of law, in particular at international level (EC, WTO), but also at national level. The role of private or semi-private bodies (ISO, CEN) has become increasingly important in standard-setting, the speed of production of norms has become faster, the nature of intervention has changed towards more extensive use of soft law (recommendations, resolutions, statements of

300. He considers that at the moment we are living in the era of post-modern law. Other authors, instead, consider that concepts like ‘mature modern law’ (Tuori 2002, 5) or ‘late modern law’ (Wilhelmsson 2001) better reflect the incremental nature of legal development. If the role of positive law is taken as the criterion for making the distinction between modern and natural law (which preceded modern law), we still are living the era of modern law. However, the emergence of modern law is a centuries long process and its time-frame cannot by any means be equated with the time-frame of ‘ecological modernisation’. The time-frame of concepts like ‘mature modern law’, ‘late modern law’ or ‘post-modern law’ come closer to that of ‘ecological modernisation’, though they are still substantially longer.
intent). As a result of this dynamic change, law in general and environmental law in particular, has become fragmented. Furthermore, the simplicity, systematization, and coherence of legal system have partially abounded so that legal norms might respond more rapidly to urgent and complex social needs. Law has become pluralistic, soft and negotiated.\textsuperscript{301} Sometimes the concept of soft law is associated in particular with international law. However, Tapio Määttä has recently documented with regard to Finland that soft law also has a significant, and apparently increasing, role in national environmental law.\textsuperscript{302} The development of law reflects general societal development. New, more flexible modes of action, which better adapt to the dynamics of social realities in order to ensure the effectiveness of public policy, have developed.\textsuperscript{303} Despite this the development also has certain potentially negative outcomes regarding the steering capacity of legislation and public policy in general. “This new approach tends to downplay the role of legislation and dilute the responsibility of public authorities in formulating and implementing public policies.”\textsuperscript{304} Tapio Määttä points out that soft law has increased the flexibility of law in the sense that part of soft law is general and abstract (as opposed to precise and exact), but even a greater part of it is detailed technical guidance.\textsuperscript{305} From the governance point of view a problem is that the practical relevance of soft law instruments differs from their legal nature.\textsuperscript{306} This may, indeed, downplay the role of legislation and cause serious confusion with regard to responsibilities. According to de Sadeleer, at the same time than the fragmentation process described above, general principles of law (‘directing principles’), which are linked to specific public policy, have come into existence within the post-modern legal framework. In the field of environmental law examples of such principles are the polluter pays principle, the principle of prevention, the precautionary principle. These principles have filled gaps or alleviated the obscurity of the legal system.\textsuperscript{307}

There is a rich literature based on different disciplines showing that a significant societal change relevant to environmental matters is taking place. The change is deep and it goes beyond legal regulation, though legal regulation is also changing. The change in legal regulation has many dimensions; not only are the instruments governed by law changing, but also the way in which the (legal) governance mechanisms are structured, is changing. The change concerns environmental regulation, but it has a broader context and it would not

\textsuperscript{301} de Sadeleer 2002, 233–261
\textsuperscript{302} Määttä, T. 2005, 348–381.
\textsuperscript{303} de Sadeleer 2002, 233.
\textsuperscript{304} de Sadeleer 2002, 246.
\textsuperscript{305} Määttä, T. 2005, 443–446.
\textsuperscript{306} Määttä, T. 2005, 361–370.
\textsuperscript{307} de Sadeleer 2002, 236.
be necessarily correct to associate it purely with ecological modernisation (now understood as a political programme). Increased market orientation, in line with ecological modernisation, is a case in point. One may wonder whether increased market-orientation is due to the inability of previous environmental regulation to achieve its goals, or whether it is just a reflection of a more general societal change, which does not have its primary roots in environmental issues. However, a change of regulation is taking place and it is assumed to produce better environmental outcomes. One important implication of this change concerns a shift from traditional regulation to other forms of regulation. Many authors stress the change towards economic instruments, procedural regulation and non-governmental regulation are taking place as pointed above. Another implication relates to the distinction between public and private law. It is seen to become blurred, which means that distinguishing regulatory law (like environmental administrative law) from other branches of law becomes more difficult. Examples of this development are producer liability, environmental liability, extended producer responsibility. Another implication is that the law governing regulatory instruments is changing itself. The sources of law and particularly the amount of soft law not produced according to formal legislative procedure, is increasing. The adjudication of law is becoming more context-bound and open to the extra-legal sphere, which may decrease its predictability and which stresses in substantial terms the importance of environmental principles as well as the transparency and accountability of decision-making.

The development of regulation in recent years can be described as a part of the wider ecological modernisation of industrial societies. As noted above, the world view of the theory of ecological modernisation is optimistic; both economy and ecology can win. However, the future development will not necessarily continue as one dimensional—as the discussion of the contested concept of better regulation shows. Some commentators claim that EU’s better regulation policy has meant since its birth at the Edinburgh summit of 1991 “hidden efforts” of deregulation. Others, instead, assert that the EU’s initial ‘better regulation’ agenda, which originally aimed to improve effectiveness, efficiency, transparency and public consultation, has recently narrowed to an issue of economic growth. As a result the concept of ‘better regulation’ is becoming close to that of ‘deregulation’. This certainly is the case, if any effort

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308. Pöyhönen (2000, 186–201) has pointed out his with regard to private law and de Sadeleer (2002, 248–249, 252–258) also with regard to environmental law.
309. Määttä T., however, claims that the recent development of environmental law has not increased its flexibility. On the contrary, environmental law—due to established legal practice and more specific soft law and other guidance—has at least partly become more detailed and precise. (Määttä T. 2005, 291–296). This would indicate that the predictability of law has not decreased.
to use alternatives to traditional regulation, like economic and procedural instruments as well as privatization of environmental services (drinking water supply, waste disposal, waste water treatment) is considered deregulation, as some are doing.\textsuperscript{312} For me, however, deregulation refers to lowering the ambition level of environmental protection. Seen from this perspective labelling better regulation as deregulation may still today be an exaggeration, although future development will depend on what kind of interpretation of better regulation emerges from political struggles. Though one would oppose a narrow definition of better regulation and stress the fact that maximization of perfect allocation of resources is not a primary goal of environmental regulation,\textsuperscript{313} it seems hard to avoid better regulation discussion while pondering the challenges for future reforms. Better regulation policy can be understood as an effort to strike a fair balance between efficiency and other evaluation criteria and at least in political rhetoric it aims not to lower the ambition level of environmental protection.

As a reaction to requirements related to efficiency demands and wider better regulation discussion, attempts to lighten environmental regulation have become reality in countries like the Netherlands and Denmark,\textsuperscript{314} which have a strong reputation for being forerunners in environmental matters. Deregulation can be understood as a change of environmental regulation, which lower the environmental ambition level of it. Lightening, instead, refers to efforts to reduce the use of administrative resources without affecting the ambition level. A recently established working group\textsuperscript{315} is a reflection of lightening attempts in Finland. Though a single working group may have only minor impacts on the overall development, the issues discussed now are unlikely to disappear in the near future.

What is the economic logic behind the lightening of environmental regulation? The most immediate pressure to lighten environmental regulation comes from the need to use public resources in more efficient way, i.e. from the need to control public expenditure. Governments are generally under pressure to maintain or reduce the relative size of public expenditure in relation to

\textsuperscript{312} Rehbinder 1999, 93–94.
\textsuperscript{313} Baldwin and Cave, based on Dworkin (1980) and others, criticize Posner (1979, 1985) for exaggerating the role of wealth maximization as a criterion of ‘goodness’ of regulation and write that “wealth maximization provides no ethical basis for action, … it cannot justify any particular distribution of rights in a society, and…, as a result, it cannot be used to measure regulatory decisions affecting rights.” Baldwin and Cave 1999, 76 –.
\textsuperscript{314} Internationally, the lightening trend has already been emerging for some years, Rehbinder 1999. On the development generally in the Netherlands, see Verschuuren 2004a and in particular from public participation point of view, Verchuuren 2004b. Wilkinson et al. 2005 mention examples of lightening from several other countries. In the United Kingdom environmental permits are also to be simplified. ENDS Issue 2043, 21 February 2006.
\textsuperscript{315} Ministry of the Environment, 2005. The same working group, which consists of three subgroups, also aims to streamline the administrative structures. Streamlining administrative structures means, in essence, merging the two regional permit authorities into one.
economies as a whole and this pressure may be coming even stronger in the future due to the ageing of the population and other demands. However, there seems be no end of new environmental needs. From the combination of financial constrains and ever changing needs follows a continuous need to set new priorities to ensure that the resources available are used in the best possible way. From this perspective efficient use of administrative resources without lowering the effectiveness of regulation can be seen behind lightening attempts. In the real world, different motives and goals are often mixed, and a single regulatory reform hardly aims purely to reduce administrative cost, but also has other goals such as increasing generally efficiency and effectiveness. Be that as may, the role of efficiency requirements as a driving force for regulatory reforms seems unlikely to diminish in the future.

Lightening understood as an attempt to improve the efficient use of public resources is a narrower concept than better regulation. Better regulation policy aims to promote general efficiency of regulation (which can be interpreted to include allocative efficiency and cost-effectiveness considerations) as well as effectiveness, transparency and public consultation. Lightening, as I understand it, instead focuses on the efficient use of public resources without a relevant change of policy goals. With this regard it is important to note that the amount of public resources directed to environmental protection is generally much smaller than that of private resources. Furthermore, administrative costs, which are borne both by private and public actors, are much smaller than compliance costs, which are typically borne almost solely by private actors. These are, however, generalisations and it cannot be excluded that with regard to specific activity administrative costs would exceed compliance costs.

As the literature discussed above shows, many important contributions have been made with regard to the understanding of the recent regulatory change. Often the contributions have combined visions and facts and drawn less attention to the systematic nature of those facts. Next, I will explore regulatory change in Finland using data on legislative change as a point of departure. In order to gain further insight into regulatory shift, the relevancy of selected new instruments for the regulation of industrial activities will be discussed.

317. Government aims to reduce the number of officials working for the environmental administration by a couple of hundreds employers by 2011.
318. The variety of goals is clearly reflected in the terms of references of just mentioned the working group.
3.2. Development of legislation

The amount of legislation has been increasing for decades in Finland as also in many other countries. Though there is some variation between years with regard to amount of legislation, the longer trend is obvious.\(^{320}\) This has been seen to result in so-called legislative inflation.\(^ {321}\) However, in a recent OECD review of Finland it was reported that there are indications of a change. The OECD found that the increase of annually adopted pieces of legislation reached its highest point in the first half of the 1990s and thereafter a slight drop took place in late 1990s. The OECD reports that “Finland has been successful in controlling the rate of growth of new regulation.”\(^ {322}\) The even more recent figures presented by Tala, however, suggest that, with the exception of a peak in mid 1990s, the amount of legislation continues to increase.\(^ {323}\)

The increase in the amount of legislation takes either the form of expansion or differentiation. Expansion means that new matters or/and activities are regulated, differentiation, instead, means that the legislative apparatus becomes more sophisticated.\(^ {324}\) In practice, the line between expansion and differentiation is blurred, because an expansion often involves some sort of differentiation. For example, the regulation on new kinds of waste (like electrical and electronic waste) involves, to be exact, regulation of new matters (=expansion), though from a broader perspective it can be seen as “only” differentiation of law: the law on waste becomes more sophisticated by making a difference between types of waste. Expansion and differentiation are both dimensions of juridification. Blinchner and Molander\(^ {325}\) also distinguish four other dimensions of juridification as follows: constitutive juridification, juridification as increased conflict solving with reference to law, juridification as increased judicial power and juridification as legal framing.

Not all legislative changes increase the body of legislation. Even if the amount of regulation does not increase, regulation may become tighter/looser—for example, through a change of environmental standards. In terms of environmental policy, this type of change is equally important, in particular with regard to technological development, regardless of whether regulation affects technological development or technological development affects regulation.

The amount of legislation is in general increasing. How is it with environmental legislation? This issue will be studied next on the basis of information

\(^{320}\) Tala 1999, 2–24.
\(^{321}\) Eng 2002.
\(^{322}\) OECD 2003b, 43.
\(^{323}\) Tala 2005, 215.
\(^{324}\) Blinchner and Molander 2005, 8.
\(^{325}\) Blinchner and Molander 2005.
collected from ‘Statutes of Finland’ concerning the period between 1987 and 2003. Before embarking on this analysis and keeping in mind the distinction between law and legislation, a clarification of what here is meant by ‘environmental legislation’ is needed. Following the integration principle of environmental matters, many branches of legislation traditionally considered as something distinct from environmental legislation nowadays include provisions promoting environmental protection. In other words, the regulation of environmental matters has dispersed widely over the legal system and a piece of legislation intended to affect society in such a way as to improve, or to prevent the deterioration of, the quality of the natural environment can be found in many places in legislative systems. In the following analysis, to minimise subjective judgements, any piece of new legislation or amendment to an existing piece aiming to promote the goal mentioned above is considered a piece of environmental legislation. In those cases where a piece of legislation has many goals, it is considered environmental if at least one of the goals is environmental. Furthermore, all amendments to legislation expressly environmental in nature were considered as environmental legislation regardless of the nature of the particular change. Hence, all changes to pollution control legislation, such as the Air Pollution Control Act and sub-legislation under the Act, were considered to be pieces of environmental legislation, even if the change was of a formal nature. During the research project all published statutes were gone through with the help of Internet services. A preliminary assessment was made on the basis of the title of the statute and in the case of uncertainty the full text was checked. All statutes were classified to one of the following sub-categories of environmental legislation: pollution control, natural resources, nature protection, chemicals, waste, energy and land use. Due to the huge number of statutes (more than 1,000 items are published annually), there is a risk of misjudgement. Hence, the statistics should be understood as indicating trends rather than exact numbers.

Figure 2 shows that the total number of pieces of environmental legislation adopted has varied significantly from one year to another. The highest peak was reached in mid 1990s. After a fall thereafter, the number has gradually approached the level of 1994. The preparation for EU membership partly explains the peak in the mid 1990s. Due to EU membership all existing legislation was reviewed in the light of EU law. This was a resource-intensive effort resulting in many changes in the legislation, though many of these were technical; the ambition level of national environmental regulation mainly corresponded or

327. Research assistant Minna Kettunen was responsible for the assessment and production of the statistics.
328. The same argument related to the whole body of legislation is presented by Ervasti, Tala and Castrén 2000, 14–25.
exceeded the European level, though regulatory technique differed. To describe the same phenomenon Glachant distinguishes environmental compliance from (formal) legal compliance. By environmental compliance he means compliance with policy goals,\(^{329}\) whereas legal compliance refers to compliance as it is understood normally in legal literature. Later, in Figure 3, the portion of national legislation formally implementing EU laws will be presented. This figure shows that the formal impact of EU laws alone does not explain the variation. On the other hand, in 1993–1994 the transposition of EU legislation was something additional to the adoption of other legislation already in the pipeline for other reasons. Thereafter, is can be assumed, the national legislator has been in a better position to incorporate the transposition of EU legislation into other needs to develop legislation. Hence, it is likely that the impact of EU legislation on the number of pieces of legislation adopted was stronger just before accession than thereafter.

Excluding the peak in the mid 1990s, the quantity of annually adopted environmental legislation has been increasing. During the last seven years legislation has increased, practically speaking, every year. The notion that the length of legal texts has generally been growing even faster than their number, strengthens this observation.\(^{330}\) Hence, the trend has been towards more legislation. Apart from 1993–1995, there is no other period of three years which exceeds the number of pieces of legislation adopted in 2001–2003. In

\(^{329}\) Glachant 2001, 6.
1993–1995 the impact of Finland’s accession has more directly affected the total amount of legislation, which I interpret to be an exception from the basic trend. Hence, there are no signs of stabilisation of environmental regulation. The relative size of different sectors varies from year to year. However, pollution control regulation has been the biggest sector more often than any other sector. In addition, the total amount of pollution control regulations (230) during the 15 years studied was clearly more than any corresponding number in other fields of environmental regulation. The quantity of new pieces of legislation concerning both natural resources and nature conservation were about 120. The figure for chemicals regulations was 90 and that for waste was 50. Regulation on natural resources (e.g. agriculture and forestry) seems to have relatively increased.

One possible explanation for the ever-increasing amount of legislation is that the life cycle of legislation is short. A short life cycle is not, however, necessarily an indication of manifestly irrelevant development. Replacement of existing legislation with new legislation may contribute to the expansion of regulated activities, or it can change the nature of regulation. In any case, it can be assumed that the replacement of the whole statute is more significant than that of part of it. This being generally true, there is also an example of a significant reform, which formally speaking was merely an amendment of an act. The amendment of air pollution control in 1995 (by Act 1711/1995) changed the basic form of control from notification to permit.

The age of statutes (not sections or paragraphs) was assessed during the course of this research using the collection of laws and regulation to be found in the web-pages to the Ministry of the Environment.\textsuperscript{331} The assessment was restricted to legislation located under the title of pollution control law. In practice the web-pages also included references to laws which mainly deal with other environmental issues than pollution control (like planning legislation). These statutes were also included in the assessment. This collection of legislation is not complete, although one can assume that a major part of the legislation is to be found there. Furthermore, it can be assumed that this source is biased towards traditional regulation, because the Ministry of the Environment has competence with regard to this type of environmental regulation, whereas most legislation related to economic instruments falls under the competences of the Ministry of the Finance or the Ministry of Forestry and Agriculture. Because traditional regulation should, according to standard understanding, be the oldest part of legislation, this tends to increase the average age of legislation.

On the basis of the more than 100 pieces of environmental law found in this source of information and studied, the following observations were made.

\textsuperscript{331} Source: www.ymparisto.fi, Page: Lainsäädäntö (legislation), ympäristönsuojelulainsäädäntö (pollution control legislation), October 2005.
A little less than one third of statutes were less than 5 years old, a little more than one third 5–10 years old and another slightly more than one third was more than 10 years old. Four statutes in force at the time of the research were enacted in the 1980s, four in the 1970s and three in the 1960s. Though these statutes have not been totally revised, some of them were amended several times. The conclusions is that the life cycle of environmental legislation is rather short according to this assessment. Most of the legislation in force at the time of the analysis was reformed less than 10 years ago and almost all of the legislation in force prior to 1990 was replaced. These observations confirm the assumption that life cycle of legislation is short.

The information on the relative rate of change between sectors is relevant for the overall development, though it still is a rough indicator. The observations concerning the quantity of new legislation does not tell how the legislative principles and rules in force at a given moment are substantially changing. Tala stresses the importance of seeing the development of regulation from the perspective of those regulated, and asking what changes mean for them. It is easy to agree with this view as well as with Tala’s further note that studying the general development of regulation from this perspective is challenging. It is, however, generally possible to note that radical changes seldom occur and clearly the vast majority of changes have only limited implications for the overall substantial development. Beyond the environmental field, it has been estimated that about 2/3 of all new legislation amends legislation in force and only roughly 5% regulates new, previously unregulated phenomena. Such estimates cannot, however, be precise, because it is open to discussion when a phenomenon should be considered unregulated. Often phenomena which at first glance are considered unregulated have links to regulation, when studied more carefully. Although most of the amendments may be minor and promote incremental development, this does not rule out the possibility that the amendments as a whole ultimately cause radical changes with major substantial implications. Hence, there is a need to improve our understanding of the relevancy of legislative change.

The relevance of legislative change will be approached from two opposite directions. Later the relevance of certain key changes of pollution control regulation will be discussed (in Chapter 3.5). Here the focus is on the assessment of the number of changes which are manifestly irrelevant for the substantial goals of environmental policy. Any change in legislation, which expands, differentiates or increases/decreases the ambition level of environmental regulation is considered relevant and other changes manifestly irrelevant. If the share of such legislation is high, then it shows than the relevance of legislative change has been smaller.

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than the figures presented suggests. Instead of aiming to give empirical evidence of the share of manifestly irrelevant legislation, the goal is to identify sources of such legislation and in this way help to understand whether the legislative change shown in Figure 1 reflects a real change in environmental policy. It should be noted that though legislation is manifestly irrelevant for the substantial goals of environmental policy, it does not necessarily mean that the changes are needless. There may be many other good reason to adopt legislation.

The first category of potentially manifestly irrelevant legislation is laws repealing obsolete legislation without bringing new requirements instead. The abolition of obsolete legislation is not intended to cause substantial change in terms of the environmental performance of regulated entities, though it may have other (intended) effects such as a reduction of regulatory load of the regulated industry. Deregulation, which is intended to abolish substantial environmental requirements and let the (previously) regulated industry decide whether to change their environmental performance or not, should conceptually be kept apart from the abolition of obsolete legislation. In the case of deregulation the legislator has accepted the possibility that the change can result in negative environmental outcomes, whereas with regard to the abolition of obsolete legislation this is not the case. In other words, deregulation is relevant for environmental policy, and the repeals of obsolete legislation are not. A quick analyses of the changes suggests that the share of legislation which repeal old obsolete legislation seems to be small. It is hard to identify such legislation where the legislator has only abolished obsolete environmental legislation during the 15-year period studied. The rule has been that when old legislation has been repealed, new substantial legislation has been enacted. In few cases, however, has a legislative technique been used where old legislation has been repealed by a separate act and new legislation introduced by different acts. The use of this technique affects the figures presented above, though only to a small extent.

A second category of potentially manifestly irrelevant legislation relates to the organisation of public administration. This kind of legislation is not intended to change the environmental performance of those regulated. The organisation of public administration should, however, be kept apart from legislation concerning decision-making procedures. A legislator may expand, differentiate or increase the ambition level either through substantial or procedural provisions. Environmental impact assessment procedure is an example of doing this through procedural norms. Environmental impact assessment is not (only) re-organisation of public administration and aims at substantial improvements through production of better information. Admittedly the borderline between the organisation of public administration and substantial/procedural environmental regulation is blurred. The (re-)organisation of public administration, like the creation of new administrative bodies or merging existing ones, may indirectly
affect the environmental performance of those regulated. This is because a change of the management of public administration may indirectly affect its outputs, such as the content of environmental permits. Though implications of re-organisation of public administration cannot be included in statistical analysis, it is interesting to find that the portion of environmental legislation concerning the organising of public administration is rather small. According to the analysis, less than 5% of all environmental legislation adopted during the period explored can clearly be located to this category. The major part of legislation relates absolutely to the substantial or procedural rights and/or duties of citizens.

Thirdly, a change of national legislation made in order to fulfil an obligation based on international or constitutional law, may be of purely formal nature. This kind of formal adoption of legislation does not necessarily expand or differentiate legislation or make it tighter, and again, it may not change the environmental performance of polluters. European environmental law—as well as international law generally—may require that the regulatory technique used in national legislation must be changed regardless of substantial needs. Furthermore, a similar kind of change of a formal nature may be due to the national constitution or a change in regulatory style. In Finland, due to a change of constitutional law as well as the development of perceptions on good legislative technique, parliamentary legislation is nowadays used more and sub-legislation less than previously. The starting point is that the (main) legal effects on citizens should be decided in the form of parliamentary law and sub-legislation should have a complementary and technical role. Hence, it is possible that the legislator considers it necessary to make a change in legislation in order to fulfil all constitutional requirements, though she may not intend to cause any substantial change for environmental policy.

It is undeniable that EU law and international law have caused purely formal or technical changes in national legislation, which can be considered manifestly irrelevant in terms of environmental policy. However, there is no adequate information available to what extent this has occurred, though examples can be found. An example of formal transposition of European law without expectations of changes in administrative or legal practice is the incorporation of general water pollution standards into the Finnish regulatory system. Previously there were no general standards, only individual ones, designed for each individual regulated entity separately. Because the standards (emission limits) of individual installations set in permitting process were

334. The new Constitution was adopted in 1999 and entered into force on 1 March 2000. In Section 80 is stated as follows: “… The principles governing the rights and obligations of private individuals and the other matters that under this Constitution are of legislative nature shall be governed by Acts.” See more in Tala 2005, 216.
already higher than the general standards adopted through legislative acts, the new legislation has not caused a change in environmental performance.\textsuperscript{335} It can, however, be assumed that this phenomenon was stronger during the preparatory phase of EU membership than thereafter. After this period the main differences between European and national regulatory techniques have been resolved and disappeared and, as a result, the need to adopt this kind of formal legislation has decreased. Another matter is that EU policy frequently forces member states first to accept and then to implement EU laws which they have originally opposed. The Water Framework Directive is a case in point. Finland opposed the adoption of the proposed directive, because it was seen to require significant changes in national administration without environmental benefits. There is no indication that anything like the system of the directive would have been adopted in Finland without a legal obligation to do so. However, after the adoption of the Directive, a very work-intensive implementation process with a great variety of activities and measures was initiated. It is difficult to judge now whether this process has resulted in changes in environmental performance or other positive environmental outcomes not previously envisaged. It can only be noted that the mechanisms created produce, or at least are aimed to produce, new knowledge for future policies. Because this new knowledge may prove relevant, the legislation adopted due to the Directive cannot be considered manifestly irrelevant. The formal implementation of originally undesirable changes in legislation and administrative practices may work as an avenue of change and have environmental outcomes not previously taken into account. With regard to constitutional law, one can note that there is apparently no reform of environmental legislation initiated purely to fulfil the new constitutional requirements, though constitutional law has affected how reforms initiated for other reasons have been formulated. However, an amendment to the Land Extraction Act (Act 468/2005) is an example of a environmental law reform which was remarkably influenced by the Constitution requirement. Even in this case the reform was not limited to changes related to the Constitution, but substantial changes were also made (e.g. Sections 10 and 16).

There are still some other potential sources of manifestly irrelevant legislative changes in terms of environmental policy. Changes which result from the need to maintain the coherency of the legal system are not necessarily intended to change the behaviour of polluters. In a complex legal system one change of legislation can result in other changes due to linkages between different strands of the system.\textsuperscript{336} Furthermore, technical details, like the entry into force of the main legislation, the revision of the amount of subsidies

\textsuperscript{335} Vihervuori points this out with regard to water pollution directives, Vihervuori 1998a, 78.
\textsuperscript{336} On the factors in general affecting the increase of legal regulation, see Tala 2005, 220–222 and the literature referring thereto.
and bureaucratic information requirements can be decided in the form of legislation or sub-legislation and these changes increase the number legislative amendments, though they do not cause any relevant change in the behaviour of those regulated. Again, lack of systematic information prevents quantitative assessments.

In sum, though there is no solid quantitative basis for the precise assessment of the amount of legislation manifestly irrelevant for environmental policy, the magnitude of such legislation should not be overstressed. There is no evidence showing the opposite. Only a small portion of the new legislation concerns the organisation of public administration or is purely of a technical nature. It is true that there are examples where European legislation has not caused any such change in national legislation, which can be expected to change the environmental performance of those regulated. However, it is much easier to find examples of European legislation which cause a significant change than *vice versa*. In addition, practically no deregulation in the sense that the legislator has intended to free (previously) regulated entities from environmental regulation has so far occurred in the field of environmental regulation. Neither the liberalisation trend in other countries has reduced the ambition level of environmental and other social regulation. Thus, one can make a hypothesis that most changes in environmental legislation have meant either expansion, differentiation or increase of the ambition level of regulation. However, this is not to say that the change has been radical. Apparently most legislative changes are of minor importance, though they in some sense expand, differentiate or higher the ambition level. However, from the notion that most changes are small, it does not follow that the cumulative change is small.

### 3.3. Europeanization of regulation

Jordan and Liefferink have found five different definitions for Europeanization. One of them is the top down impact of the EU on its member states, which refers to the influence deriving from European decisions and impacting on member states. Next this definition of Europeanization will be employed, though it is acknowledged that this definition only partly captures the dynamic relationship between the EU and its member states. It neglects the influences of member states on the EU and influences between member states.

Europeanization—and internationalization more generally—is often considered as one of the main trends in the development of regulation in

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337. However, few and rather insignificant examples have been found, Ranta 2001, 28.
general, not only that of environmental regulation. However, Matti Wiberg has claimed with regard to the whole Finnish legislation, that there is no statistical basis for these claims. According to his analysis only a small portion of the legislation is of European origin and the vast majority of national origin. As a general conclusion Wiberg claims that EU influence on national legislation is less than is generally assumed in public discussion, and that the national legislator is still a powerful actor. It is worth noting that Wiberg excludes certain possible interpretations which would significantly change the picture, for example, that small and minor changes are of domestic origin, important and principal changes are of EU origin. With regard to environmental regulation, the degree of Europeanization is almost universally considered to be high. It is claimed that about four fifths of national environmental regulation in EU member states is of European origin, though this is only a rough estimate.

The number of laws transposing European legislation can be used as an indicator of Europeanization. This analysis completes the research of Europeanization of Finnish environmental regulation based on more general observations of others. In each legislative act implementing EU law there is a mandatory reference to European law. Thus, on this basis it is possible to identify those legislative acts which are of European origin in this formal sense. However, this method has certain restrictions. All statutes with a reference to European law are considered to be of European origin without taking into account the amount of European influence. Many laws implementing EU laws also include to a varying degree provisions of purely national origin and European law often leaves a degree of discretion to member states to decide how the implementing measures are designed in detail. The Environmental Protection Act, which transposes the IPPC Directive and is affected by a number of other pieces of EU environmental law, is, according to this logic, of European origin, though the Act also includes plenty of provisions of national origin. For example, municipal environmental protection regulation, which is a new instrument introduced by the Act, is of national origin. In addition, this method ignores influences based on anticipation of coming EU law. A member state may for various political reasons anticipate higher European standards, though the negotiation process in the EU has not been finalised. If national legislation is amended already before

342. Europeanization has many different forms and effects, which may also be indirect or hidden.
344. Wiberg used same source of information for his analysis.
346. Article 19.
formal approval of the directive, there is naturally no need to transpose it any more afterwards. Hence, from the documentation point of view there will be no references to the anticipated directive in any piece of legislation published in the ‘Statutes of Finland’. In addition, a change of a provision of law due to EU law may result in a need to change another law in order to maintain the coherence of the legal system, though the other change may not formally be an implementation measure of EU law. Thus, EU law may have indirect impacts which are not recognized through this method. Despite these deficiencies, the data makes it possible to approach Europeanization is a systematic way and it covers all cases where national law is intended to fulfil the formal requirements of EU law. The results of the analysis are presented in Figures 3 and 4.

Finland joined the EU on 1 January 1995, however, the first pieces of legislation linked to the EU were already adopted in 1993 as a part of preparation for The Agreement on the European Economic Area, which entered into force on 1 January 1994, one year before Finland’s full EU membership.

Figure 3 shows that the number of legislative acts of EU origin is only a part of all environmental regulation. Between 1993 and 2003 about 30% of all environmental regulation was of EU origin. Not surprisingly, the amount was at its height in 1994, when Finland worked hard to fulfil all requirements of EU membership. One can assume that a misfit between the national and the European regulation was at its highest level prior to membership, and then the development was smoother. After the peak in the mid 1990s, the number of statutes transposing EU law has varied annually without any clear trend. The annul variation in the total amount of national legislation cannot be explained by the variation in laws of EU origin.

The level of Europeanization varies from sector to sector (figure 4). The most Europeanised areas are waste, chemicals and pollution control. About 49% of waste legislation, 44% of chemicals regulation, and 40% of pollution control legislation are of European origin.

To complement the analysis, the link between EU law and national law was also studied on the basis of the legislative proposals in preparation. In October 2005 there were 13 legislative proposals related to environmental protection in preparation at the Ministry of the Environment. Eight out of 13 of these legislative projects were implementation measures of European law. Furthermore, one of the five which were not formally linked to EU law, was a direct result of EU enlargement: a bilateral treaty between Poland and Finland had lost its relevance due to the Polish accession. The remaining four proposals’
Figure 3. EU connected legislation.

Figure 4. EU connected and domestic legislation sector by sector.
aims were not directly and formally linked to EU law, although they regulate in detail matters for which EU law provides a broader legal framework. Hence, EU law does not directly require any national action in these regards, but sets certain limits, which must be taken into account. This observation suggests that EU influence is more significant than the figures presented above show.

The figures presented above can be compared with those of Wiberg. According to him, 12% of all legislation adopted between 1995 and 2003 is of European origin. Above it was noted that 30% of all environmental statutes were of European origin and hence it shows than environmental regulation is more Europeanized than legislation in general. One should note that this applies to environmental regulation generally, covering regulation prepared by the Ministry of the Environment as well as by other ministries. The Ministry of the Environment also has responsibilities with respect to other legislation than that included under the concept of environmental regulation in my statistics. In fact, according to Wiberg, the Ministry of the Environment does not prepare significantly more legislation of European origin than the ministries in average. His figure for the Ministry is 13.4%. 350

The figures above are based on formal transposition of EU law and hence they do not include information of the nature of influence. To provide another, more substantial, insight into the relationship between international and national legislation, the substantial influence of EU law on water and air pollution regulation are studied. With regard to air pollution regulation the issue was explored in a project concerning the influences of international air pollution policies generally, not only those of the European Union. 351 In this project particularly the Geneva Convention on Long-Range Transboundary Air Pollution, adopted in 1979 and entering into force in 1983, and the protocols adopted under the framework convention, were in focus. Hence the scope of this evaluation goes beyond Finnish EU membership and substantially it was restricted to NOx and SO2 emissions from large combustion plants.

In the evaluation it was found that all nine decrees studied setting environmental protection standards and adopted under national air pollution control law, have a direct link to international policy, though the link was stronger in some cases than in others. It was noted that prior to EU membership the national policy was clearly more ambitious than the international policy. After the mid 1990s the gap between either EU or other international law and national law has become smaller. Though EU membership did not immediately cause significant changes in Finnish air control law, a general gradual convergence development has taken place. Since EU membership no major national initiative has occurred in this field but all major changes in regulation have related to the

351. Mickwitz and Kivimaa (eds) manuscript.
development at European level. The convergence of international and national legislation has not removed all differences between international and national law. Finnish air pollution law still has stricter rules than what is required by international or European law, though to a lesser degree than it used to have. International law and policy did not only affect substantial requirements; the general nature of regulatory instruments was also profoundly influenced. Even the adoption of the Air Pollution Control Act in 1982 was influenced by the Geneva Convention, though it would not be possible to associate the adoption of this law purely with international policy. There were also national reasons behind the adoption. A reform of the Air Pollution Control Act in 1991 was not directly linked to the implementation of any international obligation, but the revision of the Act in 1995 was markedly affected by EU law. In this revision, the control mechanism was changed from notification to permit and this change can be attributed to EU law (the Framework Directive 84/360). The next major reform, namely the adoption of the integrated permit mechanism in 2000, was also much influenced by EU law, in particular by the IPPC Directive (96/61). Many important features of air pollution control mechanism, like the adoption of best available technology principle are due to EU law.\textsuperscript{352}

The case of water pollution is different, in particular with regard to the impact of EU law. The traditional approach of Finnish water pollution control differs from that of the European Union, because the Finnish water pollution control law has not employed general standards. Instead, in European law there are a number of standards, like quality objectives or emission limit values. When Finland joined the EU the EU standards were to be adopted into national law. However, because the European approach to water pollution was considered to be alien to the Finnish system, the impact of EU legislation on the national legislation was limited to a minimum. The rather loose European standards were transposed into the national legal system as such with no aim to affect the existing administrative or legal practices. As a result, the practical relevance of the European standards has been rather small. As Vihervuori puts it: “In practice, the effect of these additional provisions has been minimal, as the interpretation of the general ban leads most often to the same result.”\textsuperscript{353} Only rather few directives like the Nitrates Directive (91/676) and the Urban Waste Water Directive (91/271) have reportedly affected permitting practice.\textsuperscript{354} There has emerged no evidence to prove these initial assessments to be wrong in a fundamental way.

In the case of air pollution regulation it is certainly correct to speak about Europeanization. Not only air pollution standards, but also the procedures, like

\textsuperscript{352} Similä and Kivimaa \textit{manuscript}.  
\textsuperscript{353} Vihervuori 1998a 105.  
\textsuperscript{354} Vihervuori 1998a, 237.
the permitting mechanism, have been ‘Europeanized’, i.e. the EU influence has been strong. The national air pollution policy has always been influenced by international policies, but since Finland joined the EU in 1995 the development has been linked in particular to the EU. No major political initiative of purely national origin has emerged since then. As a result, the ambition levels of European and national air pollution law and policy are converging. Partly the convergence process is due to the rather detailed nature of EU law, which leaves less room for national discretion and regulates the instruments used for pollution control more directly. Partly it can be understood as a reflection of the success of previous policy. There is less need for new action than before. This applies particularly to traditional pollutants like sulphur and—though to a lesser degree—nitrogen. This trend is likely to continue in the future in the sense that the need for further development will be seen from the international (=European) perspective. The recently adopted programme for air pollution policy is a case in point. The fundamentals of air pollution policy were assessed and the programme adopted as required by the National Emission Ceiling Directive (2001/81), though the underlying idea of the programme is that practically nothing new needs to be done, because international law and policy do not require it.

No doubt Europeanization has also affected water pollution regulation, though not to the same degree as air pollution regulation. The general standards of water pollution control adopted due to EU law do not have a major practical relevance for the formulation of permit conditions and the regulatory approach still has many features inherited from the era before Finland’s EU membership. The role of individual discretion is greater in water pollution regulation than that of air pollution and the discretion is to a large extent based on principles and rules of national origin. However, the Water Framework Directive may change this situation, because it affects the overall regulatory approach. Interestingly, the different national traditions of air and water pollution regulation have made their way into integrated permitting, as will be discussed at length later. Hence, although a piece of national legislation may formally be an implementation measure of EU law, the national regulatory tradition may significantly affect its final content.

355. Air Pollution Control Programme 2010.
3.4. Change of regulatory instruments

One core argument in the discussion on the development of regulation is the increasing use of so-called new policy instruments (NEPIs). The concept of ‘new policy instruments’ covers roughly all other instruments than traditional regulation, including economic and procedural instruments as well as non-legal voluntary approaches. It has been repeatedly suggested that the use of new instruments is growing in comparison to that of old. What does the development in the amount of legislation tell about this? Clearly, the amount of legislation is a deficient, albeit still interesting, way of measuring the development. One may assume that some forms of regulation rely more heavily on frequent changes of legislation than other forms. Procedural instruments may last longer than others without a need to make changes, because they do not necessarily contain technical information which easily becomes outdated. Making a general distinction in this respect between traditional regulation and economic instruments is more difficult. Both need frequent changes, the former, for example, when technical standards become outdated due to technological development and the latter, for example, when the amount of subsidies must be re-defined due to inflation. Hence, the need for frequent changes most likely depends more on the exact details of the instrument than the broad category in which it is located.

The argument that new instruments have become increasingly important is based on the assumption that previously traditional regulation has had a dominant position in environmental regulation. Figure 5 suggests that traditional regulation has kept its dominant position in comparison to other legal regulation throughout the period studied—at least if measured though the number of annually adopted items. However, it is interesting to observe that legislation related to economic instruments became more common towards the end of studied period and some procedural legislation was also adopted. Most economic instruments (almost 90%) concern fuels, electricity, agriculture, and forestry and are prepared by the Ministry of Finance and the Ministry of Agriculture and Forestry. In other words, the use of economic instruments is strongly focused on certain issues. The remaining 10% relates mainly to subsidies for environmental investments, waste oil fees and the oil pollution compensation fund, which fall under the competence of the Ministry of the Environment. With regard to traditional regulation, the Ministry of the Environment is typically responsible for their preparation.

About 30% of all pollution control legislation and natural resources legislation can be considered economic. However, there are only three fields of environmental policy (pollution control, natural resources and energy)

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where economic instruments have a significant role. In all other fields, the number of economic instruments was negligible. Legislation concerning energy issues was mainly economic apart from nuclear energy, which was regulated through traditional regulation. The number of pieces of legislation classified as procedural instruments was seven. All of them established or modified public voluntary programmes (EMAS and eco-labels). These laws set procedural requirements, but firms are free to decide whether they want to participate in these programmes.

Environmental taxes can be divided into fiscal and regulatory taxes, though the distinction between the two categories is often blurred.\textsuperscript{357} Though the environmental effectiveness of taxes do not necessarily depend on the amount of revenue they generate, it is interesting to combine the information of legislative development with that of tax revenues. The development of revenues gives background information for the overall development.\textsuperscript{358} A major part of revenue from environmental taxes comes from rather few sources. Traffic fuels, other energy products and vehicle based taxes constitute roughly 98% of all revenue in Finland.\textsuperscript{359} This phenomenon seems to be international, though the number of tax instruments is reported have increased at least in EU countries.\textsuperscript{360} According to Eurostat, energy taxes made up around three quarters of environmental tax receipts, transport taxes around fifth and pollution and

\textsuperscript{357} Määttä, K. 1997, 218–225.
\textsuperscript{358} With regard to effectiveness marginal tax rate is more important that the overall revenues, see Määttä, K. 2003, 178–181.
\textsuperscript{359} Ministry of Finance 2004, 18. With regard to all OECD countries the figures are: 75.1% comes from energy products, 23.6% from the use of motor vehicles, waste management makes 0.7%. Ministry of Finance 2004, 45–46.
resource taxes together made up just 3% of total environmental tax revenue in the EU. In the EU countries, environmental tax revenues have increased when measures as a share of total revenues and as a percentage of the gross domestic product (GDP) between 1980 and 2004. However, since 2000 environmental tax revenues have slightly decreased both in relation to GDP and as a share of total taxation. The overall GDP share of environmental taxes has also in Finland been rather decreasing than increasing between 2000 and 2004. Similarly, the data from OECD countries indicates that the revenue from environmental taxes decreased between 1994 and 2001 both in comparison to total tax revenue and to GDP. In 2004, environmental taxation in the EU accounted for 6.6% of all taxes and social contributions and 2.6% of GDP. Another way of measuring ecological tax reform is by comparing the tax rate on labour to that on energy. On this basis the European Environmental Agency has reported a shift of the tax burden from labour to energy in the EU–15 countries. It is important to note that occasional reasons may explain some changes and to some extent facts point in different directions. Nevertheless it can be concluded that these figures do not suggest that a radical shift to increasing use of tax instruments is under way.

3.5. Relevance of alternatives to traditional regulation

The legislative change explored above concerns environmental legislation generally. Now, in order to enhance the analysis, the focus is narrowed to pollution control regulation, more precisely to regulation intended directly to regulate pollution from industrial sites. This limitation excludes such regulation that indirectly affects pollution from industrial sites. No doubt, for example, a successful product policy may also affect emissions or other environmental harms originating from an industrial site, though the chain of influence how this happened is complicated and indirect. The limitation is justified on the basis that the analysis aims to cover instruments which could be considered as alternatives to environmental permit system, which is a traditional form of control of industrial sites. Environmental permit system itself will be explored in the next chapter and is hence excluded from the present analysis.

361. Denmark had by far the highest ratio of environmental taxes to GDP, at 4.8% followed by Cyprus, the Netherlands, Slovenia Luxemburg, Finland, Malta and Portugal (all more than 3%). At the other end of the scale some countries were below 2%. Eurostat 2006, 71–72.
While it is undeniable that the diversity of instruments controlling pollution from industrial sites has become greater than before, not all of them are necessarily equally relevant. The information on the amount of legislation adopted gives an incomplete picture on the overall development. In principle, one piece of legislation introducing a new instrument may cause more significant change in the environmental performance of polluters than tens or even hundreds of others. In addition, not all regulation is legal and the legislative change does not tell anything about the use non-legal instruments, like environmental agreements. In order to fully understand the development from the effectiveness perspective, it would be ideal to make a full range effectiveness analysis of all instruments in use. This, however, is beyond the scope of present study. Instead I explore to what extent new instruments are relevant for pollution control. The aim is therefore to link instruments with the environmental problems caused by industrial activities in order to increase the understanding of how significant the regulatory shift has been. In the evaluation literature this kind of examination is called relevance analysis and the relevance criterion is defined as a question, whether the goals of the instrument cover the key problems of environmental policy.\(^{366}\) Here I will be more precise and link the instruments and problems by posing the following question: “Has the instrument been used to handle pollution problems caused by industrial activities?” Thus, I do not only ask whether it would be possible to use an instrument to address some environmental problems, but also if it has really been used.

In addition to the relevance analysis, results from research on effectiveness of new instruments are presented, when such results are available. The focus is on research concerning Finnish instruments, though references to the international literature are made to complement the picture. It is a fact that the research done so far is inadequate, thus exhaustive exploration of this issue is not an option. However, the evidence already available may show general lines, though the picture may remain somewhat incomplete.

The analysis will cover the following instruments: environmental agreements, environmental management systems, energy taxes and liability. These instruments were selected, because they are among the most important alternatives or supplements to permitting with regard to the pollution control of industrial activities. Naturally, there are also other instruments intended to regulate pollution from industrial sites, like subsidies and technology policy. Furthermore, the tradable permit is a new instrument, which may prove very influential in the long run and the public debate around tradable permits indicates that this instrument has had effects. It is, however, excluded here because it is so new and its impacts are likely to occur in the future.

3.5.1. Negotiated agreements and environmental management schemes

There are many types of voluntary approaches available for environmental policy. In an OECD report four main types of voluntary approaches was identified: unilateral commitments made by pollutants, private agreements between polluters and pollutees, environmental agreements negotiated between industry and public authorities, and voluntary programmes developed by public authorities. The two last approaches are linked to the activities of public authorities, whereas the two first belong totally to the private sphere. A threat of legal regulation may be behind non-mandatory action, though there are also other (=economic) reasons for voluntary action. Later I will take a look at the two last mentioned types of voluntary approaches. It must be stressed that there is little research-based information available on the use and development of private agreements in Finland and it is not know to what extent such agreements exist. According to Börkey, Glachant and Lévêque lack of proper analyses is also typical in other countries. Neither is there much analytical information available with regard to unilateral commitments in Finland, though some research has been done with regard to the Responsible Care Programme, which is the largest unilateral commitment in the chemical industry.

Many voluntary approaches do not necessarily need any specific legal framework. This clearly applies to unilateral commitments and private agreements, but also to negotiated agreements. Despite this the legal base for negotiated agreements in the field of environmental policy has in some countries been specifically created. Public voluntary programmes, where participating companies agree to follow standards of performance, technology or management set by public bodies may be created by legislation. Major examples for environmental policy are the EMAS regulation concerning environmental management and auditing system and the ECO-label scheme.

Next I will briefly assess the relevance of negotiated agreements and environmental management systems with regard to pollution control of

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367. OECD 2003c, 18–19.
370. Hildén et al. 2002, 75–81, see also Börkey, Glachant and Lévêque 1999, 41.
371. This is, for example, the case in Denmark (Section 10 of the Environmental Protection Act). Particularly, in the Netherlands, negotiated agreements are incorporated in the general system pollution control and, hence, the agreements are given much greater legal status than in many other countries.
373. EC regulation 761/2001
industrial activities in Finland. European and national eco-labels schemes, which are instruments of product policy, are excluded from the scope of analysis following the definition of focus given above.

Environmental agreements. An EU-wide study concluded that environmental agreements have had a fairly small role in Finnish environmental policy. Only two environmental agreements were found in Finland, whereas in certain other EU member states, particularly in the Netherlands and Germany, the numbers were greater. The total number for all 15 member states included in the study was more than 300. While the real number of environmental agreements in Finland is greater than two, the report still correctly indicates the general line: Finland rather belongs to the group of countries seldom employing voluntary agreements as instruments of environmental policy than the opposite group.

Sairinen has identified 17 environmental agreements in Finland which relate to four different issues: Chlorofluorocarbons (CFC) reduction, packaging waste, energy conservation and remediation of contaminated soil. All these environmental agreements relate to environmental harms caused by industrial activities. Hence, they are relevant for this study as a point of departure. Recently, voluntary approaches have drawn increasing attention in Finland in another field of environmental policy, namely in nature conservation. In the framework of the Forest Biodiversity Programme for Southern Finland 2003–2007 (METSO) new instruments are being developed and experiences sought. However, for the purposes of this study these attempts are not of interest.

The agreements concerning CFC reduction and packing waste were temporary. Of the two CFC reduction agreements, one was made with the aerosol industry in 1987 and the other with the plastics industry in 1988. In addition, an agreement on packaging waste was made in 1995. All three agreements lasted two years or less and thereafter were replaced by traditional regulation. They were initiated by respective industries to avoid or postpone the anticipated regulation. The level of ambition was equal to that of the Montreal Protocol and Waste Directive (of 20 December 1994). In other words, the agreements concerned implementation, not target setting. They helped the industries to adapt to the new situation, and their environmental benefits have been assessed to be minor.

There are two layers of energy conservation agreements, one at the level of industrial sectors and another at installation level. In framework agreements

376 Jordan, Wurzel and Zito.
377 Sairinen 2000, 214–244.
379 Sairinen, 2000, 219–228
industrial sectors and the Government of Finland agree upon general conditions for energy conservation, while concrete measures (such as environmental auditing) are agreed at installation level. Subsidies for environmental auditing are also provided. Generally speaking, the first set of framework agreements (agreed since 1992) has been assessed not to have achieved major environmental benefits in comparison to the business-as-usual scenario. The second set of framework agreements (agreed since 1997 and still in use) seem to be more promising. By the end of 2003, 8 framework agreements have been concluded concerning the following sectors: industry, energy production, municipalities, real estates and construction, housing, bus services, truck and van business, and oil heating. In contrast to the early 1990s these led to active participation at installation level; by the end of 2003, more than 150 companies accounting 81% of all industrial energy consumption had made an agreement. Taking all sectors into account the agreements covered activities responsible for 55% of all energy consumption. The Information Centre for Energy Efficiency (MOTIVA), a body established by the Ministry of Trade and Industry, has reported positively, on the basis of evaluations, on the impacts of energy agreements.

Though energy conservation agreements are basically voluntary, there exists a link between the energy conservation agreement and traditional regulation. New environmental permits often—but not always—include a provision to carry out energy auditing. It is still unclear to what extent the permitting practice reflects development which would have happened in any case and to what extent the permit conditions on energy auditing result in additional measures and environmental benefits.

An agreement, based on a Danish model, for treatment of contaminated soil in service stations was made in 1996 between the Finnish Petroleum Federation, the Ministry of the Environment, the Association of Finnish Local Authorities and three oil companies (SOILI programme). Later two other companies joined the agreement. The agreement aims to promote treatment of contaminated soil of defunct service stations. The inclusion of functioning stations was rejected on competitive grounds. The implementation of the agreement is funded directly by the industry or on the basis of public funds, which, in turn, gather funds from the same industry through obligatory fees. Under the agreement several hundred sites have been treated in order to meet the criteria established in law. The motivation of industry comes from the fact that the soil of most sites is contaminated and the service station owners would potentially be liable for the treatment in any case. However, it would not have been easy to identify the person liable without dispute and through agreement.

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381. www.motive.fi.
costly lawsuits have been avoided. From the environmental protection point of view, the agreement has been considered a success, because the number of sites treated—and to be treated—is assessed to be higher than it would otherwise have been. In addition, the agreement is claimed to have resulted in efficiency gains for society as a whole.\footnote{Sairinen 2000, 236–239, Tuomainen 2001, 309–320.}

The overall conclusion is that the relevance of environmental agreements for Finnish environmental policy has been rather limited. Firstly, the number of environmental agreements has been low and they have concerned only a few environmental problems. Secondly, some environmental agreements have worked in the shadows of traditional regulation without any recognisable environmental benefits. CFC agreements and packaging agreements were initiated due to anticipation of coming regulation and they soon lost their relevance, when regulatory instruments were introduced. The environmental targets of the SOILLI programme are firmly based on the liability rules and the standards of public law. Thus, the point of having an agreement is not to set new environmental standards, but to find a more effective and efficient way of implementing them.\footnote{On the difference between target-based and implementation based voluntary approaches, see Börkey, Glachant and Lévêque 1999, 12.} The agreement has apparently improved the efficiency of implementation in comparison to costly and time-consuming litigation. Energy efficiency seems to be the only environmental issue where negotiated agreements aim to contribute to the ambition level of environmental policy. Though research-based evidence on the effectiveness of these agreements is lacking, it is not only possible but likely that they have had positive environmental impacts.

Environmental management systems. The firms use different kinds of environmental management systems on a voluntary basis and only one of them, namely EMAS, is directly related to specific legislation. EMAS is a typical public voluntary programme, where public standards are set, but participation is decided by the firms. ISO14001, the main alternative to EMAS, is a product of standardisation organisation and, hence, the standards of the management system do not have to be decided in a democratic process. The previous ISO 14001 scheme and environmental managements systems based on EMAS regulation differ in numerous points, but nowadays requirements under EMAS are equal to ISO14001 with the additional features of public reporting and auditing.\footnote{EMAS = an environmental management and auditing system. The new EMAS regulation (761/2001) is implemented by law 914/2002.} The environmental management systems do not require the achievement of stricter environmental standards than those already stipulated in public law, though the adoption of such a system may improve environmental performance. However,
the main benefits relate rather to improving the effectiveness and efficiency of implementation than to new substantial targets. Hence, the very nature of these systems is complementary to other instruments.

With regard to impacts of the environmental management system a major problem it that is has spread to only a rather small number of plants in Finland. This applies in particular to EMAS, but to some extent also to ISO 14001. Not surprisingly, the environmental management system is used much more in different installations of large companies as the records of EMAS authority shows. At the beginning of 2005, there were 40 EMAS registrations from 17 different companies. This number includes 13 registrations made by different installations of large pulp and paper companies. Due to the fact that one registration may include several installations, the number of installations covered by the registrations was higher being 48. The ISO 14001 environmental management system is much more common in Finland. According to the Finnish Standards Association the number of registered environmental certification was 919 at the end of 2005 and some organisations have adopted the standard without registration. Still this is far from the number of installations in need of environmental permits, which is estimated to be about 26,000.

In a study on the pulp and paper industry, the effectiveness of environmental management systems was evaluated. The very nature of the instruments makes it difficult to distinguish the impacts of environmental management system from other incentives, because environmental management system is an integral part of overall management. However, in line with observations from other studies it was found that management systems are likely to identify possibilities for environmental improvements. The study concludes that an environmental management system may result in positive impacts. Furthermore, it was found that the perception of continuous improvement varies greatly from installation to installation. In some installation environmental management system was not much more than a haphazard collection of measures, whereas in others it was used in a clearly more systematic way to get a comprehensive picture of present environmental effects. In other recent research related to Finnish industries it was found that although the attitudes to environmental management systems are positive, their real influence on company behaviour is still subject to further investigation.

In the international literature, too, the existence of a causal link between environmental management systems and environmental benefits has turned

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388. The information received from the Finnish Standards Association SFS in May 2006.
out to be difficult to prove. According to an interim report related to a review of EMAS, the scheme “is perceived to bring improvements to on-site environmental performance” and “seems to have positive effects” on environmental innovation in companies. But differences between certified and non-certified firms in resource use and emission levels are “not statistically significant”.392 In a OECD report general doubts about effectiveness of voluntary approaches covering e.g. negotiated agreements and voluntary public programmes were raised. It was reported that “there are only few cases where such (=voluntary—JS) approaches have been found to contribute to environmental improvements significantly different from what would have happened anyway.” Furthermore, the economic efficiency was found to be “generally low”. It is therefore not surprising that the OECD experts recommend that a first best alternative would be to replace command-and-control regulation by “economy wide economic instruments” and that a second best option would be to improve the flexibility of existing command-and-control regulation instead of a “piecemeal approach” that lets only few companies attain environmental improvements in a more flexible way.393

3.5.2. Taxation

The use of taxes and fees as environmental instruments is restricted to rather few, albeit important, environmental problems. The main taxes and fees are energy tax, car tax, vehicle tax, motor vehicle tax (including so-called ‘diesel tax’), waste tax, surtax on alcohol beverages, surtax on soft drinks, oil protection tax, waste oil charge, pesticide charge.394 The water protection charge was repealed, while the Environmental Protection Act was introduced in 2000. Hence, no new water protection charges have been determined since 1 March 2000, although previously determined charges will produce revenue for some years to come.

With regard to pollution emitted by point sources the energy tax is particularly relevant.395 A tax based on carbon content of fuels was introduced into Finland in 1990, although other considerations also affected tax levels of different fuels. Thereafter there have been rather many changes. In 1995 the tax structure was changed so that all sources of primary energy came to be taxed on the basis of energy content. Additional tax based on carbon content was imposed on fossil fuels. Wind energy, wood and waste fuel were exempted.

392. Hertin et al. 469.
393. OECD 2003c, 14–15. Ashford, on the basis of similar kind considerations, see voluntary—as well as consensus-based approach generally—rather problematic with regard to innovations. Ashford 2005, 167–169.
395. For a detailed and critical analysis of the design of energy taxation in Finland, see Määttä, K. 1997 and 2000a, in particular 111–150 and Määttä, K. 2003.
from the tax. In the early 1990s it was assumed that some kind of European energy/environmental tax was emerging and Finland aimed to anticipate this coming development. This assumption turned out to be false. Instead, import tax on electricity used in Finland was deemed illegal by the European Court of Justice. This Court judgement and the opening of the Nordic electricity market affected the next energy tax reform, which entered into force from the beginning of 1997. The use of fuels in electricity production is not taxed directly; instead, tax is focused on the consumption of electricity. The reasons for this are related to the problems of using (domestic) tax on open Nordic electricity markets. Severing the link between the carbon dioxide content of fuels and the amount of tax has reduced the effectiveness of electricity tax, though due to the factual difference between the marginal production costs of different forms of electricity production, electricity tax may favour the use of fuel containing less carbon dioxide. With regard to energy production the link between the amount of tax and carbon dioxide content is not full and direct: some fuels, such as natural gas and peat, have a lower tax rate than they should have according to carbon dioxide content of the fuels. Furthermore, fiscal aspects have always had an important role, while the rate has be determined.

The impacts of Finnish energy taxation have been assessed in some studies—with somewhat different results. It has been acknowledged that the objectives set down in the Bill for Parliament introducing the CO\textsubscript{2} tax, have been achieved with certain reservations related to the underlying factors. The objectives included 1 per cent reduction on the growth of CO\textsubscript{2} emissions compared to the development without the tax, and the reduction of nitrogen oxides and hydrocarbon by 2 per cent. In an evaluation project focusing on the impacts of regulation on pulp and paper mills, it was pointed out that taxation may have had an indirect impact through energy saving agreements, though it is difficult to show to what extent this has occurred. In other words, the energy tax may have encouraged the companies to take energy conservation measures to reduce tax. According to Kivimaa and Mickwitz the tax has not been a contributory factor to efficiency improvements by new technologies in pulp and paper mills. This is apparently due to the low level of taxation and refund mechanisms. Kivimaa and Similä found that the impact of the

\begin{itemize}
  \item 396. Governmental Bill, HE 237/1994, On the development of energy taxation, see Määttä, K. 2000a, 111–150.
  \item 397. C–213/96 (2 April 1998).
  \item 401. Economic Council of Finland 2000.
  \item 402. Hilden et al. 2002, 72–73.
  \item 403. Kivimaa and Mickwitz 2004.
  \item 404. Kivimaa and Similä manuscript, see also the Economic Council, 2000, 46–47.
\end{itemize}
Finnish energy taxation on the acidifying emissions from electricity production is likely to have been negligible, whereas for heat production, the energy tax may have been one of the factors facilitating change from coal and fuel oil to natural gas and biofuels. With regard to heat production the tax has affected the price structure. It has made certain fuels relatively cheaper than they would be without tax. The arguments for rather weak effectiveness have varied to a certain extent. Kalle Määttä\textsuperscript{405} stresses the importance of frequent changes and Hildén et al. consider the low level of the tax even more important.\textsuperscript{406} The level of energy tax in Finland is rather low in comparison to other western countries,\textsuperscript{407} and in addition the refunding mechanism lowers it even further. The refunding mechanism has been criticized for leading to a situation where raising energy taxes would mainly have impacts on other operators than the most energy intensive industry.\textsuperscript{408} Seemingly all factors have contributed to the outcome. The predictability of tax policy is of special importance for long term expensive investments, which in many cases, like energy production, are crucial for environmental effects.\textsuperscript{409} The combination of low level of tax and its unpredictability suggests that taxation may be seen as rather weak signal for further environmental investments by company directors. Naturally, this argument says nothing about the potentiality of tax instruments as means to reduce greenhouse gases or other pollutants if designed and used differently.

3.5.3. Liability for environmental damage

The need for specific legislation on environmental damage comes from deficiencies in traditional tort law. Specifically the following problems reduce the influence of tort law as a means to prevent pollution: (1) proving the existence of a causal link between pollution and damage is difficult; (2) the damage is born by a large number of people and the interest of each individual person may be rather low, (3) proving who of many polluters has caused the damage is difficult; (4) only damage to private interests is compensable. Furthermore, the long latency periods and solvency problems should be added to problems.\textsuperscript{410}

As a response to problems associated with traditional tort law the Environmental Damage Compensation Act (737/1994) was passed in 1994 and this is a major piece of legislation concerning damage caused by pollution from industrial activities. Prior to the adoption of this act damage caused by water discharges was determined on the basis of the Water Act. Under the Water Act the compensation of anticipated damage caused by discharges allowed in a permit was assessed

\textsuperscript{405} Määttä, K. 2000a, 130.
\textsuperscript{406} Hildén et al. 2002, 73.
\textsuperscript{407} Economic Council of Finland 2000, 7.
\textsuperscript{408} Hiltunen 2004, 27, Määttä presents similar criticism, Määttä K. 2003, 180.
\textsuperscript{409} Kivimaa and Similä \textit{manuscript}.
\textsuperscript{410} E.g. de Sadeleer 2002, 265.
ex officio and ordered to be compensated as a part of permitting procedure. It was also possible to obtain a retrospective compensation for damages caused by ‘illegal’ pollution, i.e. damage caused by pollution exceeding emission limits. The adoption of the integrated permit procedure in 2000 did not bring in a principal change in the sense that damage caused by permissible water pollution can still be determined in advance as a part of permitting procedure, though not in the case of other types of pollution. However, also with regard to water pollution the substantial basis for compensation is regulated by the Environmental Damage Compensation Act. Because compensation of permissible water pollution is based on ex ante assessment, the problems related to the proving of a causal link have diminished. It is enough that be the damage is a likely result of water pollution. As a result, compensation for water pollution has frequently been ordered in conjunction with the granting of permits. Recently this has started to change, because in many cases the activities under permitting discharge significantly less than before.\(^{411}\) In this chapter the focus is on the recent regulatory change (since 1987 or so). Hence the compensation system of the Water Act is beyond the scope of this chapter.

The Environmental Damage Compensation Act covers damage caused by activities carried out in certain areas and resulting from (1) pollution of water, air, or soil; (2) noise, vibration, radiation, light, heat, or smell; or (3) or other similar nuisance. It includes a number of features which increase the likelihood that compensation will be ordered in comparison to the general civil liability law.\(^{412}\) First, it imposes strict liability for the person liable to pay damages. In addition, proving causality between the activity and losses was made easier; probable causality is enough to constitute liability. Bodily injury and material losses as well as financial losses are compensated assuming that the loss is not minor. Furthermore, in the case of several polluters the Act provides that they shall be jointly and severally liable. One important feature of the Act is that persons comparable to the persons carrying out the activity are liable. This unconventional extension of liability means, for instance, that a parent company can become liable. A lender, if the relationship between the borrower and the lender is typical, is not liable. However, in a specific situation, where the lender has a strong control of the borrower’s activities, the lender may become liable.\(^{413}\)

\(^{411}\) The approach of how compensation is determined had varied in practice from one water court to another, as the permit authority was previously called. In some cases the compensation has been calculated based on the assumption that the pollution was permanent. If so, only an increased amount of pollution has resulted in further compensation in the next permitting cycle. In other cases, compensation covered only the period of validity of the permit. If so, damage must also be assessed and compensated in the next permit cycle.

\(^{412}\) Legal practice based on traditional tort law to some extent developed in the same direction even before the Environmental Damage Compensation Act entered into force (1 June 1995). See e.g. KHO 1989:7 and also KKO 1995:108. Hollo and Vihervuori 1995, 218–227.

It may be questioned whether the primary intention of the Environmental Damage Compensation Act was indeed the reduction of pollution. The formulation of the Governmental Bill for the Compensation for Environmental Damage Act suggests that the main goal is not to affect pollution levels in general, but to give legal protection for the victims of pollution. The fact that the Act regulates compensation for losses sustained by a private interest, not losses for the public interest (ecological damage), also supports this. However, reasonable costs of restoration of the environment can be ordered to be compensated. The Act also covers reasonable costs incurred by authorities for measures to prevent the threat or the effects of a nuisance or to reinstate a polluted environment to its original state. This way damage to the environment (ecological damage) may also be covered.

Although the intended goal of the Act was not the general reduction of pollution, it could have such an effect. There is, however, no proper evaluation available to what extent the Environmental Damage Compensation Act has influenced the polluters and the reduce of pollution. Hence, the impacts of it are still subject to further investigation. Internationally the potentiality of liability as an instrument to reduce environmental harms—and even to spur innovations—has been widely discussed, though mainly on a theoretical basis. Still the preventive effect of liability is disputable and convincing evidence of such an effect is lacking. It has been claimed that the preventive effect of civil liability law has been overestimated. Only a high enough likelihood that the liable party will actually pay for the damage resulting from her behaviour, will make this potentiality a reality. If this assumption is correct, lack of cases can be interpreted as an indirect indication of poor effectiveness. From this perspective it is interesting to find that only few cases have been brought before the Supreme Court and in the literature the number of cases is generally considered to be low. The number of lawsuits related to

414. The Governmental Bill (HE 165/1992) states as follows: ”The compensation of environmental damage should be distinguished from the above-mentioned means of environmental policy and environmental protection (such as permitting and taxes—JS). The principal goal of rules on environmental damage is to provide legal protection, not the achievement of certain environmental policy goals. However, the application of damage compensation rules may also to a varying degree prevent the deterioration of the environment.”
417. There is abundant, albeit mainly theoretical, literature concerning the relevance of tort law for public policy goals, E.g. Shavell 1984a, 1984b.
421. Tuomainen 2001, 398. In 1999 legislation (Act 30.1.1998/81) on mandatory environmental insurance was adopted. The regulation is secondary in nature and it covers cases where the liable party is unknown or insolvent. According to annual reports (2002–2004) of the Centre
environmental damage is claimed also to be rather low in other countries.\textsuperscript{422} However, some, though weak, empirical evidence of the preventive effect of liability schemes has been found,\textsuperscript{423} and liability for environmental damage has been shown to increase the costs of firms.\textsuperscript{424} Apparently the increase in the costs concerns soil protection in particular. Hence, the external costs are to some extent internalised, which is a prerequisite for the preventive effect. This alone, however, does not directly show that the behaviour of the polluters has changed.\textsuperscript{425} In sum, though the lack of sound evidence restricts the drawing of definite conclusions, it is likely that the Environmental Damage Compensation Act has affected air and water pollution level only to a lesser degree.

3.6. Concluding remarks on regulatory change

The amount of environmental legislation is increasing and the rate of legislative change is high. The annually adopted environmental legislation tends to increase, though variation between years is significant. A part of legislative development can be considered as manifestly irrelevant for the goals of environmental policy. Manifestly irrelevant legislation does not seek to change the behaviour of those regulated, though it may be needed for other reasons. There is a number of types of legislation, which potentially, though not necessarily, are irrelevant in the sense referred to above, like the repeal of obsolete legislation, legislation concerning purely the organisation of public administration, change of legislation intended to fulfil formal implementation of international or constitutional law without any substantive goals, measures intended to maintain the coherency of law without substantial goals, and changes concerning technical details such as the date of entry of substantial requirements. Though the exact amount of manifestly irrelevant legislation could not be precisely determined, there are no reasons to overstress its portion of all legislative changes. A major part of changes in environmental legislation contribute to the expansion, differentiation or tightening of legislation. This is not to claim that most changes are highly significant; clearly the opposite is the case. However, the observation that individual changes are typically minor does not permit the conclusion that the overall development will not be significant in the long run.

\textsuperscript{422} For Environmental Insurance Compensation, compensation was paid in one case in 2002, and one case was in pending in 2003 and 2004. www.vakes.fi/yv. The number of insurances was in 2004 about 1,000.  
\textsuperscript{423} With regard to Germany, Roller 2006, 131.  
\textsuperscript{424} Austin and Alberini 2001, 1–5.  
\textsuperscript{425} The European Environmental Agency summarises the results of USA based research, European Environmental Agency 2006, 113.  
\textsuperscript{425} Segerson 2002, xxii.
Though deregulation of environmental regulation has not occurred in substantive terms, the liberalisation of the energy market and privatization of utilities has indirectly affected pollution issues. The public authorities have nowadays fewer direct channels than before to influence energy producers. Hence, the liberalisation of utilities as well as the other forms of increasing the use of markets, stresses the importance of regulation, as is generally noted in the discussion on the “New Regulatory State”. This applies to all forms of regulation. The role of taxation as a regulatory instrument also becomes more important, when energy markets are liberalized.

Finland is considered an especially law-intensive country in comparison to other European countries. This applies in general to public policies in Finland, not only to environmental policy. The assumption of law-intensity suggests that in Finland non-legal regulation is seldom used. While answering this question properly would require a comparative analysis, the rather minimal role of negotiated agreements in Finnish environmental policy supports this assumption. However, the great number of examples of national soft law instruments presented by Tapio Määttä shows that extensive use of legal regulation has not cut the needs to use also other means of regulation to complement formal regulation. Most of his examples can be seen as a part of a differentiation process, where soft law instruments more precisely define the content of hard law. The law-intensity of Finnish policy is often explained by referring to the constitutional requirements and legalistic tradition of Finland. The Constitution stresses the importance of using parliamentary legislation as the means to define the rights and duties of citizens. This has contributed to the increasing use of Parliamentary Acts instead of sub-legislation, but it also generally promotes the use of all kinds of legislation in comparison to other ways of exerting influence. The plentiful use of soft law instruments is, however, in contrast with this development and creates a constitutional constraint within regulation. Another fact affecting the plentiful use of (hard and soft) legal regulation is a sharp division of powers between legislative and enforcement bodies. The Council of State and the ministries as part of it wield the main regulatory powers and the regional state authorities “only” implement the laws. The regional state authorities as well as the municipal environmental boards have an independent position and the ministries are not allowed to intervene in the decision-making concerning individual activities or installations. Thus, it is mainly by means of hard and soft law and producing information, what the

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ministries can fully ensure the correct implementation of policy.

Is the increasing amount of environmental legislation a problem? At least in the rhetoric of the better regulation initiative the amount of legislation seems to be a problem *per se*. The European Commission has set the target of reducing the acquis by 25%, corresponding to about 22,500 pages of the Official Journal. The goal is general, but it involves also environmental regulation. The increasing amount of legislation may, indeed, have undesirable impacts. The steering capacity of law may diminish, if those regulated are not able to follow continuously changing legislation and its uncertainty and internal constraints increase. Furthermore, a great number of laws may also have side-effects, like an excessive amount of administrative costs. While these challenges must be taken seriously, reducing legislation through simplification may also have negative side-effects regardless the direct impact on the level of environmental protection.

The relationship between the quantity of legal texts and its quality is not a straightforward matter. Clear and specified legal expressions may require more and longer texts. Confusing and ambiguous expressions may be a much worse alternative in comparison to high quality but lengthier expressions. Cutting the amount of legal texts does not necessarily mean that law becomes less open to various interpretations nor does it necessarily increase predictability. In Finland, water pollution regulation does not employ sub-legislation to the same extent as air pollution regulation does. From the fact that there are more relevant legal texts regulating air pollution than water pollution, it does not necessary follow that decision-making on water pollution based on broadly defined legal standards is less open to various interpretations than air pollution control standards, which use more exact technical expressions. Apparently the opposite is the case. The use of broadly defined legal standards also has the consequence that a significant part of decision-making powers is delegated to permit authorities and judicial bodies reviewing permit decisions. This contributes to another aspect of juridification, namely juridification as increased judicial power.

Equally important to the numerical goals of better regulation policy are the methods used to achieve the goals. The base forms of reducing the amount of existing regulation are simplification (simplification of legislation, of

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435. To a large extent the existing water pollution sub-legislation was adopted to fulfil the EC law and a large part of it was already ‘obsolete’ in comparison to the Finnish permitting practice at the time of adoption.
436. The difference between these two approaches will be discussed later, in Chapter 4.
administrative procedures for public authorities and of administrative burdens for private actors), codification (reorganising law by gathering obligations and rights from different pieces of law into one), consolidation (making updated versions of legislation in order to facilitate the finding of law) and removing obsolete legislation. This approach reflects a belief that the problem is not in substantive requirements set in environmental regulation but in the form of it. Furthermore, it implies that changing legislation in the spirit of better regulation does not necessarily result in looser standards. Interestingly, simplification and codification of legislation may increase, not decrease the number of annually adopted legislation, because they require new legislative efforts. This becomes clear from the following quotation related to better regulation initiative: “The review of acquis must become a continuous and systematic process enabling the legislator to revise legislation taking all legitimate private and public interest into account.” Hence, the better regulation initiative may increase the rate of legislative change.

In this regard attention can be drawn to the fact that a vast majority of the Finnish environmental legislation currently in force is of recent date. It was observed in the course of this study that in autumn 2005 a little less than one third of the pollution control statutes were less than 5 years old, a little more than one third 5–10 years old and another little more than one third was more than 10 years old. Only few pieces of present law were made prior to 1990. Partly this is because the matters regulated are new, but it also shows that most of the old legislation has recently been revised. Hence this indicates a high rate of re-regulation. Until now re-regulation has typically involved more specific rules than previous legislation (differentiation), regulation of new matters (expansion) and/or tightening existing rules, and this development is clearly something other than pure simplification or codification of legislation. However, re-regulation has most likely also reduced the amount of obsolete legislation, whose negative side-effects outweigh its benefits.

A common trend in all regulation is that of Europeanization. Contrary to conventional wisdom, Wiberg has claimed, on the basis of statistical information, that only a minority of all national (not only environmental) legislation is affected by European law. Despite the fact that the statistical information gathered for this research with regard to environmental legislation gives some support to thinking along the lines of Wiberg, I hesitate to do so. Though the national legislator still produces most of its legislation without a formal link to EU law in all sectors of environmental regulation, EU influence is strong.

It is claimed that the EU has generally speaking not had a significant effect on policy instrument selection at the national level.\textsuperscript{441} With regard to the Finnish pollution control regulation this generalization can be considered justified in the sense that both the EU and the Finnish pollution control regulation rely heavily on traditional regulation. On the other hand, the general development of the major instrument, namely the environmental permit system, can be associated with EU regulation. In addition, the EU has affected the taxation system and the Environmental Impact Assessment Act (468/94) as well as the emission trading scheme (683/2004) were adopted due to the EU.\textsuperscript{442} Environmental standards adopted in the form of legislation, are likewise strongly influenced by EU law, as the case of air pollution regulation indicates. One could even hypothesise that most of new legal ideas adopted during the last few decades have come from abroad, though this hypothesis would require further studies. The main value of the statistical information on annually adopted legislation is that it reveals the differences between sectors of environmental regulation, while combined with the results of Wiberg it supports the view that environmental legislation is more Europeanized than legislation in general. Furthermore, it shows that waste, chemical and pollution control regulation are the most Europeanized sectors of environmental regulation. The amount of EU influence has varied from one year to another and it is not possible to identify any clear trend with regard to the rate of Europeanization since Finland joined to the European Union.

Though the Europeanization of environmental regulation is strong, the national legislator—as well as national administration—also has a significant role for a variety of reasons. First, the administrative structures are mainly in the hands of member states. Secondly, there are fields of environmental policy where the EU does not have competence, like land use planning and environmental taxes. Thirdly, most EU environmental regulation has a minimum character, which means that the national legislator may impose stricter requirements or enlarge the scope of activities under regulation in comparison to what EU law requires. In the case of environmental permitting the installations under the IPPC Directive consist of only a small portion of all regulated installations, albeit the biggest ones.\textsuperscript{443} Fourthly, EU directives are often—and are meant to be—incomplete in the sense that they do not define exactly how the implementation should be done. This aspect is different than that concerning strictness, because not all options can be judged on the basis

\textsuperscript{441} Jordan and Lieffrink, 2004b, 226.

\textsuperscript{442} Sairinen and Lindholm (2004, 71) also conclude their analysis on the Europeanization of Finnish environmental policy by stressing that "the process of Europeanization has meant deep changes in the content of Finnish environmental policy".

\textsuperscript{443} About 12% of environmental permit granted by state permit authorities between 1 March 2000 and 31 May 2005 are regulated under the IPPC Directive. The state permit authorities grant roughly 50% of all environmental permits. Similä et al. 2006, 14–15.
of strictness. Thus, the national regulatory styles may greatly affect the exact form of legislation. Depending on the exact nature of the national legislation, the stricter requirements may be decided either at legislative or administrative level. Water pollution regulation in Finland is an example where EU standards have, after all, had rather limited impacts with regard to the permit conditions imposed by regulatory agencies.

During the last two decades environmental regulation has significantly changed in general and pollution control regulation in particular. The emergence of new policy instruments has hit pollution control regulation particularly, where the diversity of instruments is nowadays greater than in many other fields of environmental regulation. About 30% of the new pollution control legislation adopted during the period explored related to economic instruments. The diversity of environmental regulatory instruments is, in turn, greater than in many other fields of regulation.444 Despite this, the traditional regulation still has a dominant role with regard to pollution control of industrial activities, when the whole range of environmental matters is considered.445 Most legislation relates to traditional regulation and only few non-legislative instruments have been adopted. The scope of activities and range of matters covered by traditional regulation often outweigh those of its alternatives.

In the literature, it has frequently been repeated that the number of new instruments is increasing.446 This is undoubtedly true, but at the same time it should be noted that the number of traditional regulatory instruments has also increased and most of the traditional regulations have undergone reforms, which have—more or less—changed their nature. Both hard law and soft law instruments of traditional regulation have increased at national and international level. In other words, environmental regulation of all kinds has increased and changed. These observations can be made on the basis of the changes of the amount of annually adopted legislation. Though the amount of annually adopted legislation is an insufficient indicator of change due to the variety of reasons as explained above, it has the advantage that it covers all instruments in need of legislative action. Data on legislative change gives some basis to explore relative changes between different types of instruments.

To provide additional insight into the development, the relevance of some key new instruments in relation to industrial sites was discussed. Often in the discussion on the new policy instruments the exact scope of application of different instruments is given little attention. While this may be understandable in the sense that new instruments may contain interesting qualitative features, there is a danger that too loose discussion leads to confusion.

444. OECD 2003b, 30.
and misunderstandings. If real-world regulation has very specific character and a narrow scope of application, their role for the overall effectiveness of environmental regulation is likely to be small.

The research-based evidence available does not support the view that new instruments, in particular the EMAS scheme or negotiated agreements, have had a major impact on the environmental performance of industrial activities in Finland. Internationally critical—or should it be called ‘realistic’—attitude towards new policy instruments has increased while experience of them have grown. Knill and Lenschow, for instance, are generally rather critical with regard to the effectiveness of new policy instruments. They stress the importance of contextual factors as opposed to the features of the policy instruments. Hence, they do not claim that the instruments per se do not work, but the real-world instruments have often not worked well in the context in which they are implemented. Their analysis covers instruments like EMAS, eco-label and access to information adopted in the European context. In an OECD report generally sceptical views about ecological effectiveness and economic efficiency of voluntary approaches have been presented. The report, based on case studies, concluded that: "The review above provides only a few examples where a voluntary policy approach is deemed to have contributed significantly to the fulfilment of a given target. In most cases, factors other than the given voluntary approach seem to explain the major part of any environmental improvement that has taken place." Furthermore, it is stated in the report that “the environmental effectiveness of voluntary approaches is still questionable.” However, voluntary approaches can be seen as good choices when there are no other better ones politically available.

With regard to economic instruments the overall picture is more complicated. No doubt environmental taxation as a whole has had positive impacts on the environment (in particular on traffic). With regard to industrial installation the most relevant tax, energy tax, has been criticized for its design as well as its observed effectiveness. At the same time it must be stressed that some positive impacts in terms of effectiveness have also been identified. However, there are rather few research-based results on the effectiveness of Finnish energy taxation, which makes it difficult to draw definite conclusions. With regard to liability for environmental damages the situation is even worse in terms of research. In the international literature, the effectiveness of liability for environmental damages is disputable. Perhaps this is why the primary goal of the act, as presented in its preparatory documents, was to protect individuals suffering damage rather than to affect pollution overall. One can conclude that there is little evidence showing

448. OECD 2003c, 62.
449. OECD 2003c, 14.
that the Environmental Damage Compensation Act has significantly affected the environmental performance of polluters.

Despite the foregoing a moderate regulatory shift towards new instruments can be observed. One reason for this development is the changing nature of environmental problems. Traditional regulation is often considered to be unsuitable to regulate new environmental problems and, hence, there is a need for some other kind of regulatory instruments. While hardly anyone doubts this, a more interesting question is, whether perceptions with regard to the effectiveness and efficiency of regulatory instruments have to any extent resulted in a replacement of traditional regulation by new regulatory instruments. Based on the Finnish development the main conclusion is that replacement has not occurred to any significant extent. Old legislation has been repealed and new, better legislation adopted, but this has not involved the replacement of traditional regulation by new instruments. To the extent new instruments have been adopted, it has meant an expansion of regulation, not a move from old to new instruments. The pollution control legislation is a case in point. New instruments, like energy tax, liability for environmental damage, environmental management system or negotiated agreements have not resulted in limitations of traditional regulation. On the contrary, traditional regulation has at the same time continued its expansion and differentiation process. In this sense the evolution of regulation has been incremental. It must at least be queried whether the constant change of traditional regulation has been even more important in terms of effectiveness, efficiency and innovations than the moderate shift of the types of regulatory instruments.

In the next chapter, the focus lies on traditional regulation concerning industrial activities. Both regulation on integrated environmental permits, which is a major development in Finnish pollution control regulation, and one sectoral permit (water pollution permit) preceding it will be discussed.
Chapter 4

Traditional regulation

The general theme for this chapter is pollution control through environmental permits. This chapter, unlike Chapter 2, aims to shed light on effectiveness and efficiency issues on the basis of the analysis of legal regulation in one country, namely Finland. Before going to specific topics related to environmental permits, a general overview of the permit mechanisms is presented. In order to accomplish this task the development of a legal framework for pollution control, with a particular focus on air and water pollution, is presented. The examination covers previous sectoral regulation and ends up with integrated pollution control regulation. The first topic is the development of water and air pollution standards prior to the adoption of an integrated permit mechanism. The purpose is to investigate how the legal framework modifies the general nature of standards and what implications follow from this in terms of effectiveness and efficiency. As a second topic the influences of permits on technological development will be explored. This investigation is limited to pollution permits under the Water Act. The analysis is divided into two parts. First the key elements of regulatory approach are explored and thereafter the impacts on the pulp and paper industry are evaluated on the basis of permit decisions, related material and interviews. The third topic is integrated pollution control and the aim is to understand, whether the goals of integrated permitting, namely increased effectiveness and efficiency, have been achieved. To accomplish this task the legislative material relevant to integrated pollution control was studied so that exact goals and the mechanisms for achieving them can be identified. Also, following on from the first topic, the legal framework for standard setting under an integrated pollution control mechanism is explored, taking into account the previous analysis of sectoral regulation. Thereafter, the mechanisms to increase the effectiveness and efficiency of pollution control are discussed first at a general level and then on the basis of material gathered. Finally, conclusions are drawn and findings discussed with special reference to integrated permits.
Environmental harms originating from point sources have traditionally been regulated through various permits.\textsuperscript{450} The core idea of the environmental permit is that environmental control of an activity causing environmental harms should take place before the activity commences.\textsuperscript{451} A permit system is used to control a wide range of different environmental problems, like pollution control, risk management, use of natural resources and land use.\textsuperscript{452} All of these could be called ‘environmental permit’, though here the expression is used in a narrower sense referring solely to the permit mechanism regulated by the Environmental Protection Act (86/2000) and preceding legislation. This use of the expression corresponds to the terminology used in the legislation.

The focus in this chapter will be on the control of water and air pollution from point sources, hence, most traditional forms of environmental control exercised by public authorities. The goals of the environmental permit mechanism are broader than the mere prevention of pollution,\textsuperscript{453} though pollution control is undeniably at the heart of the mechanism. The scope of environmental permitting as a control mechanism has gradually enlarged and nowadays it covers a wide variety of activities from small and temporary activities or projects to large, complex and permanent plants. Different point sources of pollution from an industrial plant to waste water treatment plants and from agricultural activities to mining may come under the control.

Pollution control has long roots in politia regulation and elsewhere,\textsuperscript{454} though the emergence of modern environmental pollution control occurred only some decades ago. As noted in Chapter 3, the late 1960s was a turning point for the historical development of environmental policy in Finland as well as in many other countries, and it was then that modern environmental pollution control started to take shape. Thereafter forms of pollution control mechanisms have been developed and changed several times. The existing, integrated permitting mechanism is fairly new, adopted in 2000. The pollution control mechanism in use now is a result of historical process and some of its features only become understandable through the process.

The Water Act (264/1961) was the main piece of legislation with respect to water pollution between 1962 and 2000. The Water Act also regulated other water related issues than pollution, like construction in waters. At the beginning of the 1960s these other aspects had a dominant role in decision-making, but

\textsuperscript{450} Hollo 1976, 61–70, Kuusiniemi 1992, 38–92.
\textsuperscript{451} Kuusiniemi 1995b, 1–3.
\textsuperscript{452} Kumpula 2001, 1170–1176.
\textsuperscript{453} The broad goals listed in Section 1 of the act cover, in addition to pollution, waste management, and sustainable use of natural resources, climate change and sustainable development.
gradually the role of pollution control has strengthened. The control was based on prior authorization (i.e. permit) and the central decision-making body for the whole mentioned period was called—rather confusingly—’the Water Court’. Certain minor matters were decided by the municipal environmental protection board. The National Board of Waters and Environment with its district organisation was responsible for enforcement and monitoring between 1970 and 1995. The establishment of the Board can be considered a symbol of the policy change in the late 1960s and early 1970s. In particular, the legislative development of water pollution has much longer roots than modern environmental awareness, which started to emerge in the late 1960s. Since 1995 the Regional Environment Centres, which were constituted from the district organisation of the Board and the Environmental Departments of the State Provincial Office (earlier responsible for pollution control of air and soil), have been responsible for enforcement and monitoring. At the same time the nature of the central administrative unit of the Board was changed to a research and development institute (the Finnish Environmental Institute) along the lines of the general reform of the central administration in Finland. The position of the Regional Environment Centres is relatively independent and the Ministry is not empowered to intervene in individual cases.

Generally speaking, the regulatory powers are nowadays devolved to ministers in Finland whereas the executive powers is to large extent decentralized, though the development is not uniform. The main provision of the Constitution with this regard (Section 80) sets strict limits for the delegation of regulatory powers to independent agencies. This, however, has not prevented the founding of some new regulatory agencies such as the Communications Regulatory Authority, and the Energy Market Authority as a part of the privatization of former state functions. However, with regard to pollution control, there is no independent rule-making agency in Finland and its seems highly unlikely that such an agency would emerge in the foreseeable future. The 1995 reform of environmental administration is to be seen as a part of general change of state administration in Finland, where regulatory and executive powers were separated as a part of reform inspired of the administrative doctrine.

455. On the different categories of matters handled in Water Courts, see Vihervuori 1981, 15–27.
456. This title for the board was adopted in 1986 (Act 84/86). Originally it was called the Municipal Board of Waters.
457. Originally called ‘National Board of Waters’.
458. Vihervuori 1998a, 32.
459. The structure of environmental administration (including the Regional Environment Centres, and the Finnish Environment Institute) was established and the main functions were defined in law 55/1995. More detailed provisions were given in decrees (decree 56/1995 for the Finnish Environment Institute and decree 57/1995 for the Regional Environment Centres).
460. OECD 2003b, 6.
461. See on the rule-making powers of independent agencies in Finland, Suviranta 2006.
called new public management.\textsuperscript{462} Originally the National Board of Waters, which was metamorphosed into the Finnish Environment Institute, did have regulatory functions, but the new institute does not have such functions with the exception of certain function of minor relevance.\textsuperscript{463} Most of environmental regulation is given in the form of legislation,\textsuperscript{464} though the municipalities have powers to issue general rules as well. The Ministry of the Environment has a key role with regard to the preparation of legislation, though it has a lesser role with regard to the implementation and enforcement of it. Technical standards are prepared by the Ministry, decided by the Council of Ministries and given in the form of legislation.

Contrary to what its name suggests, the main function of the Water Court with respect to water pollution was to issue wastewater permits and make other related decisions with regard to enforcement. The initiative to bring a matter to the Court came from outside. If the operator did not bring a permit application to the Court as required, it was the responsibility of the supervisory authorities to initiate action. The supervisory authorities did have an important role in decision-making due to the fact that they were always consulted and in most of cases made their own proposals for the essential conditions of a permit.\textsuperscript{465} Although the initiative for all kinds of enforcement actions came from the supervisory authorities, it was the Court which made the decision e.g. with respect to administrative sanctions. In keeping with its name the Court functioned as a judicial body in certain types of civil and criminal matters. Particularly matters concerning compensation for damage caused by water pollution went to the Water Courts and were handled at the same time and in the same procedure as permits. The issue of whether an offence had been committed against the Water Act was resolved by the Water Court as well. It exercised judicial control over permit decision made by local water boards. Furthermore, the Water Court was empowered to make decisions on a wide variety of issues related to the use of water. An appeal against a permit decision of the Water Court was to be made to the Superior Water Court and thereafter to the Supreme Administrative Court. There were three different Water Courts for different territories and one Superior Water Court. All these bodies had legal, technical and, since 1987, ecological experts at their disposal. The three

\textsuperscript{462} Temmes 1998. Suviranta (2006, 206), however, rejects a link between the new management doctrine and the emergency of independent rule-making agencies, whereas Temmes (1998) sees it otherwise. 
\textsuperscript{463} Despite the Finnish Environment Institute is mainly an expert and research unit, it has some duties related to the registration of chemicals and environmental management and auditing systems that can be considered as regulatory functions. 
\textsuperscript{464} Acts of Parliament and Decrees are usually issued by the Council of State. 
\textsuperscript{465} Many other authorities were also involved, see Vihervuori 1981, 255–430.
Water Courts were transformed into three Environmental Permit Authorities in March 2000, when the pollution control legislation was radically reformed.

The centrepiece of air pollution law between 1982 and 2000 was the Air Pollution Control Act (67/1982). Before 1982 air pollution regulation was mainly based on the Public Health Act 1965 (469/1965) and the Neighbourhood Relations Act (26/1920). These did not constitute a coherent legal basis for air pollution prevention policy, because impacts on the environment as such were not covered; only impacts on health or neighbourhood relations were considered. The Air Pollution Control Act (APCA) covered major industrial installations releasing emissions into the air. It set a general framework for decision-making in air pollution policy.

The regulatory mechanism of APCA was based on a combination of general standards applicable to a certain category of installations and installation specific regulatory decisions. The installation specific regulatory decisions have three different functions: to ensure the implementation of general standards, to modify them taking individual circumstances into account, and to complement them. The general standards were to be set by decrees adopted by the Council of State. The rather high number of decrees reflects the central position of general standards for the air pollution policy. The Council of State made decisions on the general standards on the basis of preparation by the Ministry of the Environment. Furthermore, the Ministry itself gives general rules of less importance. Originally, installation specific regulatory decisions were made by the State Provincial Office (between 1982 and 1995), though this task was transferred in 1995 to the Regional Centres created as mentioned above. After the integration of permit procedures in 1992 a municipal board had some competence to grant permits. The State Provincial Office as well as the Regional Environmental Centre were responsible both for decision-making and supervision. Thus, these two functions were not separated as was the case in water pollution.

Originally the installation level decision making was based on a notification procedure. On the basis of notification the competent authority was to make a decision, where it set requirements for each installation belonging to listed activities. Under the notification procedure—unlike under a permit

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466. The number of employees just before the transformation was 75 (31 members of the Court, including lawyers and other experts, 44 other staff). At the same time there were more than 2000 employees at the Regional Environment Centres.
468. On the development of emission based control, see Kuusiniemi 1992, 38–92
469. Formerly decrees were called 'Decisions of Council of State'. Hereinafter also these decisions are called decrees, because their nature is of similar kind (a norm setting substantial environmental requirements, like emission limits).
470. The total number of decrees is about 30, if those decrees replaced by newer ones are also taken into account.
mechanism—the operator of an installation was allowed to start or continue the operation of the plant, even before the decision had been made by the authority. The notification procedure was changed into a permit mechanism through two reforms during the first half of the 1990s. Through the enactment of the Environmental Permit Procedure Act (736/1991), the decision-making procedures of all the environmental permits except for the water (pollution) permit relevant for industrial installations, were incorporated into one permit from 1 September 1992 onwards. This reform was based on an idea of one-stop shopping: an operator needs to stop only once, while visiting in all shops. In legal terms, this meant that the substantial provisions still remained in separate acts (the Air Pollution Control Act and the Public Health Act, the Neighbourhood Relations Act and the Waste Act). Thus, the substantial legal basis was still incoherent until the introduction of the Environmental Protection Act in 2000. However, only one application was needed for all those permits covered by the Environmental Permit Procedure Act and the procedure produced a single document called ‘environmental permit’, though strictly legally speaking this document included several permits. Practically, albeit not terminologically, the reform changed the nature of the control mechanism from notification to permit: with respect to new installations the decisions were to be made before the start-up of the installation or its significant change.

In 1995 the Air Pollution Control Act was thoroughly amended. The main aim of the reform was to fulfil EU requirements and establish a permit mechanism as required in the Framework Directive (84/360) on air emissions from industrial installations. Thus, not only the nature but also the wording was changed from a notification into a permit. This reform changed almost all sections of the Act and it was significant in principle, though its immediate impacts were rather slight in the sense that it did not result in immediate changes of already made regulatory decisions at the level of installations. In other words, the amended law applied immediately only to new decisions and because the old regulatory decisions lack a renewal mechanism, only new installations or significant changes of existing installations immediately required a regulatory decision under the new act. However, a timetable according to which existing installations had to apply for a new permit was also determined. This timetable partially overlapped with the corresponding timetable of the subsequent reform, i.e. the adoption of the Environmental Protection Act in 2000, and the former timetable was incorporated into the latter one.

In 2000, pollution regulation was reformed in Finland. The main piece

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471. This response to fragmentation to permits is also used elsewhere. For the USA, see Davies 200, 33–35.
473. See Vihervuori 1998a.

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128
of legislation then adopted was the Environmental Pollution Control Act (86/2000),\textsuperscript{474} which came into force in March 2000. The Integrated Pollution Prevention and Control Directive (96/61) was transposed through the reform, though the reform also covered a number of issues not directly linked to the directive. The reform integrated water (pollution) permits\textsuperscript{475} and the permits already procedurally integrated in 1992. Furthermore, the notification procedure under the Noise Abatement Act was removed to new legislation. The Air Pollution Control Act and the Noise Abatement Act were repealed and the Water Act, the Public Health Act, and the Neighbourhood Relationships Act were significantly amended.

Since 2000 there have been three kinds of permit authorities, two regional and one local. The existence of two regional permit authorities in a system of integrated permits reflects more the difficulties to change institutional structures than the needs for effective and efficient administration. The water courts were transformed into the environmental permit authorities and the regional environmental centres retained their position as a permit authority. In addition, the regional environmental centres are responsible for supervision. The dual role of the centres as decision-makers and supervisors has been much criticized and to respond to criticism these two roles have been separated within the centres.\textsuperscript{476} The criticism stems from an assumption that an administrative body promoting environmental interests (=supervisor) cannot be competent to make balanced decisions between environmental and other interests. Though the logic of this argument may be challenged, the starting point in the ongoing discussion on the development of administration is one regional permit authority.\textsuperscript{477} In terms of personnel, the reform resulted in almost no immediate changes, though to facilitate the solving of a backlog of permits, some new resources were directed to permit authorities. Thus, to a large extent the reform meant a re-organisation of the work of old staff.

During the process where the former water courts were transformed into the environmental permit authorities the functions of the body were significantly changed. As a point of departure all matters of civil or criminal law previously handled by the water court have been transferred to ordinary civil courts. However, the matter of compensation for the damages caused by water

\textsuperscript{474} For a general presentation of the main elements of the reform, see Vihervuori 2000 and Kumpula 2001, 1111–1322.

\textsuperscript{475} Prior to the reform water construction and water pollution issues were handled together, in the same procedure. The same permit covered both aspects. In this reform these two aspects were, as a point of departure, separated from each other.

\textsuperscript{476} The relevant section of effective legislation is Section 4 of Decree 950/2004. It requires that environmental permits be decided in a separate unit, which may not be responsible for conflicting functions.

\textsuperscript{477} Ekroos 2005, 73–75.
pollution is, in principle, processed at the same time and in the same procedure as the permit. The division of competence between two regional authorities was built on their previous expertise to the extent that it was possible. In practice, this meant that the competence to grant permits for activities where water pollution has a dominant role tended to be given to the environmental permit authority and, in turn, for activities where air pollution or waste management have a dominant role, competence was typically given to the regional centres. Furthermore, the environmental permit authority tends to have authority over bigger activities than the regional centres. The municipal environment board continues to have competence with respect to minor activities. The Superior Water Court was incorporated into one of nine administrative courts (that one located in the same city—Vaasa—as the Superior Water Court did) in 1999. An appeal concerning a decision made under the Environmental Protection Act (such as an integrated pollution permit) or under the Water Act from any environmental authority, either regional or local, goes to the administrative court in Vaasa. According to the tradition of the Superior Water Court, other experts than lawyers may also take part in decision-making as members of the court when such a matter is processed in the administrative court in Vaasa. Thus, although there is no independent environmental court in Finland, the administrative court in Vaasa has to a certain extent the same function, because some environmental matters are concentrated in it and it has environmental specific expertise that courts normally do not have. However, appeals from other environmental decisions than those made under the Environmental Protection Act and the Water Act go to Regional Administrative Court in question.\textsuperscript{478} This applies, for example to land use plans.

\textbf{4.2. Effectiveness and efficiency of standards}

The effectiveness and efficiency of traditional regulation largely depends on the standards applied. In Chapter 2 different forms of standards as well as various issues related to them were discussed on a general level and this chapter focuses on the national legal regulation. Next an excursion into water and air pollution control regulation prior to the integration of permits in 2000 will be made. The legal framework for standard setting, the forms of standards and their implications in terms of effectiveness and efficiency will be explored. As will be shown later, the national tradition of sectoral regulation has to some extent been transferred to integrated permits and hence, some of the implications of previous approaches are still relevant. Integrated pollution control regulation will be investigated later in a separate sub-chapter.

\textsuperscript{478} For a judicial review on environmental matters, see Kuusiniemi 2002.
4.2.1. Water pollution

The control of wastewater discharges in the Water Act (264/1961) was based on in principle on the prohibition of pollution of water unless it was authorised in the form of permit (Section 1:19).\(^{479}\) The ban on polluting waters was not absolute, but it defined what kind of activities required a permit. Originally there were no general standards applicable to certain sectors in the system of the Water Act, which governed the granting of permits. Instead the decision-making was based on individual discretion guided by the principles and rules in the relevant part of the Water Act.\(^{480}\) In other words, the legally binding standards were imposed individually in each permit. The main elements of discretion were as follows.

The discretion was divided into two steps. Firstly it was considered whether there was an absolute obstacle to grant a permit. Threats to public health, far-reaching changes in natural conditions, essential deterioration in the conditions of local populations or local economic life constituted an absolute obstacle already in the 1960s. The wording of the relevant provision has been subsequently slightly amended.\(^{481}\) In addition, pursuant to 1994 amendments,\(^{482}\) two other absolute obstacles were inserted into the Act. Finland’s international agreements in the field of the protection of waters or of the sea constituted such an absolute obstacle as did pollution of the sea outside the territorial borders. It is worth noting that the absolute obstacles to granting a permit have very rarely applied. For instance, these provision have never prevented the granting of permit for the pulp and paper industry, which is—and previously was even more so—of crucial importance in terms of water pollution (as well as prosperity) in Finland.

The second step was the weighing of public and private interests. A permit could be granted if the adverse effects of discharges were relatively minor compared with the benefits gained. Different kinds of public and private interests were taken into consideration. In addition, the Act required as a precondition for issuing a permit that the elimination of wastewater or some other substance polluting the water body was not possible in any other way at reasonable cost. Thus, all pollution prevention measures which did not exceed the level of reasonable costs were required to be taken. In substantial terms this principle resembled the best available technology principle, which was introduced into the Act in 1994.\(^{483}\) The wording of the law was admittedly rather

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\(^{480}\) The most relevant provisions were to be found in Chapter 10, which was overridden by the Environmental Protection Act.

\(^{481}\) Act 467/1987.

\(^{482}\) Act 1416/1994.

\(^{483}\) Act 1416/1994.
flexible. In practice an approach was developed which was based on individual discretion using a combination of an assessment of technological options and the state of water (according to the so-called recipient principle).

Despite the lack of legally binding technical standards, non-legally binding objectives for different sectors, e.g. the pulp and paper sector, or for industry as a whole (last programme) have been set in the National Water Protection Programmes. The first programme established 7 August 1974 covered the years until 1985, the second (6 October 1988) until 1995 and the third (19 March 1998) until 2005. Hence the time period of each programme has been approximately 10 years. The programmes have been rather general in nature and they have not contained recommendations for individual decision-making. The nature of the normative status of the programmes was not totally clear. The law did not recognize the programmes and because the permits were so-called legally-bound decisions, the programmes were in the nature of extra-legal material in legal decision-making.

The flexibility of the water pollution regulation, which is an outcome of the lack of general standards and the existence of flexible rules, had important implications in terms of effectiveness and efficiency. Firstly, new kinds of activities could be included under control without the rigidity related to legislation. The scope of regulation was defined through the environmental impacts, not through listing of regulated activities. Though the regulatory technique of listing the regulated activities common in many countries and also in European regulation has the advantage of being clear about the issue who should apply for a permit, the political struggles related to law-making would easily slow down or even prevent the inclusion of new regulated activities. There is no major indication that the impacts based approach would have caused significant confusion about who should apply for a permit.

Secondly, new types of standards were adopted through permitting practice, not through legislative changes. The establishment of the National Board of Waters in 1970 had significant consequences in this respect. Before 1970 permit conditions related to pollution were typically expressed in qualitative terms, which were rather difficult to monitor and enforce. As a result, the effectiveness of pollution control was rather poor. The Board promoted the adoption of a new regulatory technique, i.e. emission limits, which expressed the allowed amount of pollutants in quantitative terms, and hence, facilitated monitoring. From 1970 onwards emission limits values were gradually adopted

487. The concept of legally-bound decision is explained in Chapter 1.  
488. See Vihervuori 1998a, 73–77. An example of this is the regulation of peat production from peat bogs. KHO 1992 A 94.
through new permitting decisions. However, the process was slow. First, only fairly few types of emission limits were initially used. With regard to pulp and paper mills the main types of emission limits were those concerning suspended solids and biological oxygen demand. Secondly, it took about a decade before most of the pulp and paper mills were regulated by any emission limit. Later in the 1980s, when new perceptions and need of environmental problems arose, new emission limits were adopted in permitting practice. However, the adoption process was still slow. For example, in the case of phosphorus limits, it took a further decade before the most of the mills were regulated by this new permit condition.

Thirdly, the use of differentiated standards made it possible to increase efficiency in comparison to the use of uniform standards. As noted in Chapter 2, the efficiency criticism of traditional regulation applies, in particular, to uniform standards. Variation in standards enables, at least theoretically, the most crude efficiency problems to be avoided. In the case of water pollution control in Finland the different costs of installations had—according to the law—to be taken into consideration. Although the principle that all pollution prevention measures not exceeding reasonable costs might not be exactly the same as the concept of marginal costs of environmental economics, it became possible to take the variation of costs into consideration. However, a principal and a practical problem impaired the achievement of efficiency. The principal problem hindering the full realisation of efficiency came not from individual rules but from a structural problem; asymmetry of information between the regulator and those regulated made it impossible to achieve optimal efficiency. The regulator can never know exactly what the marginal costs of different installations are. The practical problem was related to the permitting practice adopted. In practice, the standards regulating a category of installations (like waster water treatment plants) were designed to be rather similar, apparently on the fairness basis, though the needs (the state of the waters) and opportunities (technological options) for reducing discharges varied from case to case. This practice was adopted though the law not only allowed but also required the decision-makers to take into consideration the individual circumstances (environmental and economic) of each case. In the legal literature this practice was criticized on the grounds that the legal requirement of fair treatment of applicants should not be interpreted in such a way that resulted in diminished effectiveness and efficiency of regulation.

Fourthly, the flexibility of regulation has allowed the creation of a trend towards ever stricter standards. In other words, the standards were typically made stricter than before in each permit cycle. This may sound self-evident in modern society, but as air pollution control regulation will show, this has not always been the case, even fairly recently. From the perspective of a polluter, the trend towards ever stricter standards works as an incentive to anticipate coming stricter standards, because the polluter knows that some kind stricter standards will come in any case. The lack of a general binding standard agreed at national level has apparently promoted this development. However, a degree of stability was created in permitting practice. A so-called ‘general policy line’ (‘yleinen linja’), which was neither expressed in any document nor decided by any central body but to be founded on practice, guided the decision-making. The main policy guidance from above has been non legally binding water pollution programmes, which have not tied the hands of permit authorities, but indicated the direction of coming decisions.

Fifthly, the flexibility made the system open to regulatory capture. If the rules guiding decision-making are rather general and non-specific, it increases the discretionary powers of the permit authority and makes them more difficult to control. One could even talk about delegation of powers from the legislator to the permit authorities. There is no clear evidence as to what extent regulatory capture took place, although some indications can be found. On the other hand, some features of regulation worked as safeguards against at least the crudest versions of regulatory capture. If the supervisory authority was not satisfied with the decision of the permit authority (i.e. the Water Court), it had an opportunity to take the case to the Supreme Water Court, which had extensive powers to review the lower decision not only from a procedural but also from a substantial point of view. The Supreme Water Court was a specialised national body, and thus had both the expertise and opportunity to ensure the coherence of the decisions of lower bodies within the legal boundaries of judicial review. Furthermore, the national supervisory body had an opportunity to ensure that local interests were not taken excessively into consideration. The permitting procedure was transparent towards the public, who did have fairly large participatory rights. The general policy line established through permitting practice was partly a product of control and partly a means

492. In the 1960s the permits were still granted for the time being and changing these kinds of permits is more difficult. In a decision of 1971 the Supreme Administrative Court (KHO 1971 A II 94) allowed the use of periodic permits.
496. On the mechanisms of control exercised by supervisory and other public authorities, see Vihervuori 1981.
of it. It increased predictability and predictability, in turn, facilitated the control in the sense that it enabled the identification of those decisions which differed from others.

4.2.1. Air pollution control

The approach adopted for air pollution under the Air Pollution Control Act was different from that of water pollution control. General standards had a greater role in decision-making than in water pollution control. The approach to air pollution was to be based more extensively on uniform standards than that of water pollution, although the difference is not absolute but relative. It has always been possible to set differentiated standards under the air pollution regulation, though to a lesser degree than in water pollution.

Until the adoption of integrated pollution control, general standards were given either in the form of general regulations or general guidelines. A general regulation was legally binding and applicable directly without a transmitting administrative decision. In other words, the regulated industry had to comply with the general regulations immediately, otherwise there was a threat of facing administrative or criminal sanctions. General guidelines, on the other hand, did not have direct legal effects and aimed to guide the decision-making of permit authorities. Hence, the permit authority had a greater degree of discretion to impose different installation specific standards than in the case of general regulations.497

The air pollution decrees were prepared in four committees.498 The Ministry of the Environment led the preparation and different stake-holders from industry and various parts of the government participated. During the preparation significant effort was invested in identifying different abatement technologies and differences of abatement costs between sectors. The aim was to promote the cost-effectiveness of the regulation by addressing investments to those sectors of industry where the costs are lowest. The emission limits stipulated in the general standards are based on the best available technology principle in the sense that the standards reflected the best technological options at the time of the formulation of decrees.499

The total number of decrees adopted under the Air Pollution Control Act exceeds 30. The standards cover a variety of issues from emission standards for different sources to quality of fuels and air quality. However, it took rather many years from the adoption of the Act in 1982 before the full set of standards was

498. Four different committees have prepared policy proposals related to air pollution: The Sulphur Committee I (1986), the Nitrogen Oxides Committee (1990), the Sulphur Committee II (1993), and the Acidification Committee (1998).
in use. The first standard adopted under the new regime concerned air quality in 1984\footnote{Decree (537/1984) on air quality was adopted in 1994, it was replaced by a new one in 1996 (Decree 480/1996).} and in 1987 the first emission standards relating, for example to \( \text{SO}_2 \) and particulates, were adopted. In addition three other decrees were adopted in the 1980s. From the effectiveness point of view equally or even more important is the rate of making the installation-specific decisions. The evidence available shows that this has been a rather slow process. With regard to pulp and paper mills only one regulatory decision was made before 1987, and five years later the number was still fairly low (18) and thereafter it has gradually increased so that by the end of September 2000, most installations (34 out of 43) had obtained at least one regulatory decision.\footnote{Hildén et al. 2002, 44. Although these figures are based on incomplete material, as explained in the study, they show the trend. At the same time is must be remembered that not all pulp and paper installations were in need of obtaining a regulatory decision.} The choice of making no fixed and strict time-table for implementation of the Act had its consequences; decision-making processes often lasted several years, even a decade. The law made it possible to adopt general standards, which became directly legally binding, but because this opportunity was used only to a limited extent, it did not speed up the implementation process during the 1980s. Because the renewal of the decisions is also a slow process, many pulp and paper mills were still regulated at the beginning of 2000s by conditions set for the first time in the 1990s.\footnote{Hildén et al. 2002, 42–44.} The implementation of the Environmental Protection Act is gradually changing the situation.

Both quality standards and source standards have been used for guiding installation level decision-making, though in practice quality standards seem to have a minor role. Kuusiniemi notes that quality standards had not, at the time of writing, been directly used as a basis for individual standards. However, he points out that quality standards have still been as one factor among others in the final decision. According to this notion stricter emission standards should vary from one region to another depending on air quality of the region.\footnote{Kuusiniemi 1993, 111–121.} In particular, one can assume that the role of quality standards was greater for those installations and pollutants not regulated by general standards.

The discretion of regulatory authority under the Air Pollution Control Act, as amended in 1995, was divided into two interlinked parts: consideration of whether the preconditions are met and the setting of installation-specific standards and other permit conditions. The permit conditions may have concerned emission limits, other air pollution prevention measures as well as monitoring and control. There were three preconditions which each activity had to meet before granting a permit: (1) the activity had to fulfil the requirements
of or under the Act; (2) the activity might cause no risk or injury to health, or otherwise significant pollution of air; and (3) the reducing of emissions must correspond to the level of best available technology. The first point refers, in particular, to general standards. Furthermore, the following considerations (Section 7 para 2) were to be taken into account: (a) the characteristics of the impact area, (b) the effects on the environment, (c) the relevance of the measures to air pollution policy and (d) the technical and economic conditions for carrying out the measures.

Hence, the law left a degree of discretion to permit authorities to decide on permit conditions. As a point of departure the standards set in decrees were minimum requirements. However, there was only one reason to impose a different condition than that in the general regulations: the activity causes risk or injury to health, or causes otherwise significant pollution of the air. This option was a kind of safeguard clause aim to be implemented only in exceptional cases. Hence, the general regulations replaced the emission limits based on the BAT principle or other individual consideration apart from the safeguard clause.

With regard to the general guidelines the situation was different. Law did not prevent the imposition of stricter permit conditions than required in the general guidelines. However, there are indications that individual consideration has a more limited role in practice than the legal nature of the general guidelines implied. In the legal literature the impact of guidelines on the decisions has been considered significant. This was also acknowledged in the Governmental Bill proposing new integrated permitting: “(General—JS) limit values for air emissions in Finland have, as a point of departure, been considered simultaneously as minimum and maximum requirements.” A standard which simultaneously includes minimum and maximum requirements is a uniform standard: it is the same for all installations belonging to the category of installations regulated by the standard. This same observation has been confirmed in empirical research on one single sector, namely large combustion plants. In the study, it was shown that NO\textsubscript{x} and SO\textsubscript{2} emission standards are almost always uniform based on the emission standards adopted in decrees. This also indicates that air quality standards have rather a small role in decision-making. There is no geographical variation of emission standards, though one could assume that air quality varies from one region to another.

504. According to the original formulation in the APCA, in force until 31 March 1996, the permit authority was allowed to impose either stricter or looser permit conditions in comparison to general regulations on the basis of special reasons. In legal practice, the interpretation of this provision has been strict. Kuusiniemi 1993, 120.
507. Mickwitz et al. manuscript 2006a.
However, the picture is not clear-cut. First, not all installations or all pollutants were covered by the general regulation or guidelines. Furthermore, not all decisions followed the guidelines, as becomes clear from the judgements of the Supreme Administrative Court. Kuusiniemi, in his analysis of discretionary rules,\(^{508}\) shows that already in 1993 a number of Supreme Administrative Court cases, which were based in different ways on individual discretion resulted in differentiated standards. For example in a case from 1988 the Court considered acidification of soil and waters caused by sulphur dioxide as a significant harm to nature and imposed a stricter individual standard.\(^{509}\)

Thereafter, the Supreme Administrative Court has upheld this line. A case concerned the issue whether permit authorities were allowed to transform the non-binding general standard\(^{510}\) into a binding plant specific standard. The Supreme Administrative Court ruled that the permit authority was allowed to impose a binding permit condition.\(^ {511}\)

Despite this development uniform standards still have an important role in air pollution control. The importance of uniform standards comes from the fact that uniform standards cover the largest installations and major pollutants. For example with regard to sulphur and nitrogen emissions the general standards regulate the sources which emitted most of emissions.\(^{512}\) In other words, uniform standards seem to have a major role with respect to major air pollution problems measured by the amount of pollution. This is not to deny that standards have varied with regard to smaller sources, in particular in cases where there have not been general standards.

The impacts of regulation over time do not depend only on the first regulatory decision, but also on the possibility to renew a once set standard. The idea of modern pollution control also consists of a periodic review.\(^{513}\) However, the starting point of the original regulation was that standards once set will not be changed except in exceptional cases.\(^{514}\) This situation persisted until the 1995 reform. Permits issued thereafter have had a mandatory provision for a periodic review. To ensure that those decisions already given would also be reviewed, it was enacted that all existing regulatory decisions were to be renewed according

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\(^{508}\) Kuusiniemi 1993, 106–121.

\(^{509}\) KHO 1988 A 84.

\(^{510}\) VOC regulation, 468/96.

\(^{511}\) KHO 8 September 1997/2148.

\(^{512}\) On the sources of sulphur and nitrogen emissions, see Wahlström, Hallanaro and Manninen 1996, 135–145.

\(^{513}\) The periodic review has also been considered problematic, because all installations where no change has occurred will be reviewed and reviewing requires resources which could be used in other way. In the USA, states have developed different responses to avoid regular 5-year periodic reviews as required by federal legislation. Davies 38–41.

\(^{514}\) On this issue, see Kuusiniemi 1992, 762–769.
to a timetable.⁵¹⁵ Later, in the context of the next reform in 2000, the timetable was coordinated with a new one, which provides for the implementation of integrated permits.⁵¹⁶ In practice this meant that the operators were obliged to institutionalise a new permit application by the first half of the 2000s. From this it follows that only after two decades of the implementation of the air pollution control regime was an effective mechanism ensuring a systematic review of standards adopted.

Though there was not a general system of periodic review, there were other channels, which may have resulted in a change of installation specific standards.⁵¹⁷ Firstly, it was possible to impose a stricter general standard after the installation specific decision was made and if this was done in the form of general regulation it replaced the installation specific standard. Secondly, though there was no general periodic review a significant change in the regulated activity may have led to a need to apply for a new permit. Thirdly, it was possible, in principle, that in a case where the preconditions laid down in the Section 17 of the Act were met, the decision could be changed. However, there is no evidence to suggest that either of these channels had, in reality, often resulted in a change of installation-specific decisions. After all, the general regulation was seldom renewed, reasons for acquiring a new permit were seldom realized, and the option to change existing standards was seldom exercised.

The main implications of the approach adopted in air pollution regulation are as follows. Firstly, the evolution of air pollution regulation has been more closely related to legislative development than in the case of water pollution control. With regard to water pollution many important aspects of regulation, such as the emergence of the periodic review, the exact scope of activities under regulation as well as the types and strictness of standards used, were developed through permitting practice. In the case of air pollution control the development of similar features relied heavily on legislative changes. From this it follows that the role of actors, such as permit authorities, the judiciary, the ministries and supervisory bodies, differed in the case of air pollution from that of water pollution.

Secondly, the use of uniform standards with respect to major polluters and pollutants may have resulted in efficiency losses in comparison to situations where differences between installations would have been fully considered. The application of best available technology principle and efficiency considerations at the moment of formulation of decrees, instead of at the moment when the final regulatory decision was made, cannot totally reflect the real situation. Though asymmetry of information limited the application of the BAT principle

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⁵¹⁵ Decree 306/1996.
⁵¹⁶ Decree 169/2000, Sections 41–43.
⁵¹⁷ For a legal analysis of how to modify a permit decision, see Hepola 2005, 417–586.
and restricted efficiency considerations at the moment of the final decision, some of the differences between installations would have been recognized. The use of the BAT principle at the moment of formulation of decrees tends to freeze the level of environmental protection to the moment of formulation.

Thirdly, the incentive to make further improvements beyond the existing legal limits for environmental performance has been weak. There was no general mechanism encouraging the regulated industries to anticipate coming stricter requirements. This can be assumed to have reduced the efforts of the regulated industries at continuous improvements and efforts to develop technologies. One might, of course, claim that there is no need for incentives to make continuous improvements if there is no real opportunity for such improvements due to technological constraints. However, the experience from Swedish air pollution regulation, which has a dynamic element (NO\textsubscript{x} charge), indicates that such major polluters as large combustion plants can also continuously improve their environmental performance and have done so in Sweden, though not in Finland.\textsuperscript{518}

As a last point, attention is drawn to features which have apparently reduced implementation problems. So-called general regulation had a direct legal effect, which meant that no mediating permit decisions were required. This may shorten the implementation time, but only so far as this type of regulation has been used. The adoption of this type of regulation has, however, been a slow process. Furthermore, it may be that the predictability of requirements has reduced conflicts between the industry and the authorities at the level of individual installations (no surprises, no conflicts).

The previous water and air pollution regimes have been incorporated into an integrated permitting mechanism from 2000 onwards, as noted earlier. Integrated permitting is based on other ideas than the sectoral pollution control mechanism and it would be reasonable to assume that the standards used to guide regulated entities under integrated pollution control regime would differ from those under the sectoral regime. Standards for integrated permitting will be discussed later, while integrated permitting is otherwise discussed. However, already at this point attention can be drawn to the fact that the different traditions in water and air pollution control have affected the way the integrated permitting mechanism is constructed. Hence, some features of old regimes have been transferred to the new one.

\textsuperscript{518} Mickwitz et al. manuscript 2006b.
4.3. Influences on technical development of water pollution regulation

4.3.1. Purpose of the analysis

Traditional regulation have been criticized for hampering innovations and their diffusion, as discussed in Chapter 2. It is often suggested that permitting does not motivate an operator to reduce pollution below the limit stipulated in a permit. This implies a lack of incentives to innovate. This is a critical argument against a policy instrument, because without further developments in technology it will be difficult to achieve a better level of environmental protection in the future. The problem will become more important in the future, because easy solutions have already been used and in many areas better environmental technology is either not known or too expensive to use.

Traditional regulation is, after all, based on the use of coercive power. However, it would be wrong to conclude that all impacts of traditional regulation could be directly associated with the use of coercive power. The regulated industry—not to mention other actors, such as suppliers to the regulated industry—may do something due to the regulation despite an absence of concrete legally binding obligation to do so. If a permit authority, despite the objection of an operator, sets an emission limit in a permit at a level which cannot be achieved by the technology in use or planned to be adopted, the operator would be forced to adopt a new technological solution. I call this kind of impact of a permit a coercive impact. If an operator adopts new technological solutions which it would not otherwise have been adopted in order to anticipate a coming decision, the regulation has had an indirect impact on technological development. The anticipation may occur before the application for a permit is submitted or during the negotiation process. This kind of impact can be called non-coercive. It could be argued that what I call a non-coercive impact is based on the potential use of coercive power. Be that as it may, it appears in the form of anticipation. To understand the effectiveness of regulation the distinction between coercive and non-coercive impact is relevant.

Regulation is far from being the only factor which has an effect on innovations and their diffusion. Other factors, such as opportunities for cost-savings and the demands of customers, also affect the technological solutions developed and adopted by the profit-maximising mills. State intervention, like permitting, constitutes only one explanatory factor with respect to a certain phenomenon among many. The difficulties in ascertaining whether the

intervention has caused a certain impact are discussed as an impact problem. Despite all difficulties related to the identification of the role of different factors affecting the same phenomenon, a change of the environmental performance of the regulated industry should not, without a proper analysis, be seen as a result of only one factor.

The purpose of this chapter is to evaluate the impact of a regulatory instrument on innovations and their diffusion. The instrument concerned is wastewater permitting under the Water Act in Finland. The study is focused on the pulp and paper industry and the period studied is between 1970 and 2000. Thus, the study does not cover the impacts of integrated permitting, which will be discussed in the following chapter. The evaluation is made at two different levels. Firstly I consider the regulatory approach towards innovations and their diffusion. The main elements of water pollution regulation, including the role of general and individual standards as well as institutional structures, have already been presented and discussed above. It was then noted that the control is based on differentiated standards adopted under the wide discretionary powers of permit authorities. Now I will go one step further in the analysis of the regulatory approach by asking what the relevant elements of permit decisions are with regard to technological development. Thereafter these elements—as well the reasoning behind permit conditions—are analysed. Secondly, on the basis of the material gathered, I consider whether it is possible to distinguish any positive or negative impact of the permits on innovations and their diffusion. The focus is on the impacts of the permits on the regulated installations, not on indirect impacts on the whole technological network, including suppliers and other actors, to which they belong. Due to this restriction the overall picture will be incomplete, but it would be impossible to carry out a study without limitations in its scope.

The field of industry to be examined is the pulp and paper industry (hereinafter ‘the industry’), which has traditionally been one of the major polluters in Finland. The total number of paper and board mills was 37 and of pulp mills 19 in 1999, which was the last whole year, when sectoral water pollution control regulation was in use. The load of pollution from the industry has decreased significantly in recent decades despite a significant increase in production capacity. The biological oxygen demand was approximately 445,000 t/a in 1972 and less than 19,000 t/a in 1999. The suspended solids load was approximately 221,000 t/a in 1973 and less than 20,000 t/a in 1999. The production capacity of paper and board mills in Finland has increased from approximately one million tons to almost 13 million tons per annum over the past 30 years. The production capacity of pulp mills has increased over the same

period of time from more than one million tons to more than 11 millions tons per year.\textsuperscript{522} It is worth noting that the figures would not be so positive if other parameters such as phosphorus and in particular nitrogen were used, though the total load of both phosphorus and nitrogen started to diminish in the 1980s. However, the goals set for the industry generally in the National Water Protection Programme for 2005 were not achieved with regard to phosphorus and nitrogen. In addition, the industry is still a major source of biological oxygen demand and suspended solids among all industrial sources.\textsuperscript{523} However, the numbers show that a significant technological development has occurred.

4.3.2. Material and methods

The evaluation is mainly based on two sources of information: decision-making material (in the first instance and at appeal bodies) and thematic interviews. The document produced as an output of decision-making contains, in addition to the permit itself, a description of the administrative process as well as facts and opinions presented during the process. Due to the vast amount of lengthy documents, it was not possible to analyse the documents related to all mills. Thus, 6 mills\textsuperscript{524} were selected and their permitting histories over 30 years were analysed. Different regions and different types of mills were included in the selection. Four of the mills produce pulp and paper products, one only board and one only pulp. The number of major decisions (including at least a new emission limit value) was 23.

The thematic interviews were undertaken during the spring of 2000. The total number of interviews was 21 (paper and pulp mills: 6, the industry at national level: 3, regional authorities: 6, the national authorities: 6). Three of interviewees were employees of the mills, whose permitting history was examined. All interviewees from regional administration were either employees of the supervisory authorities or the Water Courts issuing the permits examined. The interviews were recorded, transcribed and thereafter coded with N-Vivo software. The interviews were conducted by different members of the research group,\textsuperscript{525} though I alone am responsible for any deficiencies in this analysis.

The decisions, despite being very long, were often poorly grounded. Lengthy descriptions of the features of the activity and often complicated

\textsuperscript{522} Pollution load in the 1970s: the Finnish Environment Institute. Production capacity in the 1970s: \url{http://www.forestindustries.fi}.
\textsuperscript{524} The mills are located in 6 different places (Äänekoski, Kaskinen, Kuusankoski, Pietarsaari, Simpele and Tampere) but, after several business arrangements, are nowadays owned by two big companies, M-real and UPM-Kymmene. Arrangements such as the merging of two companies have not changed the fact that each mill is regulated by its own permit.
\textsuperscript{525} The interviews were carried in a research project led by Professor Mikael Hildén, Report of the project: Hildén \textit{et al.} 2002.
administrative procedure took up most of the space. Typically the courts have justified their decisions by merely quoting the essential sections of the Water Act with minor modifications. The courts have only seldom made clear which facts led them to justify the exact content of a permit. Thus, a significant number of different kinds of facts is presented in the documents, but still it remains somewhat unclear which of them the decision-making body has deemed relevant. During the last few years the courts have improved the quality of their decisions by presenting the underlying facts more clearly.

The reliability of different sources of information varies from one matter to another. Documents are more reliable than interviews e.g. with respect to the exact content of permits and the opinions expressed during the procedure. On the other hand, documents naturally do not contain reliable information on the coming impacts of the permit, though they may contain information on the impacts of previous permits. This deficiency can be overcome in certain cases by recourse to interview material. The documents do not reveal which other factors than the permitting have influenced the behaviour of an operator. In this respect, the interviews give a better basis for analysis. Because the two sources of information complement each other, both are used in this study.

4.3.3. Relevant elements of permits

Static standards, which remain the same over long period of time, do not foster in the long run technological development. Thus, from the technological development point of view the gradual tightening of standards is crucial. No provision requiring a review clause to be included in wastewater permits was inserted into the Water Act until 1987. In fact, the starting point of the original Water Act of 1961 was that a permit is granted for the time being. Despite the wording of the Act most wastewater permits included a review mechanism already in the early years of the implementation of the Act. There are, however, some exceptions. Due to the lack of a proper review clause in permits issued in the 1960s, two mills did not get proper emission limits before the mid 1990s.

The impacts of a permit on technological development depend on the standards used. In Chapter 2 many types of standards were identified, among them product, process and performance standards. One of the main justifications for emission limit values lies in their measurability. In the 1960s environmental standards were often so loosely determined that they were not enforceable in practice. Quantitative obligations were needed so that the operator knew exactly what the allowed level of pollution was. The use of conditions determining the type of technology was problematic because it

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526 Hollo 1976, 383. In 1971 the Supreme Administrative Court (KHO 1971 A II 94) ruled that because it was impossible to assess the environmental consequences of discharges in the long run, it was not justifiable to issue a permit for the present. The case concerned a paper mill.
constrained operators excessively. The introduction of emission limit values was an improvement in both dimensions: being able to define the environmental objective clearly helped enforcement and left the operators free to choose the means.

Process standards, known to be problematic in relation to technological development, were rather seldom used during the period studied between 1970 and 2000. Among the 23 permits examined, the end-of-pipe technology to be used was specified in four permits. In all four cases it was the operator who proposed the type of technology in her application for a permit. In addition, there was a case in which the operator was determined to treat a special part of the wastewater chemically or in comparable way. In this case, too, the operator was, in principle, free to use any technique whatsoever. Thus, despite a few exceptions the operators have generally had the freedom to choose the purification technology. Typically the effluent treatment obligations have been given in very loose terms like an obligation to treat wastewater “in an appropriate way” or “by using modern technology”. Furthermore, other process standards were used which were obviously relevant for environmental impacts, though not apparently have any affect on the general development of technology. In this category of permit conditions mention can be made of those defining the location of a discharge tube. Product standards, though important for air pollution control, have not been used in the wastewater control of pulp and paper mills.

There were also permit conditions which did not fall into any of the categories mentioned. Most of these permit conditions were of minor importance in relation to the technological solutions adopted by the industry. They regulated matters other than technology or the dynamics of permit mechanism. However, one particular type of conditions, namely research and development obligations, explicitly aim to improve technology and, thus, this category must be considered as relevant to technological development.

None of the interviewees considered process standards to be relevant with respect to technological development more than on a minor scale. Furthermore, there is no other evidence available to suggest that process standards have had a significant impact either in a positive or negative sense on technological innovations or their diffusion. The impact of a permit, according to the interviewees, largely depends on the emission limit values defined therein. Some of the interviewees also acknowledged the relevance of risk analysis obligations. Such permit conditions have gradually become more common, although their exact impact to the practical solutions was not pointed out. In the rest of this analysis I will concentrate on emission limit values and research and development obligations.
4.3.4. Emission limits

Types of emission limits in use. The degree of differentiation of standards extended to the strictness as well as the type of standards. Supervisory authorities systematically promoted certain emission limits on policy grounds. However, the decision-making body, the Water Court, was not bound to follow the proposal of a supervisory authority though, in practice, it often did so. Before 1970 there were hardly any numerically defined emission limits in the industrial sector studied. Thereafter, due to a change of policy resulting from the establishment of the National Board of Waters in 1970, emission limits using suspended solids and biological oxygen demand as parameters spread to permits. Due to problems of enforcement it took more than a decade before most of the pulp and paper mills were controlled by emission limits using these parameters. Later other parameters (e.g. phosphorus, AOX) have also been used in emission limits, and the spreading of these parameters into permits has also been slow, partly due to the length of the permit cycle and partly for other reasons.

Emission limits were either (1) mass-based emission limits, (2) rate-based emission limits, or (3) emission limits as target values (hereinafter target values). A mass-based emission limit refers to the absolute amount of pollution over a certain period of time, (e.g. 1 ton of suspended solids per day). Rate-based emission limit is typically defined per ton of paper or pulp produced (e.g. 1 kg suspended solids per ton of paper produced). A target value differs from other emission limits by its legal character: a target value is a goal to be achieved. If the target value (defined either as mass or rated-based standard) is exceeded, it not necessarily a violation of law, but requires the operator to take measures in order to achieve the target value again. Table 1 presents the types of emission limit values used in the 23 cases examined.

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M: mass-based emission limit; R: rate-based emission limit; T: target value
Mass-based limit values were the main type of emission limits used in the period studied. The role of rate-based emission limits and target values was additional. For a short period of time in the beginning of the 1970s rate-based emission limits and mass-based limit values were seen as alternatives. Among the cases studied, the mass-based emission limits have become more stringent with each permit issued. The number of permits including an emission limit has increased so that nowadays each mill has such a permit.527

Among the cases examined rate-based target values have been imposed three times for the same parameters as mass-based emission limits. In two other cases target values were defined as mass-based standards for parameters other than mass-based emission limits. In these cases where the target-values were defined for the same parameters as mass-based standards, the aim was to foster the operator to go beyond the level of mass-based emission limits. An occasional exceeding of the target level was possible, though the operator was obliged to inform the authorities of this and to take steps to avoid exceeding it in the future. A parallel target value with consultation obligation is an attempt to avoid problems related to mass-based emission limits. While designing a mass-based emission limit, the authorities must take into account the variation of discharges. Thus, a mass-based emission limit based on ideal circumstances, would be violated in case of a malfunction. On the other hand, if all kinds of malfunctions were taken into account, a mass-based emission limit may be too loose. A target value may, instead, be set on the basis of ideal circumstances. Thus, a technological solution of the operator must be so designed as not to exceed the target value while the installation is working normally. In addition, the interviewees report that target values are used as a signal to the operator that an emission limit for a new parameter or more stringent emission limit values will be coming at the next permit cycle. Particularly with respect to a target value defined by using another parameter than that used for a mass-based emission limit, the indicative role has been essential. A rate-based emission limit has another kind of function than a target value: if production is temporarily reduced e.g. due to reduced demand for paper, a rate-based emission limit will ensure that the level of discharges will be reduced accordingly. Thus, the main function of a rated-based emission limit parallel to a mass-based emission limit value is to ensure appropriate management of the purification system, not to determine what kind of purification system must be adopted.

A standard which comes into force immediately after the adoption of it does not leave the operator any time to develop new technological solutions. He has only two options; he may either adopt a technological solution available at the time of the decision or reduce production. Thus, the emission limits of a new

permit do not give a stimulus for innovative measures assuming that the operator refuses to reduce the production. From the perspective of the development of technology, it is important that the authorities leave time for an operator to adjust. Out of the 23 examined cases there were 16 such cases where at least one of the emission limits came into force more than one year from the day when the final decision came into force (in the 70s: 6 out of 10, in the 80s 6 out of 6, in the 90s 4 out of 7). The longest period was almost 6 years and typically the time was between 2 and 3 years. A period of 2–3 years is a rather short period for any major innovation. In addition, although there have been some emission limits with an adjustment period of more than a year, most of them have come into force within a shorter period of time. This therefore indicates that the emission limit values have been used to foster the diffusion of technology rather than to give impetus for new innovations. However, the regulatory mechanism as a whole can give a stimulus for innovation if the trend of tightening of standards is predictable. In this case operators may anticipate the coming standards and develop technological responses to standards which do not so far officially exist.

Design of emission limits. There is a variety of factors affecting the design of emission limits. The overall regulatory approach was, as explained above, fairly flexible. For example, the absence of statutory standards is characteristic of Finnish water pollution control. The law did not specifically determine how the emission limits should be designed. Instead, the legal grounds for a permit decision defined in law were rather vague. The law, as it then stood, referred to absolute obstacles and the weighing of different public and private interests, to the assessment of environmental protection measures not exceeding reasonable cost and, later, to the BAT principle. These expressions do not provide detailed guidance for decision-making and leave wide discretionary power to the administration. Thus, it is worth asking how the administration saw the factors affecting the design of emission limits and analyse whether the rationale behind the factors has a positive or negative impact on the technological development.

In the interviews the representatives of the environmental administration mentioned five different general factors which affect the design of standards, in particular emission limits. None of them listed all five factors, although all individual factors were mentioned by several representatives of the administration. The factors are as follows:

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528. The same applies to some other countries, like the UK (Ball 1997, 107–109), though not to all countries. The German pollution control system is often considered to be based on different kinds of statutory standards.
1. The historical data on the discharges of the mill concerned
2. The stage of the investment cycle of the mill
3. The general policy line
4. Technology available at reasonable cost
5. The state of the environment

Regarding technological development the historical data on discharges is irrelevant if it is used only to correct the level of emission limits to reflect the new actual level of discharges. In this case emission limits follow technological development, not the other way round. From the notion that standards designed purely on the basis of historical data as described above cannot alone give a real stimulus for innovation, it does not follow that historical data could not be used at all in the standard-setting process. If historical data is used as one element if the process, it may increase predictability, which, in turn, is important for technological development. The use of historical data may also have negative effects, as was indicated in the interviews. Interviewees reported that those operators which had managed to reduce discharges exceptionally well in the past were “rewarded” by even stricter limits in the future. As was pointed out by representatives of the industry, this undermined the motivation of operators to go beyond the emission limits and may have a negative impact on the technological development. Thus, historical data alone is not sufficient for drafting emission limits to foster technological development. On the contrary, using historical data alone may even have a negative impact on innovations and their diffusion.

The relevance of the stage of the general investment cycle appears obvious. If a production line is completely modernized, there are better chances of adopting new technologies which significantly decrease discharges in comparison to mills which only consider the option of renewing end-of-pipe technologies. Thus, if permitting speeds up the general investment rate, its influence is more significant than it would otherwise be. However, on the basis of the interviews, speeding up the general investment rate was not even an intention of the permit authorities. The general investment cycle affects the stringency of emission limits, not the other way round. In other words, there were different standards for old and new installations, although this is not expressly stipulated in the law. This may have had both negative and positive impacts on technological development. The pressure on old mills to adopt new technologies is rather weak. With regard to new installations strict standards may, instead, foster diffusion of technologies. In addition, focusing on new installations is more cost-effective in comparison to a policy requiring all operators to achieve proportionately same amount of pollution reduction. However, the closure of old installations may in some cases be the most cost-effective solution, though this option is not usually even considered a realistic alternative.

The interviewees both from the environmental administration and the
industry referred to a so-called ‘general policy line’ as an important factor affecting the design of a permit. The basic idea of the general policy line is that any new standard should be at least as stringent as the standards previously specified in similar cases. This logic promotes continuous tightening of standards assuming that time after time standards are made stricter than ever before. Merely comparing standards already set in other permits does not result in long-term tightening, but only in similar kinds of standards. However, mere comparison already ensures that backward mills are pushed to follow the general development of technology. Thus, the mechanism has a positive—although limited—impact on the diffusion of technology. By and large comparison to other permits does not encourage radical innovations, because backward mills are required to do roughly the same as others are already doing. Incremental innovations may occur while the specific conditions of a particular mill are adjusted in order to achieve the level of the ‘general policy line’.

According to the interviews, assessment of availability of technology has always been an essential part of the design of permits. This is also clearly based on the provisions of the law. The Water Act, already in the 1960s, required that all protection measures not exceeding reasonable costs must be taken. The introduction of the best available technology principle in 1994 stressed the importance of technology assessment, but did not totally change the ultimate rationale on which the design of emission limits was based. The BAT principle is also relative to the costs of environmental measures. It can be assumed that the principle has pushed the environmental administration to undertake more in-depth assessment, although this hypothesis is hard to confirm on the basis of empirical data. Be that as it may, emission limits designed on the basis of technology assessment result, in theory, in diffusion of innovations. In fact, this is the very idea of the BAT principle. According to the principle, emission limits should be designed so that the industry is forced to adopt the best available technology.

The asymmetry of information limits particularly the theoretical impacts of technology-based standards. Before being able to design an emission limit the permit authority should have an understanding of the alternative technologies available at reasonable cost. However, often the industry knows this better and, thus, may affect the informative basis of setting a standard. The asymmetry of information on the technologies available between the administration and the industry was generally acknowledged by permit officials. As one interviewee put it: “As a whole the administration does not know the technological solutions as well as the industry, because who else could know how to manage the mill but the operator. The operator always has the best know-how.”

representative of the administration claimed that if an operator is unwilling to co-operate, it is not so easy to acquire sufficient information as a basis for decision-making. She also pointed out that the administration is dependent “to large extent on the know-how of the operators.” However, yet another interviewee expressed an opinion that previously the permit authorities were better informed than the industry about the purification technologies.

Furthermore, the industry has much greater resources to invest in issues related to technologies than the administration. In addition, to make an assessment of the technological possibilities of a particular installation, general information on innovations is not sufficient. Information concerning the specific conditions of each installation is also needed. In this respect the administration will always be dependent on information provided by the operator (on the basis of a legal obligation or otherwise). The point of departure in technology assessment should moreover be the whole technological solution planned to be adopted. However, the interviews indicated that the permit authorities concentrated their limited resources on end-of-pipe technology. This may result in neglecting opportunities related to the development of process technologies and does not directly foster the development of process technologies. On the other hand, if the development of process technology is a more efficient solution as a whole, and the trend of coming standards is predictable, the industry may choose to develop it instead of adopting possibly inefficient end-of-pipe technologies.

One way referred to in the interviews to avoid the difficulties related to the asymmetry of information is to base the design on the comparison to the real discharges of other mills. This means that the environmental performance of other installations is used to exemplify what level of pollution reduction is achievable. This, as well as comparison to the standards of other mills, gives an incentive to the backward mills to follow the general technological development and is a mechanism to foster the diffusion of both end-of-pipe and process technology. Even more, it could result in a positive vicious circle: while designing emission limits, pioneers are used as examples for laggards, and thereafter some of the laggards raise their level of environmental performance in response to tightening standards to the extent that they become examples in relation to former pioneers. However, the dynamics of this development requires that there are pioneers willing to go beyond defined emission limits. The motivation to go beyond emission limits must lie elsewhere than in regulation itself. In this sense this dynamics fosters rather diffusion of technology than encourages new innovations.

Although the legal regime is fairly flexible, its reactive nature may restrict the setting of standards intended to foster technological development. An example may clarify this point. In a certain case an operator applied for a permit several years before the installation concerned was to be started up. However, the administration refused to issue a permit on the grounds that the
technology would likely improve before the start-up of the mill. However, the Supreme Administrative Court\(^\text{530}\) considered that this was not justifiable. The permit should have been issued on the basis of information available at the time of issue. In other words, the permit authority should only require the use of such technologies which have been demonstrated to function. As a solution to the problem that emission limits may be out-dated even before they come into force, the Court pointed out that the operator may be required to apply for a review of a permit in the future. The review of a permit, which takes place after the basic technological choices have been made, however, comes too late. If the up-dating of standards takes place after the major investments have been made, they will certainly not affect the structural elements of the technology.

In principle, an emission limit could be pro-active. The design of emission limits could be based on emerging technologies instead of technologies demonstrated to function. An approach which forces the industry to develop a technology is called a technology-forcing approach.\(^\text{531}\) With regard to the installations studied, this approach was never used. The emission limits have been based, as the decision of the Supreme Administrative Court referred to above suggests, on existing technological ideas which have been proved to function. The interviews also support this interpretation.

Depending on the state of the environment it may be possible to set standards stricter than the best available technology principle requires. Traditionally the state of the recipient water has been one factor to be taken into account in the design of standards. This has led, in principle, to a more marked differentiation of standards than it would otherwise be the case. Some of the interviewees reported that the most stringent emission limits have indeed been imposed in those permits which regulate sensitive or heavily polluted areas and then spread to other permits. The qualitative material used in this study does not allow the truth of this to be tested.\(^\text{532}\) In theory, this kind of design means a greater impact on the diffusion of innovations than the BAT-based approach, because then the operators would be required to adopt technologies more developed than the best available technology, i.e. emerging or even technologies not yet emerged. The interviews did not support the hypothesis that the poor state or sensitivity of the environment had been used as an argument to opt for a technology-forcing approach.

**Impacts of emission limits.** The statistical information presented at the beginning of this chapter shows that there has been a significant reduction of absolute discharges despite a major increase in production during the last

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530. KHO 2 October 1996/3085.
531. Derzko 1996, 19 and the literature mentioned in the references.
532. Mickwitz 2003, has analysed the issue on the basis of statistical material.
decades. Most of representatives of the industry considered that the impact of permitting on this development has been considerable. This can be taken as an indication that there has been an impact on the technological solutions behind the discharges. However, the representatives of the industry also systematically pointed out that other factors have also exerted influence in the same direction. A fairly typical example of the views of the industry regarding which factors have influenced the amount of discharges is the following:

It is a rather complicated matter. It is clear that with respect to wastewater discharges the first remarkable factor affecting the quantity of them has been water legislation, the concrete administrative limits, which have affected e.g. the fact that biological purification plants are so widely in use. But then there is the other side affecting the development. The first big issue with respect to wastewater was the suspended solids … and it was also an economic issue. Raw material is so expensive that nobody can believe that such an amount of raw material could be lost… But after all, the major factor affecting the amount of discharges is the development of environmental legislation.“

In addition to this very general link between permits and technological development, it is possible to find examples of the diffusion of technology at a concrete level on the basis of both Court and interview material. Let us take an example. According to the decision-making material in the case of one sulphate mill there was a dispute between the supervisory authority and the operator concerning the type of purification plant. The authority required an emission limit based on an active sludge plant. The mill opposed this requirement. However, the final emission limit set in the permit granted was so strict that the active sludge plant had to be built. This observation was confirmed in an interview with a representative of the company concerned, as the following quotation from an interview shows:

The relevance of the concrete conditions of a permit has been dramatic. For example, it was a “must” to invest in an activated sludge plant in a pulp mill of our company, because the nutrient limit was so strict and remained strict after all phases of administrative procedure. A purification plant (aerial lagoon), which made it possible to achieve a sufficient level with respect to organic load, had already been constructed, but the phosphorus limit meant that the only possibility to solve the problem was to construct an active sludge plant instead of the aerial lagoon.

It would be easy to give other examples, too. However, casual examples showing the impact of a permit on the diffusion technology do not reveal how often this kind impact occurred and how strong it was. Estimating of the degree of
impact is difficult for a variety of reasons. However, it is possible, on the basis of the documents, to systematically evaluate the coercive impact of permits. The evaluation of coercive impact is based on the answers to the following questions: (1) Are the final emission limits and other permit conditions stricter than the operator originally proposed in the application or agreed during the administrative process; and (2) have the stricter conditions forced the operator to adopt a new technological solution?

The permitting history of 6 mills during the period between 1970 and 2000 was studied in order to answer this question. During that period of time the total number of permits granted to the mills was 23, as mentioned above. Of these permits it was possible to make the two-step judgement with respect to 20 permits. In three cases the information available was insufficient to make a judgement. All these three cases concerned one and the same installation. Hence, a permit-by-permit based judgement can be made with respect to five mills. Of these, a coercive impact was observed in 9 cases. Four times out of 9, when a coercive impact was observed, a major impact on end-of-pipe technology was identified. Three times a new purification plant was established and once the operator solved the problem by leading its wastewater to a municipal wastewater treatment plant. Each of the four cases concerned different installations. In addition, the fifth installation was once forced, according to one interviewee, to adopt a more advanced major end-of-pipe solution than the operator originally proposed. However, it is not possible to confirm this observation from the documents related to the issuing of the permit. The documents suggest that the operator accepted this solution (although not all other permit conditions) before the permit was officially issued. Strictly speaking, this means that this case does not meet the criterion of coercive impact, though one could, on the basis of the interview, still claim that the permitting forced the operator to adopt new technologies. On this basis it is possible to conclude that all five mills with respect to which it was possible to make a permit-by-permit judgement were once forced to adopt a new major end-of-pipe solution between 1970 and 2000. In addition there were five other cases of minor coercive impact, which did not result in identifiable major new investments. In one case the operator was able to fulfil the requirements by improving the management of the plant. Thus, no new investment was needed at all in this case. With respect to the other 4 cases of minor coercive impact, the information available did not allow identification of the concrete measures the operators took to fulfil the requirements of a permit.

The evaluation of non-coercive impact, i.e. the impact which appears in the form of anticipation, is more difficult. An operator which agrees on standards with the supervisory authorities before or during the permitting process, may do so for a variety of reasons. The documents available do not contain relevant information on the reasons why an operator has complied with the administration. The interviews are more reliable in this respect, though it is
not possible to cover all cases by interviews. In addition, an interviewee may behave strategically, i.e. may not pass on all information.

Despite these difficulties it can be noted that the anticipation of coming standards was acknowledged by many representatives of the industry. However, the representatives of the industry typically combined the anticipation of coming standards with other factors, such as improvements in resources efficiency and the demands of the customers. An example may clarify this point. One representative of the industry, who reported that the most important investment in environmental technology with regard to the mill concerned was an activated sludge plant in 1989, stated as follows:

Well, with respect to purification plants the pressure (to adopt new technology—JS) comes from outside. In fact, with respect to the wastewater purification plant a plan for the reduction of discharges was required in a permit in 1983, when we got a permit for a new paper mill. At the same time the customers became interested in discharges … and this resulted in a proposal for a new activated sludge plant in the next permit application. The timetable went so that after we had agreed with the authorities on the effectiveness of the plant, … in 1987 we started to plan the plant, and the construction was started a year later and the plant was taken into operation in 1989, but the permit … came into force in 1992.

Generally speaking, representatives of the industry stressed the importance of negotiation with the administration. In addition, they pointed out that in the context of large investments, the industry takes as a point of departure the adoption of well-developed environmental technology. Typically this was grounded by an argument that investments must last tens of years, not by referring to the immediate demands of the administration. Some representatives of the administration agreed with this view. Furthermore, many representatives of the administration pointed out that in the past, say more than 10–15 years ago, the reluctance of the industry to take environmental issues into consideration, was much greater than nowadays. A representative of the industry described the same idea in other words. He stressed that permit conditions have had more concrete impact in the past and that nowadays other factors, such as the demands of customers, are more important. These observations indicate that nowadays there are fewer open conflicts between the administration and the industry than before. This has made the policy style even more co-operative.533 Whether the administration now has a stronger or weaker position with respect to the industry is another question. One could argue that there is no longer

533. On policy styles, see e.g. Vogel 1986 and Lange 1999.
such an acute need to use coercive power, because non-coercive means are effective enough. This does not necessarily mean that the regulatory process has a weaker influence on the industry than before. Be that as it may, it can be concluded that the existence of anticipation is confirmed in interviews and there are indications that the use of coercive power has diminished.

Most of the examples mentioned in the interviews where regulation has affected the adoption of new technologies concerned the diffusion of end-of-pipe technology. Although the representatives of the industry gave examples of inventions of process technology, none of them reported that operators had adopted a process technology solution solely in order to fulfil the requirements of a permit. A decision to adopt a new process technological solution is typically motivated by several reasons. Instead, one representative of the industry argued that regulation is the main factor behind the fact that e.g. biological purification plants are widely in use. These observations suggest that the coercive impact has been stronger with respect to end-of-pipe technology than in process technology. However, this is a relative conclusion, because end-of-pipe technology and process technology are technically and economically linked to each other. For example, it was reported in the interviews that improvements in water circulation have made activated sludge plants cheaper to establish and this, naturally, has eased the adoption of the technology. Due to the link between process and end-of-pipe technologies, the impact of regulation on process technology may be real, though indirect. An operator may be motivated to improve process technology in order to avoid increased costs of end-of-pipe technology.

4.3.5. Research and development obligations

It is often argued that traditional regulation does not give a continuous incentive for regulated industries to improve environmental performance. One aspect of this criticism is that traditional regulation does not motivate regulated industries to put effort into creating new solutions for tomorrow. One might respond to this criticism by referring to continuously tightening emission limits. However, regulators may take a more straightforward approach to this issue and regulate the production of information with the aim of creating a sound basis for future decisions.

There are a variety of types of permit conditions regulating the production of information by operators. The most typical conditions relate to monitoring of emissions and assessing their environmental impacts. The improved information basis achieved through these obligations may help to identify environmental problems and, assuming that the results are public, increase the pressure to take adequate measures. Both the identification of environmental problems and increased pressure may improve the effectiveness of regulation. However, they have no direct link to the development of technology. Instead,
permit conditions requiring an operator to take research and development activities have such a direct link. The Water Act contained no explicit provision on research and development obligations, though a provision on monitoring was inserted into the Act in 1987 and amended in 1994. However, the option to impose such conditions stems from the general discretionary power of the permit authorities.

The most typical (and most lax) research and development obligation required the operator to prepare a plan for further reduction of discharges. An example from 1971 of this kind of permit conditions is as follows:

The operator must continue to take measures in order to treat the wastewater in an adequate way. To that purpose the operator must continue to make investigations and prepare a plan for the improvement of the wastewater treatment…

This obligation is imprecise, which apparently impairs its effectiveness. In addition, a permit condition on research and development may lack a reporting mechanism, which leaves open how the results of research and development activities will be verified and used. An imprecise permit condition without any reporting mechanism is not much more than a wish on the part of permit authority. However, gradually the quality of the obligations has improved. Obligations were linked to the permit cycle, the reporting mechanism was improved by an obligation to consult with the supervisory authority and the scope of investigations defined more exactly e.g. by referring to certain pollutants. The most developed type of research and development obligations defined the project to be carried out by a reference to the pollution level to be achieved. An example of this kind of obligation is the following from a permit granted 6 September 1999 for an industrial complex including a sulphate pulp mill, two paper and board mills and a chemical plant:

The operator must continue to investigate the means to reduce the amount and load of wastewater. In particular, the possibilities to reduce chlorine and nutrients must be investigated. With respect to the pulp mill the targets are the following:

\[
\begin{align*}
Q & \quad 20 \, \text{m}^3/\text{tp} \\
\text{COR} & \quad 15 \, \text{kg/tp} \\
\text{P} & \quad 15 \, \text{g/tp} \\
\text{AOX} & \quad 0.25 \, \text{kg/tp}.
\end{align*}
\]

\( \text{(Tp: produced ton of pulp)} \)

Most of the 23 permits examined included some kind of an obligation requiring the operator to carry out research and development. However, there were 6 permits which did not contain such an obligation. Three of them were issued in the 70s, two in the 80s and one in the 90s. There were more permits, which
included only imprecise and unspecified obligations concerning technology development projects than permits including precise and specific obligations. The number of permits with the most developed type of investigation obligation was only 5. The facts that in the 1970s no research and development obligation with clear environmental objective was given and in the 1990s such an obligation was included 50% of permits examined may be taken as an indication of the improved quality of permit conditions.

There is no doubt that forcing an unwilling operator to carry out a good quality research and development project is difficult. Taking this into account, it is not surprising that neither the representatives of the administration nor those of the industry stressed the importance of these obligations. However, some representatives of the administration reported that the investigations have resulted in positive outcomes. They have improved the information and created a sound basis for negotiations between the administration and the industry. In addition, representatives of the administration reported that the obligations are also signals to the industry to be prepared for the coming new parameter or new level of emission limit values. Thus, it is on this side of a permit that the future-orientation is included. This point was also acknowledged by the industry.

Most of the clearly defined research and development obligations were so new that follow-up was not possible. However, the first research and development obligation of good quality was stipulated in the mid 1980s and it can be studied as an example.\textsuperscript{534} The obligation given was as follows:

The operator must prepare a plan for the measure to improve wastewater treatment by 31 December 1987, if the operator intends to release discharges after the said date. The plan must include a proposal for the measures to reduce the phosphorus load below the level of 50 kg/d and an investigation on emission limit values on chlorine and lignin. Before the plan is presented to the Water Court, the Board of Waters must be consulted.

The obligation led to an administrative process with several steps. First the plan was presented in due time before the end of 1987. In the plan several past and future protection measures were reported. With respect to the phosphorus limit the conclusion was negative. According to the operator it was impossible to achieve level of 50 kg/d. The operator claimed that such an emission limit would have prevented the rational management of the mill. Despite this the Water Court after having consulted the National Boards of Waters, required another investigation obligation with only some minor modifications to the previous one. After a year the operator again reported that the level was

\textsuperscript{534} The Supreme Administrative Court Judgement related to the case, KHO 27 March 1985/1185.
unrealistic and unreasonable taking into consideration the costs and harms. It evinced, among others, an argument that the technology was not well enough known and the outcome of the possible adoption of new technology might result in new kinds of environmental problems. This time, the Water Court, after consulting the National Board of Waters, imposed a requirement to make a pilot-level experiment. The objective of the investigation was defined basically at the same way as before. The operator carried out the experiment. When the operator applied for the next permit it proposed a phosphorus limit of 75 kg/d. However, the Water Court imposed a phosphorus limit of 50 kg/d in 1994. Thus, after approximately 10 years of investigations and dispute the phosphorus limit was set at the level defined in the investigation required in 1985. No information available indicates that the operator had difficulties in achieving the level stipulated in the permit. With regard to the effectiveness of this procedure one can note that the results of the investigations made on the basis of the research and development obligation were negative. The operator never came to the conclusion that the defined level was achievable. In this sense, the required research and development activities were not effective. In fact, on the basis of the study, it was not possible to show a single research and development obligation, which alone led to an innovation or to the diffusion of an innovation. Thus, there is no direct evidence to suggest that this method of regulating is effective.

Despite this it is still possible to argue, as did many representatives of the administration and some of the industry, that the authorities show the direction of the coming level of environmental protection by research and development obligations and in this way motivate an operator to improve its environmental performance before the next permit cycle. However, the credibility of an individual obligation depends on the coherency of the overall policy. It is not a single condition in a permit, but the policy as a whole, which forces an operator to take the indications of the coming level of environmental protection seriously. With respect to phosphorus there was an ongoing change of policy at the time of the dispute studied. Phosphorus limits have gradually become a common parameter in the permits from 1987 onwards. The individual research and development obligation discussed above was one element of this change and the indicated level of emission limit became reality, although not directly based on the reported results of the research and development efforts required by the permit authority.

4.3.6. Concluding remarks on influences on technological change

Impacts on technological change are considered to be one of the main characteristics of regulatory instruments. This has been stressed particularly by economists, but its relevance has also been acknowledged by private actors and public bodies. Under the Finnish water pollution control regime the strategy to influence technological change has been developed in permitting practice on an individual basis, not by general means such as general standards. The systematic inclusion of a review clause into permits, the choice of pollutants to be regulated, the adoption of emission limits as the main type of permit condition, the increasing stringency of environmental requirements as well as the adoption of research and development obligations have all been developed in permitting practice. The introduction of the best available technology principle into the law could be seen as an indication of a more active policy towards the diffusion of innovations by the legislator. However, the introduction was perhaps not so much an idea of the national legislator as an implementation measure of international law.

The core of the regulatory approach has been gradually tightening emission limits. Once emission limits have been set up, industry is free to choose how to comply with the values. Emission limits do not give an incentive to innovate, but they allow it. In theory, emission limits could be used as a technology forcing instrument, but this has not happened in the field studied. However, performance standards, like emission limits, do not hamper technological development in the same way as process standards could do. These conclusions apply to the regulatory approach adopted towards the industry studied.

Technology based performance standards are an instrument to foster the diffusion of innovations. It has been shown in this study that regulation has had an observable impact on the diffusion of technology, particularly with respect to end-of-pipe technology. Partly the impact has been coercive; partly non-coercive (i.e. it appears in the form of anticipation). Whether even more effective and efficient instruments are available is another matter. In an ideal world it would be possible to imagine instruments which allocate the resources available for technological development in a better way. In the real world other instruments, such as taxes, have suffered from remarkable design problems and have not always had significant impacts, as discussed in Chapter 3. Despite the impact observed there are features of the regime studied which diminish the

536. See e.g. Jaffe, Newell and Stavins 2000.
539. Governmental Bill (HE 323/1994) which led to the adoption of the BAT principle.
theoretical impact. Not all the factors affecting the design of emission limits are relevant or may even have a negative impact from the point of view of the diffusion of inventions. Due to asymmetry of information and the reactive nature of permitting the regulatory instrument does not ensure that the most advanced technology is always adopted. However, in the long run backward installations have been forced to adopt technological solutions ensuring the same level of environmental performance which more progressive installations have already achieved. This impact could be assumed to be stronger in those countries, such as Finland, which have a transparent administrative process and well-developed access to emission information at the level of individual installation.

Permitting is a more effective instrument to foster the diffusion of end-of-pipe technology than of process technology. It was possible to observe an impact on the diffusion of end-of-pipe technology, whereas an impact on the diffusion of process technology was more difficult to distinguish. This applies in particular to coercive impact, and does not rule out the possibility that anticipation may have a bigger role with regard to process technology. It is also rational that permits have stronger impacts on end-of-pipe technology than on process technology. Specific end-of-pipe technology can easily be classified as ‘best available technology’ and therefore demand a level of environmental protection equal to the performance of this technology. For example, because biological purification plants have been considered as the best available technology with respect to pulp and paper mills, this ensures that the invention (or its equally effective alternatives) will spread. Despite this, the rate of diffusion is not fast; usually it takes many years before a technology comes to be considered as the best available technology.

The classification of process technologies as BAT is, a priori, more demanding. However, it has been shown with regard to the Finnish pulp and paper industry that the technologies identified as best available technology in the BAT references documents have spread widely. The variation among emission limits is even smaller than that of actual emissions, which is because the design, operation and maintenance of the technologies, the specific local conditions and the product quality requirements affect the emission.\textsuperscript{540} Other factors than permitting, such as cost savings or customer demands, presumably affect process technology more markedly than end-of-pipe technology. Furthermore, end-of-pipe technology and process technology are technically linked to each other\textsuperscript{541} and the operators must take both sides into account when developing technologies and seeking efficient solutions. Hence, it would not be correct to say that emission limits affect only the development of end-of-pipe technologies.

\textsuperscript{540} Silvo et. al. 2005, 181–190.
\textsuperscript{541} Berkhout 2005, 72.
Though individual emission limits are not used as means to foster innovations, the dynamics of the permitting mechanism as a whole may have such an impact. The dynamics is a combination of different factors. First, operators always have an incentive for cost savings, also with respect to the environmentally relevant technologies. Secondly, there is a general trend of tightening emission limits. This trend provides an implicit incentive to innovate solutions which fulfil the anticipated stricter emission limits in the cheapest possible way. This study was able to confirm that the industry does indeed anticipate. In fact, many representatives of the industry reported that emission limits were halved each time a permit is reviewed and is expected to tighten in the future as well. However, the dynamics is weakened by the reactive nature of permitting. Technology forcing seems to fit badly in the national regulatory style. Neither is there any reason to assume that the dynamics motivates significant investment in research and development in order to make a radical innovation, because following the general development is sufficient. Furthermore, no indication was found in this study that anticipation had led to innovations, although anticipation has been one of the reasons for diffusion of innovations. In another study on the Finnish pulp and paper industry, it is pointed out that though standards have been set on the basis of existing technologies, regulation has had impacts on innovations through anticipation. The conclusion is based on the investigation of the development of two specific technologies. Interestingly, the anticipation of future regulation proved to be wrong. The company developing the technology found, however, other markets for it.

Different methods for production the same product may have different environmental consequences. For example, the fact that most sulphite mills in Finland have been replaced by other mills, such as sulphate mills, has had a crucial role in the reduction of pollution, when measured e.g. by biological oxygen demand. No clear indication was found suggesting that this was a result of permits. On the contrary, general economic reasons for the change were evinced in the interviews and counter-arguments can be presented. It is doubtful that smooth measures could have a significant impact on technological changes of this scale. However, no permit has been disallowed on the basis of the production method. Neither has any permit condition intended to have such an effect been identified. The design of emission limits is based on an assessment of each type of technology on its own merits. The question for the administration is: if a mill chooses this or that production

543. Major, revolutionary changes are called radical innovations, whereas smaller evolutionary developments, which actually comprise the bulk of innovative activity, are incremental changes. Ashford and Heaton 1983, 110.
method, what environmental measures should be considered reasonable? The basic technological choices of the industry have been taken for granted by the administration. This kind of flexibility towards technology is actually a typical feature of permitting. Other instruments, such as taxes or other kinds of economic instruments, are far more suitable to make one production method more attractive than another for the industry.

Under the Water Act a research and development obligation is an instrument intended to foster the development of innovations. In theory one may argue according to the lines of Porter and Linde \(^{545}\) that research and development obligations signal potential technological improvements, focus on information gathering and create pressure to innovate, and in these ways contribute to technological development. In practice the theoretical impact of research and development obligations is diminished by the facts that they were not systematically used and the quality of most of such obligations was poor. The administration also had only weak means to control the amount of resources allocated to the projects by operators as well as the quality of the research and development projects. Thus, the success of a research and development obligation depends to a large extent on whether the operator also has other motives to put its best effort into the required kind of research and development activities.

### 4.4. Integrated pollution control

#### 4.4.1. Introduction

The aim of this chapter is to evaluate the integration of environmental pollution control mechanisms in Finland from the effectiveness and efficiency point of view. The integration was carried out through a reform, which—with the Environmental Protection Act as the centre-piece of the reform—entered into force on 1 March 2000. The main outlines of the reform as well as changes in the administrative structure have been explained above, at the beginning of Chapter 4.

A great variety of activities goes under the integrated pollution control and prevention regime covering all major point sources. The number of installations and activities under the regime is significant, taking the size of the country into account. It is estimated that 26,000 installations need to have an environmental permit. \(^{546}\) By the end of May 2005 the state authorities (regional permit centres and environmental permit authorities) had made more than 3,000 decisions on integrated environmental permits. The number of annual decisions has gradually increased and state authorities made 1,000 decisions in 2005. About 12% of the decisions made by the state authorities are covered by the IPPC Directive

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(so-called ‘IPPC installations’). The number of decisions made by municipal
environmental authorities is not known, but it is assumed to be even greater.
The variation between municipal environmental authorities is great due to the
different size of the municipalities. The environmental board in Helsinki grants
some 20 permits annually, whereas some minor municipalities do not grant
a single permit in a year. Not only permit authorities but also the courts made
several decisions; an appeal is made regarding about 18% of all decisions.

A legal reform has often not only one but several goals. In particular this
applies to profound reforms of established institutions, like that of pollution
test in 2000. The reform was apparently the largest ever reform of
environmental law in Finland. New laws were introduced, and some earlier laws
repealed, but even more were amended. Perhaps among all the recent reforms of
environmental law only the reform of planning law, which came into force only
two months earlier than this reform, comes even close to the magnitude of this
reform measured in the number of sections amended and introduced. Within
such a large reform there are several smaller arrangements which may serve the
overall goals of the reform but which also have their own goals. The creation
of municipal environmental protection regulation (Section 19 of EPA) is an
example of such a smaller reform. It clearly aims to improve the effectiveness of
pollution control as does the reform in general, but in a different way than the
main control mechanism, namely permitting. In addition, the reason behind
it is not the same as those behind the integration of permit mechanisms. Next,
the main goals of the integration of permit mechanisms are identified, though
concentrating on the core ideas means that some aspects of the reform will be
neglected. The main goals have served as a driving force for the development of
integrated permitting at international as well as national level.

The Finnish reform in 2000 was the implementation measure for the
IPPC Directive. From the European perspective, the national legislation
implementing the European legislation has a dual nature: It aims to transpose
the European legal requirements into a national legal system, but it may also
have goals of its own. Sometimes national goals may be united with European
goals so that it becomes difficult or even impossible to separate them. At least
it is clear that measured in the number of activities covered by regulation, the
pollution control reform of 2000 mainly concerned other installations than
those covered by the IPPC Directive, as the figures presented above show. In
this sense the national policy ambition has been broader than the European
one. The idea of integration has been discussed in Finland for a long time
without any formal or even substantive link to European law, and one may

549. Kuusiniemi 1995b, 8–11.
wonder whether the integration of permits would have occurred without an international legal obligation to do so. Be this as it may, national legislation does not make a difference with regard to the principles and rules applied to IPPC installations and other installations, though there is a special arrangement which aims to ensure that all IPPC installations are regulated by integrated permit in due time. However, the reform also brought in changes, which did not have any connection to European law. Again it can be referred to the municipal environmental protection regulation now as an example of an aspect of reform which is of purely national origin. Such aspects of the reform, although they would merit a study of their own, are not later given any special attention.

4.4.2. IPPC policy

The idea of gathering environmental decision-making processes on environmental pollution together has long prevailed among politicians and environmental experts. However, it was not until the OECD’s catalytic work that the idea became a political reality in many countries. The recommendation of the OECD Council on integrated pollution prevention and control can be considered as the break-through of the idea at the international level. Before the recommendation the idea was developed in working groups, particularly in the chemical group between 1985 and 1987 of the OECD for several years.

The OECD Council took a very broad starting point for integration, as can be seen in the following:

Integrated pollution prevention and control (IPPC) is a method to take into account all environmental media simultaneously when attempting to reduce natural resources and energy use, exposure to hazardous substances and releases of pollutants by economic activities. Therefore IPPC promotes the concept of economic progress with reduced resource consumption and pollution.

In the OECD recommendations three different foci for integration were distinguished: integration by substance, integration by source and integration by geographic area or ecological problem.

The broad definition of integrated pollution prevention and control policy developed within the OECD is not restricted to any single type of instrument. The approach adopted in the OECD covers all environmental problems related

554. On the relationship integration of pollution permits and IPPC policy, see Emmot and Haigh 1996.
to pollution and use of natural resources and all appropriate means of public policy to prevent or reduce these problems. Integrated pollution permit is apparently one of the most prominent tools of IPPC policy and sometimes the whole idea of integration of environmental decision-making is associated with this policy instrument. This is understandable, taking into account that the piece of European law, which integrates pollution permits, has included the concept of integrated pollution prevention and control directive in its name.

The core idea of IPPC policy is to abandon policy approaches which tackle different environmental problems as separate phenomena. Methods of control vary from one focus to another. Integrated permitting may be a useful method for the integration of decision-making concerning point sources. Other methods are required for integration strategies focusing on other sources, substances or geographical areas. A significant number of recent innovations of environmental policy can be associated with IPPC policy. In addition to the integration of pollution permits' life-cycle assessment, product policy, eco-labelling, extended producer's responsibility and river basin management are examples of IPPC policy measures. Furthermore, one could claim that the attempts to make large codifications of environmental law, which are based on common principles and legal concepts, and which govern numerous environmental decision-making procedures, are a part of overall environmental integration aiming to increase the effectiveness and efficiency of environmental policy. Many of the instruments listed above can be located under internal integration, where clearly environmental protection related control mechanisms are developed. The other aspect of integration, namely the integration of environmental decision-making into other policies, has recently received increasing attention in political discussion, though the methods are still developing. From IPPC policy both sides are equally important, though making a strict borderline between ‘external’ and ‘internal’ integration may, after all, be difficult. It is challenging to identify the point at which environmental policy ends and other policies starts.

As can be seen in the foregoing, there is no single coherent system of instruments for integrated pollution prevention and control, but different approaches and methods to promote IPPC policy. Different approaches are not necessarily mutually exclusive. Integrated permitting and the river basin approach of the Water Framework Directive (2000/60) can both be seen

555. The river basin management regulated by the Water Framework Directive is a good example of integration based on geographical areas. See Adler (1999) for USA experience of integrated approaches to water pollution.

556. The so-called Cardiff process at EU level resulted in a number of resolutions and recommendations in different Councils of Ministries, though the actual integration of environmental protection into other policies has been considered to be rather weak, see Dhondt 2003, 477–485.
as examples of IPPC policy methods, though they may overlap to certain extent. Theoretically, it could even be possible to distinguish a further level of integration, namely meta-integration of different integration approaches.

4.4.3. The goals of integrated pollution control

The goals of a regulatory reform are not necessarily same as the goals of the reformed regulation. A reform may aim at modifying the existing regulation in some particular way, though it does not necessarily aim to alter its fundamental goals. In the case of integrated pollution prevention and control the aim was not to bring about a change in the general goal of pollution control, i.e. the prevention and reduction of pollution. Instead, the purpose is to change the principles and methods by which this goal is to be achieved. Because these changes are, in fact, reactions to flaws of sectoral pollution control, the goals of the reform are best understood in relative terms. Integrated pollution prevention and control aims to overcome some deficiencies of the previous control mechanisms identified.

During the preparation of IPPC policy the goals—or benefits—of it were discussed in many policy papers as well as in the literature. Essentially IPPC policy suggests that fragmented structures of on pollution control based on sectoral approaches should be replaced by new ones. The main reason for reorganising institutional and legal structures is—according to the OECD—efficiency flaws inherently present in sectoral approaches. In other words, institutional and legal structures of integrated pollution prevention and control may, in comparison to sectoral permits, enable society to achieve a given environmental outcome at lower costs or, alternatively, achieve a superior environmental outcome at the same cost. Thus, one main argument favouring IPPC policy relates to efficiency, as is the case with regard to economic instruments, though the underlying assumptions as to how increased efficiency is achieved differ.557

Efficiency has many dimensions. Frances Irwin has identified seven different reasons for integration, all of which can be considered as one dimension of efficiency: (1) fragmentation encourages the use of control methods that transfer pollutants to other parts of the environment; (2) existing pollution problems are often not accurately identified and therefore cannot be effectively managed; (3) fragmentation does not encourage the prevention of pollution (selection of raw material, design of products, the choice of processes); (4) fragmentation decreases the likelihood that new and more complex problems will be identified and prevented or controlled; (5) fragmentation makes it difficult to set priorities among problems; (5) the current approaches hinder more effective integration.

557. Taken literally a definition of economic instruments by Hahn (an economic instrument = an instrument that is expected to increase economic efficiency relative to the status quo) integrated pollution prevention could be seen as such an instrument. Hahn 2000, 376.
of environmental policy into other policies; (7) fragmentation results in an excessively complex and inconsistent administrative structure.\textsuperscript{558}

The main policy document in which the goals of the European IPPC Directive can be found is the explanatory memorandum of the Directive.\textsuperscript{559} The explanatory memorandum was prepared before the Commission made its proposal for the IPPC Directive, and during the negotiation the Council made certain modifications to the Proposal. However, none of these amendments aimed to change the overall goals. The goals of the IPPC Directive, as identified in the explanatory memorandum are as follows: (1) to prevent or solve pollution problems rather than transferring them to other parts of the environment, (2) to make pollution controls more efficient for industry and effective for the environment, (3) to increase ability to set priorities, and (4) to encourage consistency in environmental law.\textsuperscript{560} The language used in the preamble of the IPPC Directive is not explicitly the same, but the goals are similar. The need for a move towards a more sustainable balance between human activity and socio-economic development, on the one hand, and the resources and regenerative capacity of nature, on the other, is acknowledged. Furthermore, it is noted that different approaches to control emissions into air, water and soil separately may encourage the shifting of pollution between various environmental media rather than protecting the environment as a whole. In addition to the benefits of the integration of the existing permitting mechanisms, the introduction of the IPPC Directive was motivated by a need to extend the scope of permitting. The inadequacy of the Community legislation with regard to prevention and minimizing emissions into soil was presented as an additional argument in favour of the Directive.\textsuperscript{561}

The goals identified in the Finnish legislative material produced during the preparation of the reform are similar to the European goals. However, they can be considered independent in the sense that the problems were seen to be present in the Finnish system. Hence, it was not only a formal transposition of European law, but a reform where national needs and European requirements were combined. In the legislative material it was acknowledged that the inconsistency of environmental law is problematic for the environment, the authorities and the operators. It was noted that the competence on permit authorities and enforcement measures differs in different sectoral laws and that the need for a permit is defined differently in different laws. The administrative

\textsuperscript{558} Irwin 1991, 12–18. These or similar arguments are often repeated in the literature, before Irwin (Guruswamy 1990) and after Irwin (Davies 2001, 70–). The discussion continues in the USA, where no integration has taken place.

\textsuperscript{559} IPPC Explanatory memorandum.

\textsuperscript{560} IPPC Explanatory memorandum, 2.

\textsuperscript{561} Preamble, para 2, 6 and 7.
costs of both public authorities and operators were assumed to decrease because the integration of permit mechanism would decrease the number of decisions. In addition, the risk of unpredictable delay was assumed to become smaller in an integrated system. This would also reduce the costs of operators. Furthermore, it was acknowledged that the conditions imposed in different permits may be controversial and costly. Lack of coordination may result in a situation where environmental problems are transferred from one environmental medium to another and make it more difficult to take into account the results of environmental impact assessment. In addition, it was assumed that integration of the permits would make it possible to shorten the period required for the procedure, enable comprehensive environmental protection and the use of cost-effective measures.

There are two arguments not found in the European legislative material which were used in favour of the reform in national legislative documents. The first concerns the improved protection of rights and interests of stakeholders. This follows partly from a simpler, clearer and more transparent decision-making structure, which is a result of the integration of permits. On the other hand the participatory rights of those affected were also improved in the reform by strengthening the position of non-governmental organisations. This improvement is not related to the IPPC Directive. According to the other argument additional to the European goals, different goals and scopes of application of sectoral laws detrimentally limit the possibilities to impose appropriate permit conditions. In other words, a need to extend the control over gaps between different permitting mechanisms was identified.

In sum, the main goal of integrated pollution prevention and control is to increase the effectiveness and efficiency of pollution control in comparison to sectoral approaches. This argument—with rather similar reasoning—has been used at all levels of government and also in the literature promoting IPPC policy. Although the use of this argument in Finland is no surprise, taking into account the long discussion on IPPC policy, it is important to acknowledge that efficiency and effectiveness, are indeed, key concepts for the evaluation of the success of the reform.

One might think that the primary goal of IPPC policy is solely to increase

562. Hildén, Ollikka and Sahivirta have evaluated the impacts of the reform on the costs of the state permit authorities during the first two years of the implementation of the Environmental Protection Act. They concluded that the reform resulted in an unexpected increase of the resources used, which is exactly the contrary to the goal. The increase of administrative costs may be temporary and hence the original goal of decreasing them may, in theory, be achieved later. Hildén, Ollikka and Sahivirta 2003.

563. Governmental Bill (HE 84/1999) chapters “2.5. Assessment of the Present State” and “3.1 Goals and the means for their achievement”.

564. Governmental Bill (HE 84/1999) Chapter 3.1 “Goals and the means for their achievement”.

565. Governmental Bill (HE 84/1999) Chapter 2.5 “Assessment of the Present State”.

169
efficiency, i.e. to use available resources in a better way. There is some truth in this. However, it is clear that IPPC policy—or at least the reform carried out in Finland in 2000—does not only aim to achieve the same substantial policy goals with lesser costs, but also to raise the level of environmental protection. In this sense it can claimed that the integration of pollution control mechanisms also aims to increase the effectiveness of regulation. However, integration of pollution control mechanism does not aim in a straightforward way at setting stricter environmental standards. In any permit mechanisms whatsoever, where permits are regularly reviewed, it is possible to make environmental standards stricter cycle after cycle. In fact, the previous control mechanisms, in particular that of water pollution control, has also used this technique, as noted above. Thus the underlying reasoning behind the reform is that the integration of permits makes it possible to increase the effectiveness of permitting even more than the trend inherent in a system of sectoral permits. Due to the fact that there are no quantitative goals for IPPC policy in general or for the Finnish Environmental Protection Act in particular, measuring effectiveness is not a simple task. However, it is possible to identify certain mechanisms of the reform aimed to improve effectiveness. These mechanisms are at least partly specific to the Finnish context. Generally speaking, there are many options to integrate pollution permits and though the European law set certain limits for national discretion, it still leaves many options open.

It needs to be stressed that not all the goals of the Finnish reform can be put under the concept of effectiveness and efficiency. The goal to improve the protection of rights and interest of stake-holders, i.e. better opportunities for public participation, is not directly and totally linked to the issues of effectiveness and efficiency. The assumed increased consistency of environmental law can be seen as an intermediate goal, which helps to achieve final goals like increased effectiveness and efficiency.

4.4.4. Legal framework for integrated permitting

Integrated decision-making aims for an optimal solution, which takes into account the environment as a whole and is the most efficient of all possible alternatives. One could argue that a really optimal solution requires that there are no restrictions limiting the number of possible solutions available. Restrictions may prevent the adoption of the best possible solution. In practice, the process where standards and other permit conditions are set is strictly regulated and permit authorities are obliged to take into account tens of different kinds of statutes and other material. Hence, seeking an optimal solution is one guiding principle in decision-making, but it is far from being the only one.

Ideally, well designed regulatory machinery supports the finding of an optimal solution. However, rigidities may also hamper the achievement of an ideal decision. Next I will outline the basic elements of decision-making as
defined in law. Thereafter the issue of possible rigidities will be discussed.

The rules governing discretion regarding integrated permits\(^{566}\) can be grouped on different grounds. Firstly preconditions can be distinguished from rules governing the design of permit conditions. All preconditions must be met before a permit can be granted. The requirement that carrying out the activity must not result in harm to health is an example of these preconditions.\(^{567}\) If the preconditions are met, then the rules governing the design of permit guide the decision-making. Generally speaking, the best available technology principle\(^{568}\) is apparently the most important principle for the design of the permit conditions. In addition, there are a number of context-related factors, like the nature of the activity, the properties of the impact area, the impacts of the activity as a whole, the significance of measures intended to prevent pollution of the environment as a whole as well as technical and financial feasibility, which should be taken into account. The distinction between preconditions and rules governing the design is not sharp. An activity which in the first place would have not have met the preconditions, may meet them after it has been modified through permit conditions.\(^{569}\)

Another grouping can be made between general and sector specific regulation. Sector-specific regulation, as its name suggests, applies only to certain types of impacts. The preconditions and rules governing the design of permit conditions are general ones though it would be possible to trace the origin of different preconditions to the previous sectoral legislation. Instead, certain sections of EPA\(^{570}\) and most of the sub-legislation (decrees) are sector-specific, for example emission limits are defined according to the media concerned.

The reasoning on how standards and other permit conditions are to be set according to the law, can be outlined through a model (below). This structure must be understood as an heuristic model showing the steps of reasoning of a permit authority when considering what kind of permit conditions it should

\(^{566}\) The basic rules are to be found in Chapter 7 of the Environmental Protection Act. The key sections are 42 and 43.

\(^{567}\) The preconditions imposed in Section 42 are as follows: Granting a permit requires that the activity, severally or together with other activities, does not result in (1) harm to health; (2) other significant pollution or risk thereof; (3) a consequence prohibited in Sections 7–9 of the Act; (4) deterioration of special natural conditions or risk to water supply or other potential use important to the public interest in the activity’s area of impacts; or (5) an unreasonable burden referred to in Section 17, paragraph 1, of the Adjoining Properties Act. In addition, causing certain environmental effects is prohibited. The prohibitions are as follows: soil pollution prohibition (7 §), groundwater pollution prohibition (8 §) and prohibition to pollute sea (9 §).

\(^{568}\) The scope of the principles is limited: it applies only to the design of emissions limits and other conditions related to emissions.

\(^{569}\) The linkages between these two kinds of rules have often been pointed out in the literature (e.g. Kumpula 2001, 1234).

\(^{570}\) E.g. Sections 44, 45, 47–49.
impose. The model identifies 6 steps of the reasoning. The heuristic model
does not necessary totally reflect the decision-making process in practice, but
it identifies key elements of it and shows the relationship between different
elements.

Heuristic model for the setting of standards
Step 1. Are the preconditions met?
Step 2. Are the requirements of general source standards (e.g. emission limits set in
decrees) met?
Step 3. Are context related factors taken into account (nature of the activity, properties
of the impact area)?
Step 4. Are the requirements of the BAT/BAP57 principle met?
Step 5. Are the general quality standards met?
Step 6. What is the most efficient combination of permit conditions meeting all
requirements identified previously?

Steps can be understood as cumulative in the sense that the five first steps may
occasion further requirements in comparison to the previous steps. However,
the logic of reasoning of the last step differs from the previous ones: at this
stage the aim is not to identify new environmental requirements but to find
an optimal solution. At this stage the main principle governing the decision-
making is efficiency; in other words, the aim is to find a combination of permit
conditions which meets the previously identified requirements, but still comes
as close as possible to the solution where marginal benefits are equal with
marginal costs. In this sense the integration of permit mechanisms aims to
increase the efficiency of regulation in comparison to the sectoral permitting
mechanisms, though the efficiency considerations may, in practice, still be
biased for a variety of reasons, such as asymmetry of information. Even if the
permit authorities had perfect information on environmental impacts, it is
rather unlikely that they would know exactly the technological alternatives and
the costs of these alternatives for an operator. This is a structural problem of
traditional regulation which is difficult to totally overcome, although measures
to reduce its impact can be taken.

Another source of biased decision-making is the rigidities of the regulation.
Rigidity in regulation may hamper the achievement of an optimal solution,
even though all legal requirements are fulfilled. The main source of rigidity
with respect to the optimal solution seems to be sector-based requirements, in
particular generally applicable source standards. The standards may be so strictly
defined that they eliminate options, which could be better from the efficiency
point of view taking into account the environment as a whole. Preconditions,

571. BAP = best available practice.
context-related factors, requirements of the quality of the environment and the BAT principle do not pose major problems with regard to optimality. Preconditions categorically prohibit the causing of unacceptable impacts, like harm to health, and no efficiency consideration may change this. Optimality, by its very nature, is a context-related matter and quality standards define the goals, which should be achieved through efficient means. The BAT principle is likewise not incompatible with the search for an optimal solution. The principle guides decision-makers to assess technological possibilities on the basis of efficiency and use this information in the design of the emission limits. Though the BAT principle, in its normative capacity, requires efficiency considerations to be taken into account, a formal mechanical use of BREF documents and other similar sources of information may make it difficult to see all available options and so hamper the achievement of optimal solution. This, however, is not a problem of law, but of practice and this analysis is restricted to rigidities arising from the law itself. Hence, next the relationship between general and individual standards of sector-based legislation is discussed. Though applying sector basic source standards is only one step of decision-making, it is worth remembering that a significant part of decrees under the Act can be located in this category.

The standard-setting of the previous water pollution control regime and of the previous air pollution control regime were different. The water pollution control tradition left the permit authorities a great degree of discretion to decide what kind of standards are needed, whereas the general standards of air pollution regulation laid down in decrees have had a much greater role, in particular with regard to major polluters and pollutants. Integration of air and water pollution regulation has introduced a common procedure for standard-setting, though the structural difference has remained.

Section 51 of the Environmental Protection Act is the key element making the difference between air and water pollution control standards. It defines the situations in which it is possible to impose stricter requirements in a permit than the minimum requirements laid down in decrees. The section distinguishes between air and water pollution. With regard to water pollution, there is actually nothing to prevent the adoption of stricter water pollution standards in permits than those enacted in decrees. It is always possible for purposes of the protection of waters. To this can be added that there are still no general standards of water pollution other than those required by EU law and the level of these standards is not high in comparison to the national permit practice. Hence, the water pollution standards stipulated in the decrees serve as minimum standards without significant practical relevance. It seems clear that the legislator intended to maintain the traditional approach to water pollution control regulation, which is based on differentiated standards. This is also pointed out in the motivation for the section in the Government Bill (84/1999 vp) introducing integrated pollution control.
With regard to air pollution, the regulation have recently been amended. Originally in 2000, the law made it possible to impose stricter standards in two different situations: either for the purpose of meeting the preconditions for granting permits or to ensure that quality standards were met. With regard to air pollution control the clause on preconditions refers, in essence, to harm to health or otherwise significant pollution. This means that the best available technology principle as such was not originally a reason to impose stricter requirements in permits than required by decrees. Thus in 2000, the starting point of the Act was still that though there might be better technologies available to reduce air pollution than those fulfilling the requirements of the decrees, these technologies should not be required unless the quality standards were violated. However, apart from exceptional cases, such as particle content in air in major cities, quality standards mainly are rarely violated in Finland. Harm to health or otherwise significant pollution is an important safety clause, but only seldom applied. Hence, the legislator has aimed to maintain the previous approach to air pollution control, also after the adoption of integrated mechanism. The decrees stipulated the minimum requirement and the law, in general, prohibits exceeding them. The emission standards stipulated in decrees are therefore fairly uniform in practice.

Due to intervention by the European Commission,\(^{572}\) the law was amended in 2005.\(^{573}\) The amendment aims to correct the transposition of the BAT principle of the IPPC Directive. The law, as it stands now, allows the use of the BAT principle as a justification for stricter installation specific standards in comparison to the general ones. However, the basic logic of the national regulatory mechanism has been kept as before, and the exemption from it required by European law is limited to a minimum. A minimal approach was used to cope with alien elements of European water pollution regulation in the mid 1990s, when Finland joined to the European Union. Then, however, the purpose was different, i.e. to maintain as far as possible the wide degree of discretion of permit authorities, which has been part of water pollution control tradition in Finland. The technique to restrict the European influence is as follows: The BAT principle can be used as a justification for stricter requirements only if so determined in a relevant decree. Hence, in the absence of an explicit reference to the BAT principle in the decree, the situation will remain the same as before. No change to the decrees has been made at the time of writing this study. The Bill introducing the new law indicated that the decrees implementing

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\(^{572}\) In this context it may be interesting to draw attention to the historical development of the IPPC Directive. The Directive is seen as a compromise between northern and southern European countries. The northern European countries promoted strict predetermined (=unified) standards for new installations, whereas the southern European countries opted for a more flexible approach (=differentiated). Davies 2001, 73.

\(^{573}\) Law 21.4.2005/252.
the LCP and the VOC Directives\textsuperscript{574} will be changed in the future but there is no need to make other changes.\textsuperscript{575} It is also stressed in the Bill that the change of law is not intended to make standards stricter. Hence, the change is considered as a matter of formality only, which should not affect permitting practice. However, it is doubtful if the national legislation actually fulfils the requirements set in Article 3 of the IPPC Directive. In this Article the point of departure is that the principle applies to all IPPC installations, not only to those cases regulated by LCP and VOC Directives. How the regulation will actually be developed and what will be the consequences of these changes remains to be seen, though one can note that the national government seems to aim at minimal changes. However, due to the fact that the national government is not allowed to influence regulatory decisions concerning individual installations, it is uncertain whether and to what extent the new position of the BAT principle, after all, will affect the permitting practice. From a legal point of view it seems clear that the statements in a Governmental Bill cannot change the wording of the law.

Uniform standards bring in an alien element into integrated permitting seeking for an optimal, most efficient solution. If all emission standards were uniform, there would be no room at all for optimality considerations. In this extreme situation the permit authority would not have to do anything but transfer the general standards to the individual permits without any consideration whether the set of standards imposed in a permit were efficient or whether it would result in the best solution for the environment as a whole. Although this extreme is not reality in Finland, it shows that the rigidity coming from uniform standards may, indeed, hamper the seeking of the optimal solution.

4.4.5. Mechanisms for increased effectiveness and efficiency

The benefits associated with integrated pollution control in comparison to the sectoral control mechanism are not realized automatically. They require that the intervention theory of the control mechanism (i.e. the causal chain of influence by which policy produced outcomes)\textsuperscript{576} be changed and this change yields new outcomes. There are in principle two different ways in which the adoption of integrated permitting modifies intervention theories. The reformed regulation may enable the regulation of new environmental problems or old problems are regulated in a different way. The first type of change can be called an extension of controlled matters, whereas the latter is typically labelled cross-media effects. A change related to cross-media effects may either be initiated from the top or from the bottom. The change is initiated from the top when permit authorities on their own initiative impose new kinds of standards and other permit

\textsuperscript{574} Decrees 1017/2002 and 435/2001.
\textsuperscript{575} Governmental Bill (HE 227/2004) motivation for Section 51.
\textsuperscript{576} The concept of intervention theory was presented in Chapter 1.
conditions which substantially differ from those stipulated in sectoral permits. The change is initiated from the bottom when the regulated companies initiate the change. It is possible that the integration of control mechanisms makes it possible for the regulated industry to find new opportunities not previously possible for a more efficient solution regardless of the intention of the permit authority. Next the underlying logic of both mechanisms, namely extension of controlled mechanisms and cross-media effects, will be discussed, first on a general level, and then evaluated on the basis of the empirical material.

Extension of controlled matters. The logic of the integration of pollution control mechanisms may result in the extension of the range of matters controlled, though the total number of regulated activities and installations may not increase. In other words, the same installations are regulated more extensively. This kind of change increases the effectiveness of regulation because new environmental problems become regulated. However, the regulation of new environmental problems may increase compliance costs in comparison to the previous situation. In the sectoral system each instrument has its own area of application and they overlap with each other only to a certain extent. While control mechanisms are integrated, activities which were previously regulated by only a single sectoral instrument come to be controlled by an integrated mechanism which regulates a broader range of matters. Hence, the gaps between sectoral instruments disappear and matters previously in the shadows of different instruments become objectives of the control. From this it follows that the integration of the permit mechanism makes it possible to regulate new kinds of environmental problems.

The Finnish reform of 2000 followed the logic described above. The combined scope of activities in previous sectoral permits of the national law does not significantly differ from the scope of activities of the Environmental Protection Act. However, previously only few activities or installations were regulated by all sectoral laws and typically activities were covered by only two or three previous control mechanisms,577 all of which were designed to tackle certain environmental issues. It follows from this that the control of the activities was limited to those activities which at some historical point in time were considered relevant for the purpose of each control mechanism. The logic of integration resulted in a situation where all releases of all regulated activities can be regulated without limitation stemming from the nature of regulatory instrument concerned. Hence, after the reform it becomes possible that an activity which was previously regulated only by water pollution standards, is nowadays regulated by air pollution and/or waste management standards.

577. Annex 1 in the explanatory memorandum of the Environmental Protection Decree includes a list, where the scopes of different sectoral laws are compared.
as well. An example of this development is municipal waste water treatment plants. Previously these plants were controlled under the Water Act and only releases into water were regulated. Nowadays the treatment of sludge and waste is also regulated in order to minimize the odour and other detrimental environmental effects.

The likelihood that the integrated control under the Environmental Protection Act extends the types of standards and other permit conditions in comparison to previous mechanisms in real terms varies from an activity to another. An integrated permit decision concerning activities which were previously regulated by all sectoral laws namely the Public Health Act, the Air Pollution Control Act, the Water Act, the Waste Act, the Noise Abatement Act and the Neighbourhood Relations Act, are less likely to include new kinds of provisions due to the integration of permits. These activities and installations are typically fairly large.\textsuperscript{578} Instead, integrated permits concerning small, non-industrial activities are more likely to include new kinds of standards, because they were rather seldom regulated by all previous mechanisms.

The needs to regulate new environmental problems were not visibly invoked as an argument in the legislative material for the reform. The material lacks examples of environmental problems in need of new regulation and there is no indication that the regulation of new environmental problems was an essential matter in the preparation of the reform. As one legal draftsman of the Bill wrote “The goal of the reform was not primarily to create totally new permit conditions unknown to previous practice”.\textsuperscript{579} Despite this it is worth noting that there are some references to the extension of controlled matters in the legislative text. It was pointed out in the Bill that the different goals and the scopes of application of the sectoral laws result in limitations to set permit conditions.\textsuperscript{580} Despite this, it seems that the extension of controlled matters is more a result of the logic of the reform than an expressly stated goal of it. With regard to the IPPC Directive, the situation is different in the sense that the IPPC Directive aimed specifically to improve the regulation of soil contamination.\textsuperscript{581} In the national context soil contamination had already been regulated.

\textbf{Cross-media effects.} Cross-media effects are at the heart of integrated pollution control. Comprehensive decision-making makes it possible to

\textsuperscript{578} Like: (1) pulp, paper and board mills; (2) plants producing particle board, fibreboard, plywood, or other wood-based boards or other glue-laminated or laminated wood-based products; (3) ironworks or steelworks or metalworks producing iron alloys; (4) oil and gas refineries, or lubricating oil factories; (5) plants producing plastic raw materials, laminated plastics, latexes or artificial fibres, rubber factories or glue factories; (6) fixed concrete batching plants or casting yards.

\textsuperscript{579} Seppälä 2000, 12.

\textsuperscript{580} Governmental Bill (HE 84/1999) Chapter 2.5 "Assessment of the Present State".

\textsuperscript{581} IPPC Directive, preamble, 6. recital.
compare the environmental impacts of different options and choose a set of environmental standards, which ensures the achievement of an optimal outcome for the environment as a whole at a given level of resources used. There may be different options available, which require a choice to be made between the amounts of releases of pollutants in the same environmental media or of the same pollutant to different environmental media. For example, the availability of different air pollution control technologies may require a choice to be made whether air pollution should be reduced by increasing water/soil pollution. In addition to emissions, the impacts on the use of resources such as energy, water and raw material, should be taken into account, even if they have no immediate environmental effects in the site concerned. It is assumed that a holistic approach will bring about efficiency gains and efficiency gains make it possible to raise environmental standards more than would be possible in a sectoral system.

As mentioned above, both permit authorities and the regulated industry may induce changes related to cross-media effects. The environmental permit authorities may impose new standards and other permit conditions and the regulated industry may exploit the new opportunities provided by the structural change of regulation. In both cases it is assumed that integrated technologies are more efficient than sectoral ones. Although this assumption is common, the assumptions behind their intervention theories otherwise differ. The former requires that the permit authority have the necessary information on technological alternatives and costs associated with these alternatives so that it could impose other standards than in the sectoral system not exceeding reasonable costs. This does not necessarily mean totally new information. The permit authorities may have been aware of technological alternatives even before the integration of control mechanisms, but the rigidities of the sectoral system have prevented them from making full use of this information.

A change induced by regulated industry may take place, even if permit authorities do not have information on (new) technological alternatives and the costs associated with them. The regulated industry may adopt new technologies regardless of the sectoral basis of standards or the authorities may acquire the information in interaction with the applicant (though it is also possible that companies behave strategically and control information flow). A change induced from the bottom can occur only so far as the regulated industry has motivation for a change and the change can be associated with the regulatory shift only if the motivation relates to the integration of permits. With this regard one can note that an operator has an economic incentive under any pollution control mechanism whatsoever to find the most efficient technologies to meet the environmental requirements they are obliged to fulfil. Integrated environmental technologies

582. European Commission, BREF on economics and cross-media effects 2006, 7.
583. Driesen 1998a, 323.
are assumed to be cheaper and possibly cost-saving serve as an incentive to adopt such technologies which rigidities of sectoral regulation would have prevented. Partly the difference between integrated and sectoral control mechanisms comes from timing: when all standards and other permit conditions are set at the same time, the operator should not expect any additional requirements from another decision-making process before the next permitting cycle. This makes it easier for an operator to look for an efficient solution from her own perspective, which best fulfils all requirements. Because defining the best available technology used is prohibited in law, the operator typically has a large degree of discretion regarding what kind of technologies she uses.

Furthermore, the regulated industry as well as suppliers of technologies may also have a motivation to develop and the regulated industries to adopt new integrated technologies, which it assumes will become best available technology in the future. The regulatory change from sectoral to integrated system means that rigidities of sectoral regulation do not prevent the development of integrated technologies. In this respect the predictability of regulation is high and predictability is considered a key feature of regulation with regard to innovations.

If these assumptions hold, one could conclude that the stimulus caused by regulation is not dependent on the information available prior to the commencement of the permit procedure. This, however, requires that there is flexibility in decision-making and the exact formulation of standards is decided in the negotiation process preceding the permit decision. If standards are fixed in advance, the integration of permits loses some of its weight, because then the difference between integrated and sectoral permits partly disappears.

The obligation of permit authorities to seek an optimal solution is expressly based on both European and national law. The purpose of the IPPC Directive is to achieve integrated prevention and control of pollution in order to achieve a high level of protection of the environment taken as a whole (Article 1). In the Environmental Protection Act (Section 43.3) the list of factors to be taken into account in the design of permit conditions, includes “the impact of the activity on the environment as a whole” and “the significance of measures intended to prevent pollution of the environment as a whole”. In addition, the new setting

584. Section EPA 43.3.
585. Kivimaa and Mickwitz 2004, 368.
586. The whole paragraph stands as follows: "When permit regulations are issued, the nature of the activity, the properties of the area where the impact of the activity shows, the significance of measures intended to prevent pollution of the environment as a whole and the technical and financial feasibility of this action shall be taken into account. Permit regulations concerning the prevention and limitation of emissions shall be based on the best available technology. In addition, energy efficiency and precautious, preventing accidents and limiting their consequences shall be taken into account as needed."
of decision-making has implications for how the law should be interpreted regardless of changes in its wording. In particular, the role of the BAT principle is changed, because what is the best for one sector is not necessarily the best for the environment as a whole. Furthermore, the interpretation of the proportionality principle, which links environmental benefits and the use of private resources, may also change after the integration of control mechanisms. An investment which would have been disproportionate in the context of sectoral pollution control may become proportionate if benefits to other media are also taken into account. In sum, integration of control mechanism has fundamentally changed the discretionary powers of permit authorities.587

Seeking an optimal solution where all cross-media effects are considered, means that the structure and the strictness of standards are not designed in isolation from other standards. In an optimal solution priority should be given to the set of standards and permit conditions which reduced the overall pollution most compared to alternative sets. So far as a modification of a single standard or other permit conditions can increase the overall benefits, it should be modified. The design of different standards together requires that the links between them are identified. The links may be technical or economic in nature. The cross-media effects referred to above concerning the relationship between air and water/soil protection can be considered technical, because the environmental effects depend on alternative technologies and one of them must be chosen. Links are economic when the use of (private) resources, not the technological options available, is the crucial factor affecting the design. Restrictions in economic resources may exclude the possibility that all needed environmental investments are made at the same time, and hence a choice must be made on the order they will be done. In other words, prioritising means by definition that at least one permit condition is less strict than it could be, would there not be technical or economic constraints. If each environmental issue is treated in isolation, it makes the decision-maker vulnerable to a so-called “kitchen sink” approach, which means that the likely consequences of each environmental problem for humankind are seen as very significant and deserving almost any level of resource input.588 Naturally, an optimal solution does not necessarily require that any single standard of integrated control should be looser in comparison to sectoral control mechanisms. If integrated pollution control techniques are really more efficient, as assumed, this may open up a win-win situation where both the environment as well as the regulated industries benefit.

The argument that integrated environmental technologies are more efficient was used expressly in the preparatory work of the IPPC Directive. In the explanatory memorandum is written that integrated approach “is likely

to be less costly to an industrialist than requiring him to add on technologies or measures to deal with releases to each environmental medium separately as a new law or programme is implemented protecting each separate part of the environment". Furthermore it is claimed that “the control of releases to all media from an installation is often, according to OECD, significantly less expensive than the introduction of separate technologies for sequential releases to each medium. Such control also increases efficiency in the use of materials, water and energy.” This efficiency argument is used more visibly in the preparatory works of IPPC Directive than those of the Environmental Protection Act and the economic reasoning is generally more clearly present in the explanatory memorandum than the corresponding national document, namely the Bill. However, in the preparatory work of the Act, the goal of seeking more cost-effective measures is also established, although it is not clearly stated whether this goal is to be achieved through the improved possibilities of the permit authorities to design permit conditions or due to some other reason.

4.4.6. Evaluation

Material and methods. The mechanisms which may increase the effectiveness of integrated pollution control in comparison to sectoral ones, were identified above. Next, I will turn to the evaluation of these mechanisms. Hence, the aim is to identify, whether there is any evidence proving that the assumed benefits of the mechanisms have been realized, or, on the contrary, have not. Furthermore, to balance the overall picture, the rigidities of regulation discussed above, will also be tackled.

The evaluation is based on the material gathered for an evaluation project on the implementation of the Environmental Protection Act during its first 2 years (March 2000—March 2002) and results based on this evaluation project. In addition new material was gathered during the summer of 2004 in order to expand the time frame of the evaluation. The empirical material gathered for the evaluation consists of interviews, permit-analysis and a questionnaire. Representatives of the operators (7), organisations (4) and the administration (14, of whom 8 were from the local administration) were interviewed. In summer 2004, a survey was sent to all 16 regional permit authorities; 8 of them responded. The survey aimed to ascertain the opinions of the permit authorities, not of individuals. Furthermore, permit analysis related to the extension of control matters were carried out in 2004.

The evaluation of the impacts of regulation is demanding for several

589. IPPC Explanatory memorandum, 3.
591. On the basis of the evaluation 9 articles were published in a journal (Ympäristöjuriidikka 1/2003). In particular, one article concerns the theme of this chapter (Similä 2003).
reasons. Environmental problems are often complex with long time frames, concern geographically remote areas, and consequences and causes are unequally distributed.592 Another key problem is related to the so-called impact problem. Sverdrup has pointed out that when the long-term effects of laws and regulations are studied the impact problem, which arises from the fact that observed outcomes may be caused by simultaneous events other than the laws and regulation evaluated, become serious.593 With regard to a recently introduced policy instrument, the problem, in addition, is availability of information.594 Evaluation methodology may alleviate the problems related to information availability, though it cannot totally solve the problem. A key concept in this regard is intervention theories, i.e. the ways how regulation is assumed to produce outcomes. The intervention theories for the integrated pollution regulation were constructed above. The verification of intervention theories can be done partly by examining permit decisions. This applies both to the extension of controlled matters and cross-media effects induced by permit authorities. With regard to change induced by the regulated industry, the making of empirical observations is more demanding, because permit decisions are an insufficient source of information. However, interviews make it possible to draw some conclusions on this.

Evaluation of the extension of matters controlled. The change in the law of 2000 has made it possible to regulate such environmental issues which could not previously be regulated. As noted above, the extension of matters controlled is to a large extent a consequence of the logic of the reform rather than a purpose of it. However, although with regard to some issues like energy efficiency, the reform intended to expand the range of controlled matters. Next I explore if the integration of permits has brought in new kinds of standards and other permit conditions.

To make an extensive evaluation of the development of permit conditions would require that all permits be scrutinized. This is not possible due to the huge number of permits granted. Neither is it possible to limit the evaluation to the permits under legal review because reviewed permits are not representative with regard to the general development of permit practice. However, it can be assumed that the designers of the permits, i.e. environmental officers recording permit decisions, would know best to what extent the permits granted after the reform differs from the previous permits.

As a result of the interviews it was concluded that the extension of matters controlled during the first 2 years of the implementation of the new

regime, has in particular concerned non-industrial activities. Examples of such activities mentioned included the following: livestock shelters, fur farms, crushing plants, outdoor shooting ranges, peat production and fish farms, and examples of new kinds of permit conditions mentioned included the following: disposal of manure waste from livestock shelters; the disposal of fish cleaning waste from fish farms; dust and noise from peat production; and regulations for contamination on shooting ranges. The findings above show that the reform has qualitatively changed pollution control practice. However, to put these observations into context, it must be stressed that a major part of the interviewees pointed out that to a large extent standards and other permit conditions were as before. With the exception of horizontal changes covering a number of activities, namely the increase conditions on noise and odour, the interviewees considered that the reform had affected the development of permit conditions only to a minor extent.

On the basis of a survey carried out in summer 2004, it is possible to identify further matters controlled due to the legislative development in the 2000’s. The questionnaire was directed solely to the regional permit authorities. The permit authorities were able to identify several, mainly horizontal conditions covering different sectors which they considered new in comparison to the sectoral systems existing prior to the reform. The examples of the new kind of permit conditions given in the responses concerned the following issues: energy efficiency, environmental risks, noise, odour, waste management; monitoring and exceptional situations.

One respondent made a reference to a specific activity (waste water purification) which had been regulated more comprehensively. The respondent pointed out that odour emissions from the plants, waste management in the plants and treatment of waste water coming into the municipal sewers are regulated in the integrated permits, unlike in previous permits. Unlike in the interviews in 2002, the extension of matters controlled was acknowledged in most of the responses (5/8) to the survey. However, three respondents did not consider that the reform had resulted in an extension of matters controlled. In addition, one respondent pointed out the difficulty to distinguish the impacts of the integration of permits from other changes in regulation.

In addition to the survey which gives general though rough information, all the permit decisions of one sector, namely municipal water purification plants in 2003, were explored. From the analysis of permit decisions it is possible to draw conclusions similar to those of the survey. All permits included new kinds of permit conditions not related to waste water treatment regulated in

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596. In Article 9 (6) of the IPPC Directive the following “other than normal situations” is listed: start-up, leaks, malfunctions, momentary stoppages and definite cessation of operations.
previous permits under the Water Act. In all but one case there were at least two new kinds of permit conditions. Most of permits included permit conditions on sludge/odour, waste management and noise. Thus, the change of permitting practice is clear with regard to this sector.

The findings reported above on the basis of interviews, survey and permit analysis show that the reform has led to the qualitative development of permit conditions. The change concerning minor, non-industrial activities has been more significant than that of major activities. This can be easily been explained by the fact that larger activities have previously been regulated by many or all sectoral laws, whereas smaller ones by only few of these. Despite this, the change has, according to the interviews, been somewhat incremental, meaning that most of the standards used before and after the reform have been of a similar kind. This does not rule out the possibility of an ever-increasing number of incremental changes proving significant in the long run. However, it is still too early to draw such a conclusion.

Standards related to cross-media effects. A major argument for the integration of pollution control mechanisms has been that it makes it possible to take into account the links between different environmental effects. A permit authority may formulate different kinds of standards or make a standard either stricter or looser to ensure that overall optimality is achieved. Next I explore whether permit authorities have imposed standards which aims to regulate old problems in a new way and which can be associated with the integration of permits.

Permits of IPPC installations in the pulp, paper, metal and chemical industries granted during the first two years of the implementation of the Environmental Protection Act were studied to identify cross-media effects. The total number of permits granted during this period for these sectors was 19. However, only four permits included quantitative emission standards both for air and water. This indicates that the installations emit pollutants on a significant scale only in one environmental medium. During the evaluation the researchers did not find references to cross-effects media or other comprehensive considerations related to water/air linkages or any other linkages between different media on the grounds of the permits. Because inter-linkages between environmental problems are an important matter in principle, one could assume that a reference to inter-linkages would be included in the statement of reasons in a permit decision so far as they affect the design of permit conditions. The Administrative Procedure Act, Section 24 (598/1982) and the Environmental Protection Decree, Section 19.2 (169/2000) provide for the obligation of permit

authorities to state their reasons for the decision. With regard to the permit conditions on waste the results were basically the same. No indications of cross-media effects or other comprehensive considerations related to waste regulation were found. Regulation concerned how the waste should be used, treated, stored, transported, and accounted for after being produced. No regulation on the amount of waste was found. Furthermore, it was found that permits contributed only little to energy efficiency issues. Though energy efficiency measures were carried in half of IPPC installations studied, this was mainly based on energy efficiency agreements with the Ministry of Trade and Industry, not on requirements defined in permits.

These observations were confirmed by another analysis within the same research project. In this analysis, too, it was found that in the permits concerning large installations, no references to the cross-media effects were made in the statement of reasons in the permit decisions, although the studied permits regulated emissions to different environmental media. The interviews carried during the evaluation project essentially confirmed the results of permit analysis. The basic message coming from the interviews was that standards and other permit conditions included in the integrated permits do not significantly differ in substantial terms from those included in the sectoral permits. Consequently, interviewees were able to give only few concrete examples in which the integration of permits had turned out to be a relevant factor in the design of standards. However, in the interviews cross-media effects were acknowledged as an important matter on a general level. Some permit officials also expressed the opinion that regulating all environmental impacts at the same time helps to find a better solution for the environment as a whole in comparison to sectoral decision-making.

The examples of cross-media effects evinced by permit officials concerned various matters. The first example related to the timetable for environmental investments. Two permit officials considered that the integration of permits had improved the capacity of the permit authorities to determine which investment should have a priority over others. Another informant stressed that the main point in integration is just the possibility to give priority to the most needed investments. On the other hand, he stated that he had not been involved in any case where the transfer of an environmental problem from one medium to another had been under consideration. In fact, no indication that giving priority to the most important investments had an effect on the final level of environmental requirements was found. The problem was when environmental measures should be taken, not what kind they should be. Another example concerned a balance between different kinds of environmental impacts.

A representative of an environmental permit authority pointed out that the intensity of the use of electricity for waste water treatment has affected to the strictness of emission limits on waste water. Emission limits have been made looser than it would technically and economically be possible, because stricter emission limits would have led to other undesirable environmental effects. He also stated that this is the only example he knows. A third example concerned sludge originating from waste water treatment. One interviewee reported that in the sectoral system the role of the various authorities with respect to the sludge was not clear. In the integrated system there is only one authority involved, which makes the responsibility clear and helps to avoid constraints arising from unclear responsibilities.599

The interviews of the representatives of the regulated industries did not change the picture obtained from the environmental officials. Neither did they see a great difference between standards before and after the integration of permits. A representative of the industry reported that recently an innovation which made it possible to reduce both water and air emissions was adopted in a plant of the feed industry partly to fulfil the coming waste water requirements, but partly also to anticipate air emissions requirements (during this permit cycle no air pollution standards were imposed). The representative of the industry considered that the solution had saved costs. This example, however, only shows that integrated technologies are more efficient than sectoral technologies, but it does not show that sectoral regulation prevented the adoption of an efficient integrated technologies.600

In the survey addressed to permit officials carried out in summer 2004 the cross-media effects were also scrutinized. The officials were asked whether in the formulation of environmental standards the linkages between environmental media were taken into account so that the standards were different than they would otherwise have been. Only two out of eight officials, responded positively to this question. However, they did not give any relevant concrete example how of the linkages had affected the design of the permits. Three other respondents pointed out that integrated permitting had made it possible to set time priorities for different environmental measures (investments), although they did not indicate that the final environmental requirements differed in comparison to sectoral permits. In addition, one respondent stressed the importance of coordination: in the reformed system it is clear which authority has the responsibility. Hence, the indications that the holistic decision-making setting facilitates priority setting gained some support.

The issue whether rigidities originating from the sectoral aspects of regulation have limited the seeking of an optimal solution was addressed in

600. Similä 2003, 129.
the interviews. Generally speaking, the interviewees did not directly claim that the regulation had restricted the possibilities for finding optimal solutions. On the contrary, they claimed that the sectoral aspects are well justified. In fact, some interviewees had not even found cross-media effects at all. Consequently, sectoral regulation has not—according to them—hampered the finding of optimal solution and environmental problems can be addressed separately. On the other hand, some interviewees claimed that regulation had become very detailed and this is to a large extent due to European regulation. They claimed that the number of detailed legal requirements which must be met regardless of their relevance for the solving of environmental problems has increased. Furthermore, one interviewee asserted that requirements related to European waste regulation had prevented the wise use of waste. Hence, there are some indications suggesting that the space of freedom to choose the optimal solution has narrowed due to sector specific regulation.

In sum, it can be noted that despite both public authorities and the regulated industry generally acknowledged the importance of cross-media effects, only few examples of concrete benefits were evinced. Positive attitudes towards the integration were expressed, although the option of taking cross-media effects into account has in practice been realized only rather seldom. In particular, the material at hand suggests that the benefit of avoiding a transfer of an environmental problem from one medium to another is apparently more theoretical than practical. Only one such an example showing that a permit condition was made looser than would be technically and economically possible in order to avoid other detrimental environmental effects was given (energy efficiency and waste water treatment). No other examples were described showing that technical inter-linkages between environmental problems had affected the formulation of permit conditions.

There were, however, some indications that the new holistic approach has enabled new priorities to be set with regard to the temporal order of environmental measures. Some environmental problems were considered more urgent than others, and because economic constraints did not allow them all to be carried out immediately, some of them were given priority. This would not have been possible under the sectoral system, and hence it has improved the efficiency of regulation. However, there is no reason to overstress its relevance, because, after all, only a minority of the designers of permits acknowledged this effect. Another acknowledged benefit is that the coordination for the setting of different standards has improved. Better coordination for setting standards makes decision-making more transparent, helps to avoid unnecessary rigidities and increases the possibilities of the operator to respond to regulation. However, the number of environmental officials who mentioned better coordination as a benefit, was even smaller than the number of those who referred to the setting of time priority for environmental measures.
In the foregoing I outlined an intervention theory of how the integration of regulation may induce cross-media effects which are not due to intentional policy of permit authorities. This may appear in two different forms. Either the regulated industry provides the information required for the setting of new standards for the permit authorities, or then the absence of rigidities inherent in the sectoral permits enables the industry to adopt new technologies. The issue of whether new kinds of standards have been adopted was already discussed.

The change in the behaviour of the regulated industry, which is a result of the general structural change of regulation, is difficult to observe. The permit decisions as such—contrary to the other cases discussed above—are not an adequate source of information, because the initiative comes from the regulated industry, not from the permit authorities. Neither can the interviews of environmental officials provide a good information basis, because they do not necessarily know how those regulated see the changed situation. Hence the interviews with the representatives of the industry are the most relevant source of information for this analytical task.

In the interviews with the representatives of the industry some, albeit rather few, indications of the change were found which were not associated with the individual standards set in permit decisions. The change as a whole was considered something positive even though only rather few changes in actual standards were identified. Some interviewees pointed out that integrated permitting has facilitated the preparation of the permit applications and left a greater latitude for operators to choose the set of environmental measures they consider best compared to the sectoral system. The increased degree of freedom apparently makes it possible for the regulated industry to find low-cost solutions. This is exactly in line with the intervention theory, but it should not be stressed too much because the interviewees were not able to give concrete examples of how this opportunity has been used.

It is hard to draw definite conclusions on whether the integration of permits resulted in such changes which could not be associated with individual standards. Only few traces of this kind of change were found. The interviewees did not claim that the integration of permit mechanisms opened up radically new opportunities to manage environmental problems or adopt new technologies compared to the previous regulatory setting. It can be assumed that if the efficiency gains had been significant, the representatives of the industries would have noticed them more clearly than they did. Though this means that no convincing support for significant change was found, it is important to stress that not all impacts of integrated permitting can be attributed directly to individual standards. Even the structural change of permitting may, in combination with other factors influencing the behaviour of the operators, cause positive impacts in terms of efficiency regardless of what kind of information
on technological alternatives and costs associated with these the permit officials have. The time-scale of such impacts can be assumed to be long.

4.4.7. Concluding remarks on integrated permitting

The integration of pollution permits has been the most important single reform of pollution control regulation in Finland in recent decades. There are indications that the legislative reform has also changed the ways regulation works in practice. According to the survey carried out in 2004, 6 out of 8 permit authorities who responded to survey reported changes which they attributed to the reform. With regard to permit conditions, either extension of control matters or considerations of cross-media effects were reported to have occurred. One respondent had not observed any changes and another pointed out that although changes had taken place after 2000 it was difficult to attribute them solely and directly to the integration of pollution control. The main conclusion on the change is that the effectiveness of regulation has increased albeit not in radical way. The empirical evidence showing that efficiency of regulation has also improved is weaker, though some support was also found for this.

The integration of pollution control has changed the permit conditions used to regulate polluting activities. As a result of the integration many non-industrial facilities, like livestock shelters, fur farms, crushing plants, outdoor shooting ranges, peat production plants and fish farms, have become regulated by a more comprehensive set of standards and other permit conditions than before the reform. It was interesting to find that also permits concerning such installations as waste water purification plants, which have been a key object of regulation for decades, have changed. In addition, new permit conditions with respect to energy efficiency, environmental risks, noise, odour, waste management, monitoring and exceptional situations have spread to new permits. In other words, environmentally relevant issues previously unregulated are now under control. Some of these changes can be explained by individual provisions of law, though most changes can be attributed to the general change. The changes observed are important, even if the change has not been radical. The majority of the standards included in permit decisions are still much the same. The extension of controlled matters has, after all, brought in a minor change taking all activities into account.

Cross-media considerations, which are often considered a key element of integrated permits, had a smaller role in the decision-making than expected. No references to the cross-media considerations to show that they affected the design of permit conditions were found in the statement of reasons in permit decisions. In the interviews, too, only few examples of cross-media

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601. This applies, in particular, to energy efficiency and accidents (other than normal situations) due to Section 43.3 of EPA.
were mentioned. This applies in particular to the technical linkages between environmental problems. Most of the examples mentioned concerned priority setting, i.e. the temporal order of environmental investments, not the balancing of different environmental effects of a polluting activity in the long run. The increased flexibility of regulation has therefore mainly been used to overcome economic constraints. To the extent this has happened, it has increased the efficiency of regulation.

There are many factors explaining incremental change. First, there may be fewer cross-media effects in reality than suggested in the legislative material. The fact that only few permits of IPPC installations included quantitative emission standards for more than one environmental medium can be seen as an indication of this. Although the permit authorities would not see the technical linkages between impacts on different media, one can assume that they at least regulate all significant releases on a sectoral basis. If there is no releases on several media, there can not be cross-media effects.

Another factor is that the evolutionary process towards integrated pollution control started years before the reform now studied took place. Administrative practices have developed towards integrated pollution control even prior to 2000, which could partly explain why the change after the adoption of integrated permitting was not so radical. As early as in 1976 the Supreme Administrative Court laid down the principle that emissions to air, if they were to be carried into waters, shall be taken into account in the formulation of water pollution standards. The benefits of integrated pollution control were actively discussed long before the reform took place and serious policy efforts to establish such a mechanism have been made at least since the 1980s. Hence both the permit authorities and the operators may have partly adjusted their attitudes to the ideas of integrated pollution control earlier to the extent that it was possible under previous regimes. In addition, the legislative development also started earlier. All but water pollution permits were procedurally incorporated in 1992. This reform was incomplete because only the procedure was unified, but substantially it meant a compilation of permits. Due to its specific nature the Environmental Permit Procedure Act did not open up opportunities to fully bridge gaps between permit mechanisms. It nevertheless facilitated the coordination of different activities and in this way fostered an integrated approach to pollution control. Furthermore, environmental management systems, though they have spread only to a minority of companies as discussed in Chapter 3, are based on the idea of integrated management and they may also have contributed to the development. Operators use environmental management systems as a basis for the preparing permit applications, and thus the ideas of integrated management

\[602. \text{KHO 1976 A II 91.}\]
have so been incorporated into the permitting process. In sum, though 1 March 2000, the date when EPA entered into force, was an important day, it is—after all—a part of a process, which started long ago and is still on-going.

Different factors many impede the realization of the optimality inherent in integrated pollution control. One group of factors is the sectoral elements of environmental regulation, which are still strong, perhaps even dominant for the setting of standards. In an ideal world the standard-setting of integrated pollution prevention aims at an optimal solution, where each permit condition should be modified unless the modification cannot increase the overall effectiveness and efficiency of the final decision. If some permit conditions are fixed in advance so that they must be the same regardless the specific conditions of the case concerned, this may, in principle, bring down the overall optimality of a permit decision. The formulation of sector-specific uniform technology standards is based on sectoral technologies, and does not take into account the full spectrum of possibilities. Thus, the rigidity involved in uniform standards hampers the achievement of potential efficiency gains related to integrated pollution prevention policy by eliminating the flexibility of decision-making. Although permit authorities may have greater discretion with regard to one environmental medium, partial flexibility may result only in sub-optimal solutions.

Not only the idea of integration, but also the full realization of the best available technology principle may suffer from rigidities in regulation. Standards, like emission limit values, based on the principle cannot remain the same for a long period of time to be effective. This, however, is likely to be the case if they are given in the form of a decree. Thus, both the integration principle and the best available technology principle require flexibility downwards and upwards; to make one permit condition stricter may require letting another one be looser. After saying this, it needs to be stressed that the idea of totally abandoning sector specific general standards is unrealistic. The mere fact that general standards are anchored in European law and many changes would require action at European level makes a radical shift difficult. Furthermore, there are also some justifications for sectoral uniform standards. They can increase the predictability of decision-making, reduce the information costs of administration, and reduce the potentiality for regulatory capture as discussed in Chapter 2. However, a major part of these advantages would also be achieved, if general standards had the character of a minimum requirement.

What are the impacts of integrated pollution control for technological development? It must first be noted that integrated permitting—like sectoral water pollution regulation discussed above—is a reactive instrument in the sense that permit authorities have limited means to force technological change.

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603. See also Mickwitz et al. manuscript 2006c.
Within the framework of integrated permits, permit conditions must be based on technologies which have been demonstrated to function, not better emerging technologies. Furthermore, a permit authority may not—on the basis of the BAT principle—impose a permit condition requiring the operator to make changes in the process technology. An operator is free to choose whatever process technology it deems fit and a permit authority can only regulate the environmental impacts of the chosen process technology taking into account that the requirements it sets are technologically and economically feasible. In addition, although the IPPC Directive and the Environmental Protection Act prohibit the use of permit conditions defining the technology to be used, this only applies to permit conditions based on the BAT principle. A permit authority may, on other legal grounds, impose such a permit condition.

Despite traditional permit mechanisms are reactive in nature, it does not mean that they have no positive impacts on innovation. On the contrary, regulation may create opportunities for different market actors (regulated industry as well as suppliers) and these opportunities can spur technological development. However, there are other regulatory instruments, which can affect technological change more directly. Furthermore, the legal restrictions referred to above in the setting of standards may, after all, be well-grounded in the long-run from the technological development point of view. Very straightforward technology forcing policy based on specific technologies may reduce the rate of technological change, because it is based on the assumption that permit authorities have the necessary information to make the right choice. Technology forcing policy may, if wrongly designed, prevent the emergence of alternative technologies.

The main advantage of the regulatory change from sectoral permits to an integrated permit is linked to the elimination of the rigidities of sectoral permit mechanisms. However, practically no evidence to show that the structural change of regulation spurred new technological solutions was found in the empirical evaluation. Taking into account the short time period between the reform and the evaluation, this is perhaps not surprising. However, lack of evidence of significant positive impacts does not prove that the opposite is true. The theoretical argument in favour of positive impacts on technological development is still strong.

604. KHO 2 October 1996/3085, explained previously.
605. KHO 8 November 2005/2867. The case concerns a cold store which uses ammonia. The Supreme Administrative Court considered that the BAT principle does not justify an permit condition requiring the use of a substitute for ammonia.
607. A major example of tradable permits. The EU –wide tradable permit for CO₂ can make coal and oil based energy production technologies so expensive as to result in rapid change to other production methods.
An integrated approach means that more technological variables and combinations of them are incorporated into the negotiation process in which the permit is formulated. This strengthens the position of operators—and in particular so-called Big Players\textsuperscript{608}—due to increasing asymmetry of information between an operator and the authorities. It is the operator who knows specifically how the process technology could be developed so that the overall burden of pollution would be decreased. It can be assumed that an able operator will use this opportunity to decrease compliance costs by adopting efficient innovations. Seen from this perspective the permit authorities should let the development take place rather than force it to emerge. This notion, however, should be put in the right normative context. Previously, when the heuristic model of decision-making consisting of six steps was presented, it was noted that at the final step the efficiency considerations had a major role. It is at this stage that authorities should ensure that possible rigidities of other considerations (steps 1–5) do not prevent efficient solution. Other steps should, instead, aim to guarantee the adequate ambition level of the decisions.

It is possible that although all benefits of integrated permitting are not visible now, they will emerge later. In particular, this applies to technological development as just noted. However, also with regard to the formulation of standards, the learning process required for full realization of new opportunities may be long and require one extra permit cycle. The slow renewal of permit decisions slows down the rate of change. The experience from earlier reforms of pollution control suggests that it takes a decade before a new regulatory technique is expanded to cover most of the regulated installations. By now all large installations (including IPPC installations and installations under air pollution reform in 1995) have instituted new permit applications as scheduled by the reform, though the granting of permits is still on-going. This wave of new permits may bring new changes, in particular through the mechanism of extension of matters controlled. With regard to efficiency, the most interesting installations are those which are experiencing a technological change due to other than environmental reasons, because then the operators have a special interest in seeking new, efficient solutions. With regard to the installations where no technological changes are on-going the chances of aiming at efficient solutions may be more limited.

Integrated pollution control increased the flexibility of decision-making and the degree of discretion of permit authorities. This could, in principle, also have negative impacts in terms of effectiveness. In Germany, one argument against integrated permitting has been the threat that it will lead to a situation where the costs of environmental protection have to be taken into consideration

\textsuperscript{608}Mehta and Hawkins stress the importance of the size and wealth of an operator with respect to its response to regulation, Mehta and Hawkins 1998.
on a much wider scale than formerly.\footnote{Koch and Jankowski 1998, 61. See also the definition of BAT in Article 2 of the IPPC-directive.} This, it is feared, may reduce the effectiveness of environmental regulation, because it could result in looser environmental standards in comparison to sectoral regulation. On the basis of the Finnish experience, this does not seem to be the case.

In addition to the legal constraints, lack of good practical methods to valuate different options complicates the search for an optimal solution. To achieve an optimal solution requires that the different options available are identified and their consequences estimated and compared. At the moment there is no practical method widely in use, although methodologies have been explored and efforts to develop them have been made.\footnote{Vasara \textit{et al.} 2002. European Commission, BREF on economics and cross-media effects, 2006.} Some scholars have even considered the comparison of different environmental effects so demanding that doubts have been cast on the very idea of integrated permitting.\footnote{Zöttl 2000, 284–285. On German problems related to the relationship between integration and water law, see Berendes 2002.} No doubt the comparison is difficult, because the causal relationships of environmental problems are complicated and valuation of the detrimental environmental effects demanding. However, the development of methods to identify and assess cross-media effects as well as technologies to deal with these effects will remain a key issue in the future. The methodology developed in the BREF document on economics and cross-media effects may be useful for the assessment of technological alternatives, but it was not planned for the identification of technologies. Thus, that methodology may help in the assessment which of the options available is BAT, but it does not tell which options should be compared.

Despite the critical thoughts presented above it is important to realize that public authorities as well as stake-holders like industry and non-government organisations are by and large satisfied with the reform. This becomes clear through the interviews. There is no principal criticism against the integration of control mechanism or even the way it is done in Finland. This does not mean that pollution control is not criticized at all, but that the message of the critics does not concern integration, but other aspects of pollution control common in all kinds of permits (such as too slow and too bureaucratic processes). This contradicts some views presented in other countries, notably in Germany.\footnote{Zöttl 2000.} Having said this, one can wonder how is it possible that the results of integration in terms of effectiveness are rather small but the consensus on the overall usefulness of the reform is so strong. Partly this may be due to the belief that the benefits of integrated permitting will be realized in the future. Another reason may be that integrated permitting has already brought other benefits, which are not directly linked to effectiveness of regulation measured in terms of...
the amount of reduction of pollution. Clearly, other benefits can be found. The representatives of the industry, each of them being responsible for environmental management in the company concerned, were in favour of the reform because:

- integrated permitting reduces bureaucratic work in the companies
- integrated permitting makes it easier to motivate environmental measures within the company
- integrated, but installation specific permits, make it easier to re-organize the companies (including selling and buying parts of companies)
- integrated permitting is easier to relate to the general environmental management system.

The representatives of the administration used similar arguments in favour of the reform. They stressed the administrative clarity of the integrated system, the abolition of the ambiguities of regulation and the manageability of permitting process. These achievements can be seen as positive outcomes in their own right. Furthermore, it is possible that increased manageability will also increase effectiveness, although it would be difficult to observe. Improving the links between the permitting and the environmental management systems of the companies can increase the quality of information flows. Improved management of the process will make it easier for the permit authorities and the operators to identify environmental problems and solutions for them, as well as generally enable them to concentrate on the essential issues of environmental policy instead of using their time in scrambling through administrative peculiarities and obstructions. In short, it is easy to see positive links between increased manageability and increased effectiveness. However, there is no such relationship between these two phenomena so that increased manageability would of necessity improve effectiveness. Another kind of development is also possible. Furthermore, the positive outcomes achieved so far may not last for ever, though the idea of integrated permits remained the core of pollution control. In particular, if the regulatory machinery as a whole becomes more and more complicated, as many interviewees envisaged due to the continuing regulatory activism of the European Union, this development may consume the benefits of integrated permits.
5.1. Path-dependent and incremental development

In recent decades two important ideological turns relevant for environmental policy have taken place, the first already several decades ago in the late 1960s. In the late 1980s the discussion on sustainable development started, and changed many perceptions related to environmental problems, their causes and solutions. A major milestone in this development was the publication of the report of the World Commission on Environment and Development in 1987. The era starting from this ideological turn has been called ecological modernisation. Ecological modernisation refers to extensive and profound changes of societal institutions and has numerous dimensions. Although legal regulation is only one institution among many, it is hard to see that such a profound change of society could occur without significant implications for legal regulation. It is not surprising to note that ideological turning points have not immediately resulted in the adoption of totally new legal regulation. Nevertheless it is possible that the turns have changed the direction of the development.

The need for modernisation arises from the deficiencies of traditional regulation. Partly deficiencies have been associated with the formulation of traditional regulation and partly with implementation problems. Traditional regulation is claimed to be inefficient and unable to induce technological change. Although it is considered effective in the sense that the defined goals are often achieved, this is not always true, because of delays and implementation problems. Despite a long tradition of criticism of traditional regulation, a closer look at the literature, as discussed in Chapter 2, shows that it is hard to draw generally applicable conclusions. Context-related factors, such as the nature of the environmental problem in question, exact formulation of an instrument, technological options, socio-economic constraints and the legal-administrative environment are equally important. Even efficiency criticism, although correct in general terms, does not apply to all situations. Traditional regulation also has
its own benefits related to effectiveness and public participation. Furthermore, though regulation promotes the efficient allocation of resources in relation to given goal, it does not necessarily foster technological change at the same time. In the long run the ability of regulation to induce technological change can be considered even more important than effectiveness, because the immediate goals of today can only be estimates of existing options and technological change can open up new opportunities.

Recent decades have witnessed rapid legislative change. Tens of environmentally relevant legal acts are adopted annually and the rate of change is rather increasing than decreasing. Most of the laws in force prior to 1990 have been reformed and only few pieces of environmental law in force are more than 15 years old. Not all legislative changes are on a major scale, but the number of manifestly irrelevant changes should not be over-stressed. European influence has been strong in the legislative development since 1993, when Finland started to harmonize its laws with the EU laws. About 30% of all environmental laws adopted between 1993 and 2003 transpose EU laws. The most Europeanised sector of environmental regulation is waste, chemicals and pollution control. Although most of national laws do not have a formal link to EU laws, a major part of the essential legal structures as well the substantial requirements are influenced by EU law.

Regulation has, indeed, been modernized. New instruments have emerged to regulate environmental issues in general and pollution control in particular. Almost one third of the new legislation concerning pollution (including mobile sources) since 1988 was related to economic instruments. Only in the field of natural resources was the use of economic instruments relatively speaking at the same level. Pollution control legislation related to procedural instruments, like environmental management systems and eco-labels, was also adopted. Still the change has been gradual and path-dependent. Most legislation concerning economic instruments relates to issues such as fuels, electricity, agriculture and forestry, which have been regulated by economic instruments for a long time. Traditionally these instruments have mainly promoted other public goals (revenue raising, sufficient level of agricultural income) than those of environmental policy, though the environmental dimension has recently strengthened. Hence, legislative change to large extent relates to traditional regulation.

The overall effectiveness of the actual alternatives to traditional regulation has been limited. Environmental management systems, in particular that based on EMAS regulation, have spread only to few large companies. The evidence of the effectiveness of liability regimes is weak. Only two sorts environmental agreements (one concerning energy efficiency and another purification of contaminated land) are systematically used. It is likely that energy taxation has reduced the emissions of traditional pollutants (e.g. SO₂ and NOₓ), not only
that of CO₂ emissions. Nevertheless the design of energy taxation has reduced its effectiveness and empirical research has not be able to attribute significant impacts to it.

The conclusion of the weak effectiveness of alternatives to traditional regulation, can only be drawn with some reservations. Firstly, the notion does not necessarily apply to other fields of environmental regulation, such as pollution control from mobile sources. Secondly, the need to reduce greenhouse gases is changing this picture. Traditional permitting is generally considered an inefficient instrument to regulate greenhouse gases and there are no reasons to challenge this view. The tradable permit scheme, instead, is not only more efficient, but can also be a more effective instrument to achieve the goals of climate change policy. Thirdly, traditional pollution control regulation has a limited role with respect to energy related issues generally, like the choice of fuel for energy production and energy efficiency. The amount of pollution from energy production installations depends largely on the type of fuel used for energy production and traditional pollution control regulation has little impact on this issue, though it regulates the quality of some fuels (sulphur content). Instead, energy taxation has affected the choice of fuels and has in this way also affected emissions caused by energy production. The main means to influence energy efficiency are economic and voluntary. Traditional regulation has contributed to this issue to a lesser extent.

Traditional regulation, in particular the permit mechanisms, has remained a major instrument for the pollution control of point sources. It has been a major tool in combating a number of environmental problems, like eutrophication, acid rain, toxic substances, persistent organic pollutants, heavy metals, volatile organic compounds and waste. Traditional regulation has not been replaced, instead it has been modernized in order to improve its effectiveness and efficiency. Several significant and numerous small amendments of the legislation have been carried out. The rate of reform has been fairly high, in particular during the last two decades. The standards and other permit conditions have gradually developed partly through legislative means and partly through administrative and legal practice. The role of the Courts has been stronger with respect to water pollution than air pollution due to the different legal structures. The permit mechanism has been made more dynamic by making the altering of standards easier and developing the periodic review mechanism. The best available technology principle and other principles guiding decision-making have been adopted. Improvements such as joint implementation and coordination with other activities have contributed to the effectiveness of regulation. The process has been made more transparent and the public has better options than before to participate at different stages of the decision-making procedure.

The change has been continuous, but incremental and path-dependent.
This applies even to the most profound change, namely the introduction of integrated permitting in 2000. The adoption of an integrated permit system was based on the previous development in terms of administrative as well as legal structures. The path-dependence is particularly obvious for the development of administrative structures. In terms of personnel the greatest-ever reform of environmental regulation was accomplished with minor changes. The new administrative structures were built on the previous ones so far as possible and the staff of the permit authorities remained to a large extent the same as before the reform. As a result, there are two regional permit authorities and these do not have any other explanation than history. However, path-dependence is also strong with regard to standard-setting. The specific traditions of water and air pollution control were aimed to be saved, though it would be contradictory to the very ideas of the integration of pollution control and the best available technology principle. However, the integration of permits has paved the way for new reforms. Recently a step towards more widespread application of the best available technology principle in air pollution control was taken, likewise the introduction of the process of combining regional permit authorities.

Despite the gradual nature of the development, regulation has caused changes. This study shows that former sectoral water pollution control did promote technological development. It was shown that the regulation has had an observable impact on the diffusion of technology. Partly the impact has been coercive; partly non-coercive (i.e. it appears in the form of anticipation). It was found that permitting tends to be a more effective instrument to foster the diffusion of end-of-pipe technology than of process technology. An impact on the diffusion of end-of-pipe technology was discernible, whereas an impact on the diffusion of process technology was more difficult to discern. This applies in particular to coercive impact. However, through anticipation of standards the water pollution regulation affects the development of process technology. The approach adopted in administrative and legal practice was reactive in the sense that no technology forcing occurred and the permit mechanism did not aim to influence basic technological choices.

Two main mechanisms by which integrated permitting may increase the effectiveness of environmental permitting were identified. The first mechanism takes place through regulation of new environmental problems (extension of controlled matters) and the second through the regulation of old problems in a new way (cross-media effects). A change related to cross-media effects may be induced either from the top or from the bottom. The change is induced from the top when permit authorities on their own initiative impose new kinds of standards and other permit conditions which differ substantially from those set in sectoral permits. The change is induced from the bottom when the regulated companies initiate change which rigidities of sectoral permits have previously prevented. The motivation of the regulated industries to induce a change
comes from new opportunities to adopt more efficient solutions. Due to the asymmetry of information, the change from the top has its limits.

During the study it was possible to show that the integration of permits has, indeed, resulted in the regulation of such environmental issues, which could not be regulated under the actual sectoral system in use prior to the reform. In particular, small-scale facilities like livestock shelters, fur farms, crushing plants, outdoor shooting ranges, peat production plants and fish farms have become regulated by new kinds of standards. Some indications of cross-media considerations were found, although they had a smaller role in the decision-making than expected. Most of the examples found concerned prioritisation, i.e. the temporal order of environmental investments, not the balancing of different environmental effects of a polluting activity in long run. It was not possible to find sound evidence that the regulated industry has induced any change through the adoption of new, more efficient integrated technologies. This may be because such impacts of regulatory change require a long time-frame.

Despite these critical notions related to cross-media effects, it is important to stress that the permit authorities, the regulated industries and non-governmental organisations were satisfied with the reform. This was attributed to the other resultant benefits of the reform. The process has become more manageable both for those regulated and the regulators. In addition, those regulated made references to savings in administrative costs.

Incremental and path-dependent change is not necessarily bad. Building on traditions helps to avoid unnecessary risks that a new regulation will not work, institutional memory lost and long-term capacity weakened. Uncertainty related to major changes may create strong resistance and cause ineffectiveness. Despite this, gradual development may have impeded the full realization of the benefits of the integration of environmental permits. In particular the role of the sectoral elements of pollution control regulation should be noted. In an ideal world the standard-setting of integrated pollution prevention aims at an optimal solution, where each permit condition should be modified unless the modification cannot increase the overall effectiveness and efficiency of the final decision. If sectoral permit conditions are fixed in advance so that they must be the same regardless of the specific conditions of the case concerned, this may undermine the overall optimality of a permit decision.
5.2. Prospects for future regulation

Next some key issues for the future development of environmental pollution control regulation will be outlined. The focus lies on the instruments of regulation as opposed to its environmental goals, with special reference to the integrated permit mechanism. Instead of trying to predict how regulation will develop, I aim to outline drivers for change, present possible solutions and identify challenges related to these solutions.

In the European context, a key concept for recent discussion on the future direction of regulation generally—not only that of environmental regulation—is ‘better regulation’. It should be recalled that better regulation policy has originally aimed not only to promote efficiency (in the sense of allocative efficiency and cost-effectiveness) but also effectiveness, transparency and public participation. However, it is undeniable that the concept is contested and it is not yet clear what will emerge from political struggles related to better regulation policy. Still, it is likely that the coming reforms of environmental regulation will not aim solely to foster one goal like effectiveness or efficiency, but a combination of different goals. The real challenge is to find the right combination between these goals.

The discussion on the lightening of regulation can be seen as a part of better regulation policy. What does lightening mean for the development of environmental permits? Making more efficient use of public resources does not, in principle, require a change of legal regulation. The structures of permit authorities and administrative practices can be made more efficient even though the legal environment of those regulated remains untouched. While the merging of the two regional permit authorities (regional environment centre and environmental permit authority) looks promising in terms of efficiency, the previous budgetary constraints of authorities have already forced them to increase the efficiency of administrative practices. Hence, reforms which are based merely on more efficient use of personnel have their limits. Reforms of legal structures are needed to make the change significant. Such a reform tends to concentrate on numerous small and medium sized activities instead of large ones. The very idea of lightening is to remove resources from activities causing minor environmental harm to activities causing serious harm and hence to direct the resources in the right place. From this it follows that lightening could increase the overall effectiveness of regulation, though it would not do so with regard to specific activities. Small but numerous activities are relatively speaking likely to require/consume more resources than a few large ones. Hence the potentiality for the reduction of administrative cost is greater. Next some examples of how regulation could be made lighter will be discussed.

The repeal of obsolete, both substantial and procedural, legislative requirements may make regulation lighter. A reference to obsolete regulation
has also been made in the context of EU better regulation policy. Taken literally, the notion that lightening of regulation aims not to reduce effectiveness then repealing obsolete regulation should not be equated with deregulation. The problem is, however, that finding obsolete legislative requirements is not necessarily easy. In Chapter 3 it was noted that the rate of legislative change has been high. There are only a few pieces of legislation in force which were adopted prior to 1990 and the continuous process of change has apparently reduced the amount of obsolete legislation. The basic tension with regard to this form of lightening is, naturally, the very definition of obsolete regulation, which may be contested. What is considered obsolete is a matter of social definition, which varies over time. However, asking why regulation may become obsolete might pave the way for rational discussion. There are a number of possible reasons. The first one relates to changes in the technological and economic environment of the regulated activities. The techno-economic environment may change so that the activity no longer causes the same environmental harm as before. Depending on the nature of the change, even the repeal of regulation may be an adequate response to such changes. Another reason for obsolescence would be that a requirement has turned out to be ineffective or disproportionately expensive in relation to what is achieved. For example, if labour intensive production of information does not increase the effectiveness of a decision, then there may be no need for it. In this case a new understanding of effectiveness and efficiency may serve as a reason to reconsider the need for or form of regulation. The most contested reason for the repeal of obsolete legislation relates to changing perceptions. The need for regulation may come under discussion even if no changes in the material world and knowledge have occurred. Repealing obsolete legislation on the basis of changing perceptions comes conceptually close to deregulation understood as a reduction of the ambition level of environmental protection. However, to what extent this really is so is a matter of analysis of the particular case. In the future key tasks related to obsolete provisions of legal regulation are the identification of relevant changes in the techno-economic environment and the assessment of benefits of different requirements.

Another type of lightening would be a change from permits to a lighter form of control. Direct regulation, which has legal effects on those regulated without a transmitting administrative decision or regulation, which involves only registration without any detailed examination from the authorities’ side, could produce some efficiency gains. Information gathering, negotiations and designing the permit decision take the majority of the time of permit authorities and applicants. These activities can be well grounded, if each activity is individual in nature. However, this is not necessarily true in all cases and changes in the material world may change the situation. The most serious problem with regard to this form of lightening arises from public participation.
Public participation has been considered one of the main benefits of traditional regulation and constitutional law requires that the public authorities endeavour to guarantee everyone the opportunity to influence the decisions that concern their own living environment. However, it could be possible also to incorporate a public participation mechanism into direct regulation. If, for example, direct regulation were done by the municipalities, as is already possible, it could be possible, either by law or otherwise, to establish an extensive public participation mechanism in each municipality. Direct regulation could also be imposed temporarily, which would mean that a new public participation procedure would open up later. A control mechanism based on registration, instead, could include a retrospective participation mechanism. Although finding a good solution to meet both efficiency demands and public participation requirements is not an easy task, the development of new methods for public participation will be a crucial issue for coming reforms.

A third form of lightening is, surprisingly, an increase of regulation without other amendments to the existing regulation. Though this may sound like a contradiction in terms, complementary regulation in forms of soft law can produce some benefits. The information gathering takes time and money for a variety of reasons. The regulatory know-how of the new people involved is not necessarily perfect, flexible legislation may be open to various interpretations or there may be discrepancies and uncertainties in regulation. A new soft law instrument, like a BAT document or a guideline, could help to cut these costs. This method of lightening has the advantage that it is not politically contested in the same way as other methods. However, it entails another problem. At the moment it is still a matter of belief whether increased use of soft law would make regulation more efficient or not. Environmental management systems have not previously spread widely and model decisions are used already now. The benefits of both models and guidelines can be limited if the reality is more complex than the situation outlined in guidelines and models. Hence, the challenge with regard to this method of lightening lies on the technical side: how to produce a soft law instrument which really reduces the resources used for information gathering.

A fourth method of lightening relates to a new balance of responsibilities between public authorities and private actors. In addition to the decision proper as to what standards should be used, there are other regulatory functions, like monitoring and enforcement of decisions. Although they all are important phases of a regulatory process, one may well ask whether they could be privatized.613 This may sound rather radical, but in fact it has in a sense and to

613. In the literature, even private standard-setting is discussed. Driesen 2003, 139–161. Driesen’s idea of private standard-setting includes rather traditional information strategies (based on an idea that better public information about pollution levels results in increasing level of environmental protection), and more a radical idea about an environmental competition statute.
some extent already occurred. Monitoring is to a rather large extent in the hands of the operators in Finland. Privatization of enforcement means, in essence, that private actors can take legal action against a polluter when environmental standards are violated. Non-governmental organizations have a right to initiate legal action against polluters in cases where they consider that law has been violated, though this option is not often used so far. Privatization of regulatory functions, however, suffers from serious problems. As a matter of principle it is not clear to what extent a transfer of regulatory functions should be considered acceptable. There is a risk that the privatization of regulatory functions may lead to both effectiveness and accountability problems. Hence, it may result in deregulation and the uncontrolled use of public power. In a country where the public expects the state to take care of these functions, the risk may be even greater. Furthermore, it is not clear whether privatization would decrease the overall costs, when the use of both the public and private resources is considered. On these grounds, this direction does not seem attractive.

Lightening is an important theme for future regulation, but still only one among others. Next I draw attention to some other ways to improve the integrated pollution control mechanism. First policy mixes are discussed. In Chapter 3 it was noted that voluntary approaches have not been very effective means of achieving environmental goals. The experience of using environmental management systems as a complementary regulatory instrument to traditional regulation is not encouraging. Hence, I pay attention to the relationship between economic instruments and traditional regulation.

The relationship between tradable permit schemes and traditional permits is counter-productive in the sense that they should not be used to regulate the same pollutant from the same source, as noted in Chapter 2. However, the use of both instruments to regulate different pollutants is not counter-productive so far as the releases are not technically linked. At the moment some EU member states have adopted a scheme for trading traditional air pollutants and the possibility of using this kind of trading instrument has been discussed at the European level. The discussion relates to the pollutants regulated under the National Emission Ceilings Directive (2001/81, NEC) and covers major traditional pollutants contributing to environmental problems like acidification and eutrophication. Although the relevance of acidification as an environmental problem is decreasing, eutrophication continues to be one of the key problems for future environmental policies. If all NEC substances were included under such a scheme it would rather radically change the relevancy of traditional permitting with regard to air pollution. An alternative would be to use a tax instrument as a part of the policy mix. In political terms, the attractiveness of tax instruments is known to be rather low in the European context and hence development depends on national initiatives. In contrast to the case of tradable permit schemes, the relationship between taxes/charges and
permitting is generally complementary. Hence, there would emerge no need to narrow the scope of application of the permit mechanism if charges/taxes are rightly appropriately designed.

The integrated pollution control of point sources has advantages which are likely to persist. Possible changes related to lightening and/or development of policy mix, will not change this. Integrated permitting is a unique instrument in the sense that it makes possible the balancing of measures between a number of environmental issues. This has positive impacts in terms of administrative costs, though what is more important is its implications for compliance costs and technological development. The use of integrated pollution control induces technological development towards integrated technologies and this should increase the efficiency of pollution control in the long run.

For integrated pollution control, a key question is what standards should be used. A major principle for standard-setting is and will remain for years to come the BAT principle. The principle which forms the basis of individual permit conditions promotes technological development, in particular the diffusion of innovations. The basic idea is that the standards are set on the basis of the performance of forerunners and that this will force the laggards to follow. Then, when technologies continue to develop, new laggards would again be forced to adopt the technologies of new forerunners. This model does not explicitly aim to guide the operators to develop such technologies, which would be superior to the (advanced) existing ones. Still the continuous tightening of standards can spur innovations, although focusing policy measures this alone would not be correct. A permanent problem related to a BAT based approach is asymmetry of information. As a response to this problem reference documents on best available techniques are produced, but it is unlikely they will provide an adequate and up-dated information basis for all situations. There is no simple solution to the information problem. At the moment, the problem is not that of legal rules, but of practice.

Should preference have been given to uniform or differentiated performance standards? This issue is a delicate one, and requires a balance policy. Reflection on this matter can be started with the notion that the size of markets matters. European-wide markets are more attractive than the market of a small country for those who develop technologies. Hence, European-wide standards, all other things being equal, tend to induce more innovations than national ones.

However, it is not only the size of market but also the ambition level of standards which matters. The ambition level is relevant for effectiveness, but also for innovations. There are two reasons why a system of European-wide uniform standards tends to result in a lower ambition level of standards in comparison to differentiated standards. First, the rate of change would slow down. It is unlikely that the European legislator would be able to frequently update numerous uniform standards for several pollutants and numerous
branches of industry as technology developed. The slow progress in the making of BAT reference documents is not encouraging. In addition, it would be unrealistic to suppose that the European legislator would be able choose only uniform standards with great potential to spur innovations and leave others differentiated. Secondly, uniform standards which do not take into account individual differences between polluters would promote average, not innovative, solutions. A uniform standard for the whole of Europe would always be a compromise with numerous interests and it should work in many different situations. Thus, decision-makers tend to be even more cautious and leave even larger economic safety margins when designing standards for the whole of Europe in comparison to standards directed at individual installations. Differentiated standards enable public authorities to put more focused pressure on the regulated industries.

Furthermore, differentiated standards promote efficiency of pollution control. The exact set of standards should not be the same for all installations according to the very ideas of integration of pollution control. The technologies used in different installations vary and so should the regulatory response. Hence, uniform standards fit badly with the idea of efficient pollution control, in particular with regard to large scale activities.

Having said this, some balancing remarks require attention. Remarkable differences of standards would, indeed, be problematic for innovations. They could split the markets into small segments, which might not be attractive for those developing technologies. In addition, research has shown that the predictability of future standards increases the innovation effect of regulation. In order to achieve a sufficient degree of similarity and predictability, coordination of the content and tightening rate of standards is required. This could be achieved through an exchange of information on permitting practices.

With regard to the form of standards, there is a general consensus that emission control should, as far as possible, be based on performance standards instead of process standards. Performance standards are better for efficiency as well as for innovations. This notion is already incorporated into the IPPC Directive and into the Environmental Protection Act, though only with regard to standards based on the BAT principle. Process standards based on other legal grounds may still be imposed. Although it is not possible to claim that the use of process standards is always bad, they should be avoided if possible. A preference of for mass-based standards in comparison to rate-based standards could have positive impacts in terms of innovations. Mass-based standards would induce the regulated industries to innovate when they expand their production. Rate-based standards, in turn, allow the expansion of production using the same level of environmental performance.

The regulated unit of the integrated permit is an installation. This concept is crucial, because (partially) the efficiency criticism against permit mechanisms
stems from the size of the regulated unit. An installation is a rather small unit and the economic trend of splitting companies into pieces is making the units even smaller. Hence, the question is whether the regulated unit could be expanded to cover several entities currently treated as separate installations. Some mechanisms going in this direction are already included in the existing regulation, though they are only intended for use in exceptional cases. The first possibility concerns joint implementation. This instrument was designed for the purpose of climate change policy. However, the mechanisms could also be used for the control of traditional pollutants from two or more national sources. In its present form the instrument has not been used widely and the means to make it more attractive deserve to be investigated. The second possibility relates to simultaneous processing of separate activities. Now as a precondition for this it is required that the joint impact of separated activities is significant in terms of permit considerations and that they are pending simultaneously with the same permit authority. This limits its possible use. Different applications are only sporadically pending at the same time. However, in the long run a purpose-orientated permit authority could, through coordination of the expiry dates, create better opportunities for the use of this instrument. In addition, if the operators are willing to co-operate, there would be no obstacle to instituting the applications in a coordinated manner. Although these existing possibilities deserve to be explored, it needs to be pointed out that in terms of efficiency both instruments are of limited relevance. After all, standards are defined separately for each installation. Common emission standards would have a greater impact.

There are at least two additional, albeit unused, ways to enlarge the regulated unit. Instead of granting a permit for an individual installation it could be granted for an industrial estate or for a company. In principle, regulating an industrial estate and a whole company would make it possible for a larger unit to allocate resources to the cheapest source of pollution. However, there are a number of problems related, for instance, to information and the determination of responsibilities to be solved before these instruments can be taken into use.

Expansion and differentiation have featured in the recent development of regulation. In the future, the scope of regulated activities through traditional permits may not be enlarged. However, it does not follow from this that the rate of change will slow down. Pressures to develop regulation come from different quarters. Improving the effectiveness and efficiency of regulation, making it more conducive to innovations and ensuring adequate public participation will all require changes. The future regulation may be even more specifically directed at certain sectors and issues than the present one. The continuous need for the modernization of regulation may mean that the rate of change will even accelerate and the differentiation process continue.
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