Environment and the Single Market

Final Report to the European Commission

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1 Executive Summary

The starting point of the project is the observation that a harmonised approach is still missing within the European Union in regard to a number of environmental policy areas. While many commonly agreed objectives exist on the European level, a relatively lax approach towards Community environmental legislation prevails, thereby leaving it largely to the Member States to determine how these objectives are best achieved. There are many good reasons for this; the national capacities and institutions can be utilised, and variations in local conditions might be more appropriately addressed. However, cross-national differences in environmental standards may persist. Stakeholders and academics disagree to what extent such differences in environmental standards might cause competition distortions and what effects such distortions might have. Of further consideration, is whether the absence of environmental policies on the European level might also cause market distortions. The introduction of European standards might potentially level the playing field and contribute to the removal of market barriers.

The aim of the project "The Environment and the Single Market" was to identify areas of environmental policy where a lack of standardisation in environmental policies led or still leads to competition distortions, and to discuss options to overcome these distortions. To this end, the research team (including Adelphi Research, Freie Universität Berlin, GHK Consulting, Policy Studies Institute and Universität Konstanz) compiled literature reviews, analyzed the historical development of environmental standards and carried out case studies of various depths and methodologies. In the case studies, the extent to which possible variances in implementation of environmental policy cause market distortions was analysed, or if just the opposite, whether environmental policies were contributing to a dissolution of existing market distortions. The case studies focus on environmental policies that potentially impose higher implementation costs in one European country in comparison to another. The project was not concerned with cases that impose non-tariff trade barriers for products; as for these, there is an extensive legal framework.

1.1 *Methodology*

To analyse the existence and the magnitude of environmental policies on the functioning of the Single Market, a definition of competition distortion is required. The term "competition" in classical economics refers to the rivalry between economic actors to sell or buy products and services in a specific market. In theory, the welfare optimum is achieved in perfectly competitive markets in which prices are close to the cost of production and no single company has influence over the prices. Perfect markets are fully transparent and have a sufficient number of competing buyers and sellers, i.e. monopolies or oligopolies are absent. The aim of the EU Single Market policy is to achieve an integrated, unrestricted market allowing for increased competition and thereby increased efficiency of the markets. The related policies that remove market barriers among Member States can be seen as a success story; many services and products may now compete in the largest market of the world. The subsequent effects on prices and economic welfare are tremendous.

However, in a trading bloc like the European Union, there is some tension between a uniform, harmonised approach and the principle of subsidiarity. Member States quite legitimately make different decisions which reflect their national contexts and preferences. These may disturb markets, but are not necessarily market distortions. Only if national decisions contravene political decisions taken at the EU level, they are illegitimate and need to be removed through harmonisation. Such situations are competition distortions, but it is a political decision that determines that the situation is unacceptable. It is neither possible nor desirable to create the same conditions everywhere. This makes it difficult to present a definition of competition distortion independent of its context.

This also applies to potential market distortions due to environmental policies. Market distortions might arise from differences in the degree of internalisation of the external costs associated with the use of environmental resources, thereby potentially giving a competitive advantage to industries located in countries with lower standards. Whether this is a legitimate market disturbance or an illegitimate distortion depends on the motivation and the legitimacy of the underlying decisions.

Due to the 'public good' character of the environment and other aspects that markets fail to address, production costs and subsequently, prices do not fully reflect the use of environmental resources. Environmental economics suggests that costs for environmental resources should be internalised through policy measures according to the 'polluter pays' principle. Undistorted markets from an environmental economics perspective would be composed of markets in which all firms internalise the same costs for their use of environmental resources per unit of resource use, respectively for their emissions. Optimal internalisation would be a situation in which every company bears the full cost of environmental resource usage, resulting in both environmental protection and fair competition (Ewringman et al. 2001).

Competition distortion denotes a situation in which companies are not competing under equal conditions. The reasons for this might be manifold, e.g. due to monopolies, trade barriers, etc. (Van der Laan & Nenjes 2001). From an environmental perspective, competition distortion denotes a situation in which the internalisation of environmental externalities and resulting internalisation costs differ. For example, coal-based power generation, being more carbon intensive than power generation from gas, has higher external costs from CO_2 emissions than gas-based generation. However, without policy intervention to internalise the cost of CO_2 emissions, the higher CO_2 costs of coal-based power generation will not be taken into account, and thus it may wrongly be favoured over gas-fired generation. The failure to internalise the cost of CO_2 emissions can be interpreted as an unfair subsidy by certain Member States. Instruments and other approaches to internalise these and other environmental costs (e.g. through a carbon tax) decrease competition distortion in regard to environmental resource usage and move markets towards maintaining a 'fairer' level of competition.

The introduction of environmental policies often affects some companies more than others (e.g. coal fired plants are more affected by a CO_2 tax than gas fired plants). Operators of coal based power stations may argue that having to buy more emission permits than operators of gas-based power stations puts them at a competitive disadvantage. They may refer to this as a 'competition distortion'. However, it is really a change in their relative competitiveness caused by differences in internalisation costs. The previous lack of cost internalisation is the real competition distortion. The aim of the Single Market policy directly addresses this distortion in competition by forcing polluting industries to pay for their resource use (Ewringman et al. 2001). Thereby, such an environmental policy would reduce market distortions by internalising the costs of environmental resource usage despite complaints from industry.

Environmental policy might lead to competition distortion, if its implementation leads to changes in relative costs that are not caused by the internalisation of negative environmental externalities. This might be the case if some EU Member States were to allocate CO_2 emission permits in different ways; for example, if some were to do so through grandfathering and others through auctions. Companies receiving emission permits through grandfathering might gain a competitive advantage over firms that must pay for emission allowances through auctions. In this case, competition distortion does exist, as grandfathering, in contrast to auctioning, contravenes the polluter pays principle and puts firms who are obliged to adhere to this principle through auctioning at a competitive disadvantage.

From an environmental economics perspective, the application of environmental policy should lead to the internalisation of environmental externalities and thereby reduce competition distortion. In doing so, penalties towards firms which already internalise externalities (environmentally friendly producers) will be reduced. Hence, not only may the absence of European environmental policies but also, differences in the implementation lead to differences in the internalisation and related costs.

Most often, there are different means to achieve certain environmental goals. This is reflected in the principle of subsidiarity. By using directives rather than regulation, discretion for the implementation is left to the Member States. The main question is whether the national implementation fulfils or contravenes the European goals and standards. Central to our approach is the distinction between the 'ideal' implementation and the corresponding level of environmental protection set by the EU policy in comparison to the actual on-the-ground implementation by the Member States. There are a number of both legitimate and valid reasons why Member States may want to choose different ways of implementing a certain EU policy. These include: a better capability of the national administration to fit certain instruments, (higher) national preferences, but also protectionist measures for national industries. It is difficult to distinguish between different justified motivations and potential violations of the treaties.

Competition distortion may arise from government policy when, through differences in policy application, a change in the market conditions occurs. This change is faced by different businesses or sectors in different ways that are unrelated, or even run counter to the objectives of the policy, but have possible implications for their relative competitiveness. Competitive disadvantages from competition distortions (caused by differentiated implementation of environmental policies) begin with policy implementation. Competition distortions must be distinguished from competitive disadvantages that arise from historical reasons, such as inherited industrial structures and technologies that, previous to implementation, had different opportunities to externalise. Furthermore, one must distinguish between costs arising from internalisation (e.g. the acquisition of a new technology or process) and the cost of regulation (a transaction cost associated with a particular environmental policy instrument), both of which depend on the modalities of the particular implementation.

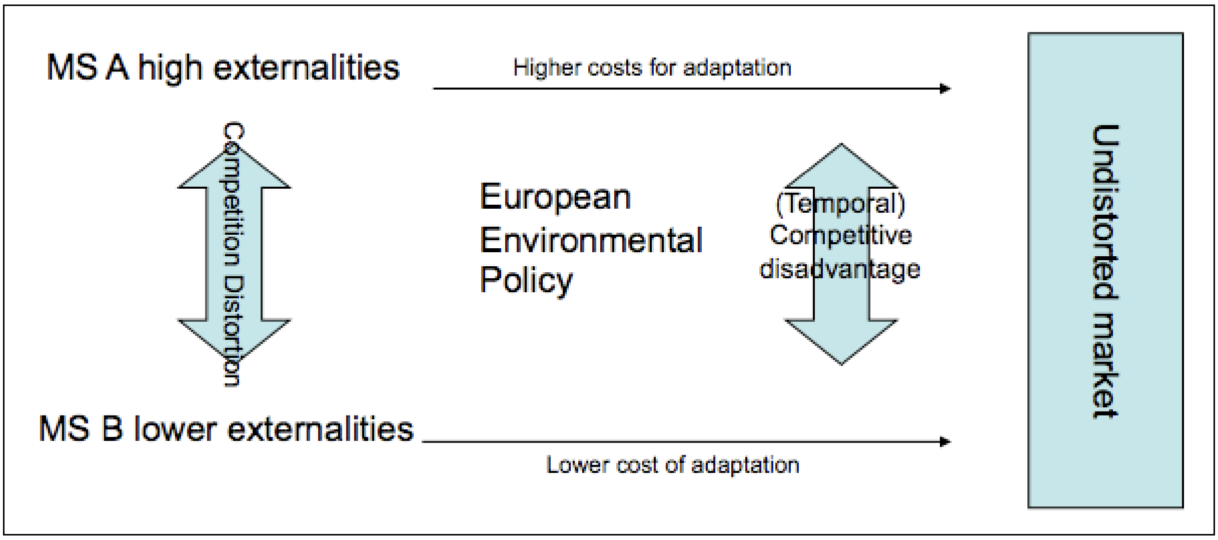
1.2 *Types of Competition Distortion*

Conceptually, one can distinguish four different cases in which regulated business in a Member State (MS) might experience changes in their relative competitiveness and fault EU environmental policy as the cause of competition distortion. According to our argument, there are only two valid cases in which competition distortion actually takes place. The cases are discussed below.

Case 1: European Policy Removes Historical Market Distortion

Industries use different technologies or operate under different costs as they make use of environmental resources. Markets are distorted because 'dirty' industries are subsidised. The European policy causes an internalisation of environmental costs. As a result, industry with higher costs for adaptation declares a competitive disadvantage brought on by this policy. In this case, there is indeed a temporary competitive disadvantage, but as a result of the European policy, market distortions are soon removed.

Figure 1: Case 1 - European policy removes historical market distortion. Example: Uniform 120 gr/km CO_2 emissions for European car industry implies higher costs in countries with car producers of heavy motorized automobiles.

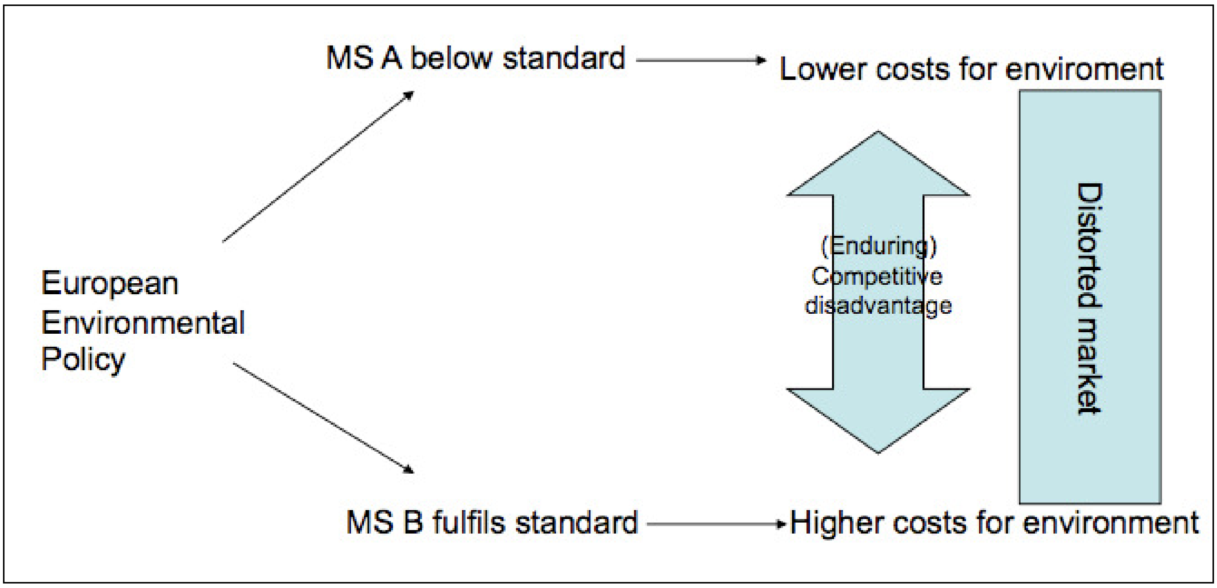


Case 2: MS is below European 'Ideal' Environmental Standard

Sporadic implementation of European environmental policy causes differing costs and enduring competitive disadvantages. Given that the cause for different costs is not due to the internalisation of environmental externalities, this is thus a case of market distortion.

Example: The European Directive allows for flexible implementation, which has arisen as a result of political bargaining to not disproportionately penalize countries falling extremely short of environmental targets. As such, environmental resources continue to be subsidised in some Member States.

Figure 2: Case 2 - MS stay below European ‚ideal'



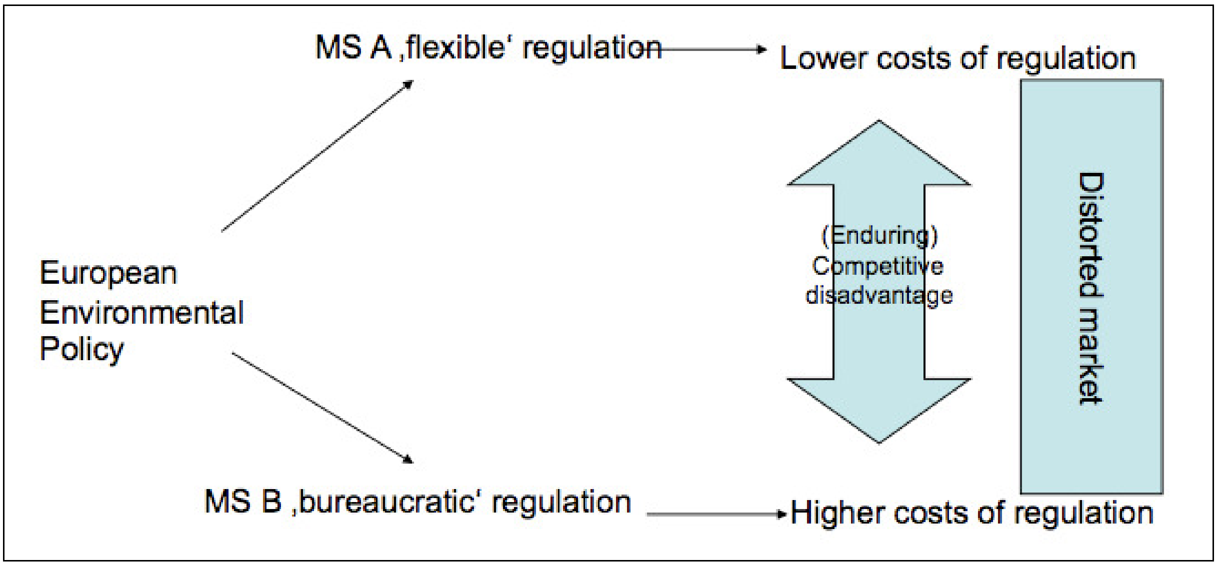
It ought to be noted, however, that stricter standards (MS B) might not always lead to higher costs for the firms. Stricter standards may in fact provide incentives to produce more efficiently, ultimately reducing costs (Porter and van der Linde 1995).

Case 3: MS implements a Costly Regulation

Member States implement a policy with different instruments, yet aim at the same level of environmental protection specified under the same standards. Some form of implementation is more costly, e.g. because of information requirements. Additional costs do not always lead to additional environmental benefits, but rather to an enduring competitive disadvantage; this is a case of competition disturbance. However, since this is not in contradiction with the European environmental goals, it cannot be judged as a competition distortion.

Example: National implementation of an environmental directive in a certain MS might have more information requirements than in another MS. These additional implementation costs thereby lead to a competitive disadvantage for the first MS.

Figure 3: Case 3 - MS implement with costly regulation

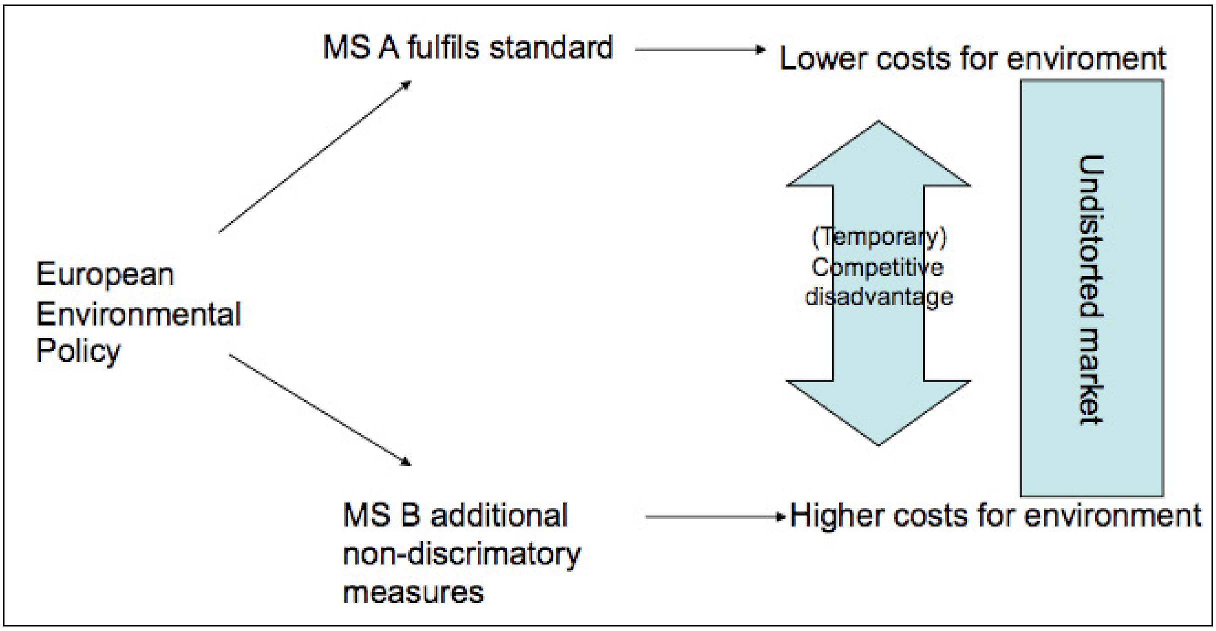


Case 4: Additional Measures on top of EU Environmental Policies

All Member States implement the EU policy equally, but some Member States undertake additional measures to support environmentally friendly goods which achieve standards that are higher than required. Industry may claim there to be competition distortion since the technology to produce these more environmentally friendly goods is unevenly distributed. Although the additional environmental measures might entail a competitive disadvantage for companies that are not able to produce the good in compliance with the additional standards, these same companies may be compelled to acquire or develop such technology. Hence, this is not a case of competition distortion.

Example: One MS offers a tax rebate for environmentally friendly goods, but does not discriminate in regard to the origin of the producer.

Figure 4: Case 4 - Additional measures on top of EU environmental policies



The different examples show that harmonisation has the potential to remove market distortions which stem either from historical reasons or from differences in implementation. However, harmonisation potentially violates the preferences of national actors. National bureaucracies which can achieve the European standards at lower costs in comparison to other countries may contribute to a comparative advantage, and thus should not be classified as a market distortion. If countries prefer to exceed the European minimum standards by non-discriminatory measures, this might cause temporary disadvantages for producers, but the situation cannot be perceived as an unfair (dis)advantage for a national industry.

1.3 *Literature Review*

What insights can be derived from empirical studies in regard to environmental policies and potential market distortions? A literature review was conducted in three key areas of academic research: (1) leader and laggard countries, the regulatory competition literature and its critics. We looked for explanations that addressed implementation timing and the ambition level of national environmental policy: Why are some countries earlier and more stringent in environmental policies than others? (2) The legal foundations of the Single Market and environmental protection offered by EU legislation. In particular, we were interested in the definition of European standards from a legal point of view. (3) The economic impacts of environmental regulation. In this section of the literature review we examined the economic impacts of early and ambitious environmental policies.

The review confirmed that there is indeed a gap in the theoretical and empirical literature. This leads to the question of whether a lack of standardisation in EU environmental policy leads to competition distortions. However, this question is dealt with indirectly in environmental policy literature on leader and laggard countries. While the traditional regulatory competition literature argues that leaders in environmental policy could suffer from economic disadvantages, there is no empirical evidence for this assumption. It is even possible to identify empirical evidence for a "race to the top" in European environmental policy.

The review of the legal literature shows that legal provisions have mainly strengthened the position of the environment through the establishment of the Single Market. However, consistency in the representation and realization of environmental interests is still lacking. The case law presented by the European Court of Justice has yet to provide a consistent legal framework for harmonising standards. While the case law has successfully removed non-tariff barriers for products, the standards for production and the costs brought on by the internalisation of environmental costs have been barely addressed by the case law. Although we might conclude from our literature review that the Court is ready to accept national deviations on grounds of stricter environmental protection standards, Member States seem to be rather cautious to use this options. This may be a result of the fact that the legal situation regarding what is possible, or even allowed under primary and secondary Community law, is not always clear.

Lastly, the review of economic effects revealed that environmental policy does indeed affect trade flows as well as innovation and productivity. From the theory, we might conclude that negative impacts on trade flows through environmental policy could evolve from (a) the inability of goods to enter national markets and (b) through unequal costs of policy implementation. While there is no conclusive empirical evidence on the magnitude and direction of trade impacts in all cases, some examples demonstrate that certain Member States will adapt more easily than others.

1.4 *Dynamics of Environmental Standards*

Variation in environmental standards is a necessary (although not sufficient) condition for competition distortion caused by unharmonised environmental policies. Therefore, the first empirical analysis has focused on the historical development of environmental standards. How did environmental emission standards and quality standards develop since the emergence of European environmental policies? Are there countries that have acted earlier or were stricter in their approaches? Is there convergence or divergence over time? Are there generic trends or are they specific to policy areas? The macro analysis of environmental standards was based on the updated and extended data of the FP5 project ENVIPOLCON, which developed a database on environmental standards for OECD countries. The results of the analysis show the following general patterns: National standards tend to develop in the direction of stricter regulation; product standards have developed to a higher degree than process standards. For product standards and to a lesser degree for other standards as well, it has been observed that in the second half of the observation period, EU Member States apply stricter standards than other countries in the sample. However, the regulatory level outside the EU is considerably high as well. Distinctive 'races to the top' to reduce lead content in petrol or impose car emission limits have been observed, though are less pronounced for large combustion plants or non EU-regulated limit values for heavy metal discharges into surface water.

A look at the frequency of regulatory shifts displays a similar picture: Upward movements toward a higher regulatory level clearly outnumber the downward levelling of standards or deregulating shifts. Only a few exeptions in the regulation of emissions from passenger cars and large combustion plants can be seen as weak indicators of a race to the bottom, yet these are only temporary. While the share of Member States' upward movements for passenger car emission standards is high, the rate of regulation for large combustion plants is lower, as well as for sulphur and lead regulation. The frequency of regulatory upward change is lower for non EU-regulated standards.

The increasing strictness of national standards coincides with increasing similarity between countries – a measure of pairwise convergence indicates growing similarity between national regulations, while it can be seen that EU Member States are not significantly similar to each other in comparison to the rest of the sample regarding standards that are not regulated at the European Level. Convergence is complemented by a high degree of mobility of the relative position of countries: international rankings change over time, and the group of forerunner countries, as identified within the literature, is confirmed in the analysis of the ENVIPOLCON data. Mobility differs between standards and subgroups in the sample: while EU Member States have tended to hold their position since the late 1980s, strong perturbations in country rankings can be observed for the 1970s and 1990s. Process standards not regulated by EU directives tend to be more stable in relation to the ranking of countries. Finally, a brief analysis of implementation lags shows that some directives have been more slowly transposed into national law than others, e.g. the first sulphur in gas oil directive or the first lead directive. While for the majority of Member States and cases, no lags or only a short delay are observed, whereas some laggards accumulate a delay of ten or even twenty years. Overall, it can be seen that those policies harmonised at the European level lead to more stringent and more homogenous standards.

1.5 *Case Studies*

Two types of case studies were conducted for an empirical investigation of the impacts of European environmental policies on market distortions and their magnitude. Firstly, a series of cases were analysed on the basis of available literature and policy documents to test and further elaborate the research protocol (scanning studies). Secondly, a series of case studies was conducted which entailed the exploitation of primary data, collected mainly from expert interviews (in-depth case studies). The scanning studies mainly focused on ex post cases of environmental policies, while the in-depth case studies are partly ongoing revisions of European environmental policies. The cases were selected on the basis of a broad review of European environmental policies. Preference was given to those cases for which the affected industry expressed concerns about potential impacts on their competitiveness (although this in itself is no evidence of competition distortion, as discussed earlier). For the in-depth cases, policies were preferred that are currently under revision. However, it ought to be noted that the studies represent an analysis focussing exclusively on potential market distortions, while other aspects, which are relevant for the revision, were not taken into account.

Scanning studies were carried out on the Environmental Liability Directive, the Volatile Organic Compound Directive, the Water Framework Directive, the Genetically Modified Organisms Directive, Integrated Pollution Prevention Control Directive and on the reduction of CO_2 emissions from passenger cars. The scanning studies served to identify possible market distortions and industry arguments, and to inquire whether the problem of competition distortion is caused, at least partly, by the identified EU environmental policy. They are based on desk research, analysis of policy documents (Impact Assessments, related studies) and possible complaints by stakeholders (press releases, publications).

In addition, case studies were conducted as well. Each case study highlights an environmental policy that differs in its implementation across the EU Member States. A key question for the case studies was whether the EU policy acted to reduce/remove the distortion or not? Certain MS were selected that represent different approaches of implementation, as a focus for the case studies. The case study then addresses whether the lack of harmonisation leads to competition distortion or not. They cast further light on whether the arguments by industry regarding market distortions are justified or merely reflect a temporary change in relative competitiveness. The industries affected are present in various countries, are of similar structure, and compete in similar markets. In this way, competition distortion is perceived and articulated through the relevant economic actors across the EU. Meeting these criteria, these case studies were selected and carried out in the following fields of environmental regulation:

1. The University of Konstanz conducted the case study on the European Noise Directive (END). It focuses on airport noise and provides examples from the U.K. and Austria.
2. The study on the Emission Trading Scheme (ETS) has been carried out by GHK and focuses on the cement industry in Germany, Poland, and Spain.
3. Adelphi Research conducted the case study on Waste Electrical and Electronic Equipment (WEEE) and focuses on the producers of electronic and electric equipment, especially in Germany and Sweden.
4. The case study on End of Life Vehicles (ELV) was conducted by the FFU and focuses mainly on the Netherlands, Germany, and the U.K.

The main results of the case studies are summarised in the following table.

Table 1: What is the European ideal or standard, and which instruments are suggested to achieve it?

Noise	Approach is intended to avoid, prevent or reduce on a prioritized basis the harmful effects, including annoyance, of exposure to excessive noise. END 2002/49 also aims to provide a basis for developing Community measures to reduce noise emitted by the major sources, in particular road and rail vehicles and infrastructures, aircraft, outdoor and industrial equipment, and mobile machinery. Instruments for Airports: • Noise Maps • Action Plans • Consultation and information given to the public.
ETS	The EU ETS is a cap and trade system aimed at putting EU Member States on course to meet their targets under the Kyoto Protocol. The first phase included approximately 15,000 installations in the EU-10 and 10 Accession Countries, representing almost half of all CO_2 emissions in the EU that fall under the activities specified in Annex I of the Directive. Each installation obtains emission allowances for the whole period. Allowances are allocated to installations covered by the ETS for each Member State by means of a national allocation plan (NAP) according to defined criteria therein.
WEEE	WEEE should be avoided, reused and recycled. Instruments include the physical and financial responsibility of producers, and national collection and recycling systems. Final holders and distributors must be able to return WEEE free of charge. Member States shall ensure availability and accessibility to collection facilities.
ELV	Waste from End-of life Vehicles is to be avoided and recycled. All ELVs are to be treated in an environmentally sound way. Instruments include: extended producer responsibility, collection systems for ELVs, free take-back of cars, minimum requirements for treatment facilities and treatment practices, as well as recycling and recovery quotas.

Table 2: Is there evidence for distorted markets? If yes, what and where is it?

Noise	The competitive situation amongst the aviation and airport industries is high; therefore, there is only weak evidence pointing to a distorted market. Some measures, such as action plans, are not yet broadly implemented. Potential distortions could result from: • Definition of major airports • Delegation of competencies to different authorities (state agencies vs. private enterprises) Differences in the timing of implementation.
ETS	There is evidence showing that the way in which the EU ETS is implemented, as dictated by the allocation mechanism in Phase I, and differing levels of growth in the cement sec-

	tor, have led to a competition distortion. The cement companies have been affected differently, depending on the geographical location of their installations. Companies with installations in Central and Eastern Europe, in general, have benefited more from the differences in Member State NAPs compared to companies with installations in Western Europe.
WEEE	Prices for recycling are diverging strongly in proportion to the degree of competitiveness in the collection and recycling business sectors. Take-back of a flat screen monitor in Germany costs only EUR 0.29, while in Austria it costs EUR 1.49 and in Sweden EUR 1.98. Diverging regulation concerning financial guarantees are leading to an uneven playing field. The municipalities in some Member States play a considerable role in the collection of WEEE from households, while in other Member States the producers are in charge. The Directive is currently under revision. The current proposal gives more responsibility to the producers, a point that is highly contested.
ELV	There is an international market for scrap metal. Distortions in markets may arise from different cost structures for treatment operators in Member States, acting as suppliers of scrap metal (output side). At the same time, shortage of ELVs in many Member States (from export of used cars) might lead to increased transboundary competition for ELVs as input in the future. Distortions might also arise from the intersection of ELV and waste policies (differing definitions of recovery and recycling, landfill bans etc.). These issues are considered in the review of the EU Waste Directive.

Table 3 What is the role of industry in the debates on market distortion? What arguments are voiced by industry?

Noise	Only modest or indirect claims from airport operators regarding airport expansion or follow-ups of the present directive; direct claims from chambers of commerce or industry associations regarding problems of the relocation of business in the area around major airports.
ETS	The European cement industry is heavily consolidated.
WEEE	Industry, at the moment, mainly focuses their arguments on the new higher collection targets introduced in the 2008 proposal. Principal arguments by industry are in regard to the lack of access to WEEE, especially to valuable WEEE. Due to the sunken prices, income from waste material is lower than expected and is not able to offset the cost of collection.
ELV	Diverging waste policies in Member States influence cost structures for ELV treatment; there is a lack of enforcement in some Member States.

Table 4: What are the causes of the (possible) competition distortions?

Noise	Definition of what constitutes a major airports Delegation of competencies to different authorities, and thus delegation of costs (state

	agencies vs. private enterprises). Different noise measurement and limit values.
ETS	The possible causes of competition distortion are: • Differences in the EU ETS national application plans • EU ETS allocation mechanism does not allow for growth • Differences in number and activities of competent authorities • Differences in monitoring, reporting and verification requirements • Differences in energy prices
WEEE	Diverging registration and reporting obligations, allocations of responsibility, interpretation of importers and exporters, financial guarantee. Many of these problems have been identified by the review process and were addressed in the new proposal from 2008.
ELV	Diverging waste policies lead to different costs for the disposal of automobile shredder residue (landfill bans, gate taxes at landfills, methods for determining hazardous waste).

Table 5: Is there a deviation from the European Standard? If yes, what is the magnitude of the deviation and how does it look?

Noise	No clear target values and no uniform approaches. Implementation of current rules and, in general, national approaches differ widely. The key element (the action plans) of the Directive has not yet been set up.
ETS	Producers enjoy surplus allowances and there have been significant differences in the amount of surplus allowances.
WEEE	All Member States have introduced minimum standards, and yet parts of the Directive have not been transposed or implemented correctly by a fair number of Member States. Member States have enjoyed significant discretionary power concerning implementation, the role of municipalities, and financial guarantees.
ELV	No deviation in the ELV Directive per se. All Member States have transposed minimum targets and requirements, but diverging waste policies in the Member States influence cost structures (cost of disposal for non-recycled fraction of ELV waste).

Table 6: Are there deviations due to bureaucratic implementation? Could a short description be provided?

Noise	Yes, differences in the delegation of competencies: In most Member States, state bureaucracies are responsible for the establishment of noise maps and action plans. Some countries delegate these tasks to airport operators, which mostly belong to private enterprises. This could have implications on the level of competition in the relevant market. Out of 19 EU member countries affected by the END (for airports), only six (Finland, Italy, Poland, Portugal, Sweden and the United Kingdom) delegate these competencies to airport operators. In the other Member States, state agencies are responsible.

ETS	There are significant differences in the way the EU ETS is implemented in the Member States. There are differences in the number of competent authorities, permitting procedures and monitoring, and reporting and verification guidelines. This suggests that cement producers could potentially face different costs for regulatory compliance.
WEEE	Yes, this is because diverging systems of registration and reporting lead to deviation. A common registration system is outlined in the new proposal.
ELV	Yes, there are differences in the organization of take-back systems; either direct contracts between car manufacturers and treatment facilities (Germany, UK), or service providers (UK), or establishment of a private limited liability company that organises and administers a fee for ELV treatment.

Table 7: What costs are related to the deviation of European legislation?

Noise	Costs are difficult to assess at this stage as action plans for major airports are not available for the countries in question. Generally, noise protection measures involve considerable costs for the airports; this means that on-top measures are very costly. Deviation in terms of the parallel existence of a national regime may also raise the costs.
ETS	The value of surplus allowances as a share of turnover in 2006 was significant for Germany (5%) and Poland (2%), but rather insignificant when compared to Spain (0%). These allowances provided significant monetary benefits leading to important differences among these three Member States.
WEEE	The amount of additional costs and cost differentials are difficult to assess. In the past, costs were rather low due to the higher value of WEEE.
ELV	At the time of writing, no major cost effects were perceived since ELV treatment is at least cost covering; this might change, however, if prices for secondary metal (metal scrap) further decline.

Table 8: Are they relevant compared to other factors?

Noise	Difficult to assess.
ETS	Difficult to assess, but not negligible.
WEEE	For most products, the difference between the recycling fee and the price is not really significant. As a consequence, differences in implementation are not a major concern.
ELV	Dominant factors include: scrap metal prices, supply of ELVs (shortages in Western Europe due to exports of used cars), enforcement, and differences in waste policies.

Table 9: What could be done to minimize the distortions? Any recommendations for the Commission?

Noise	Claims from stakeholders differ widely, ranging from the request for more harmonisation to just the opposite. Threshold definition is of crucial importance for every MS. A more harmonised approach for the delegation of costs from noise mapping and action planning would be most helpful.

ETS	The national allocation plans must ensure scarcity in the market, which is necessary to make the system function and to achieve the objective of reducing emissions. The grandfathering approach should be replaced with a worldwide benchmarking approach based on performance of the installation. Over time, allocation should be based on auctioning.
WEEE	Harmonised producer registry, binding financial guarantees, clear responsibility between producers and municipalities, and flexibility in higher targets.
ELV	Harmonisation of waste policies (EU Waste Directive currently under review), and clearer guidelines on whether a specific car is considered waste or a used car (export).

1.6 *Conclusions*

The definition of market distortions is far from easy and trivial. Not every change in the relative competitiveness can be classified as market distortion. Whenever European environmental policies are enacted, the national implementation takes place on the background of different technological and economic conditions, natural resources and different political preferences in the Member States. Thereby, a tailored implementation is not only quite legitimate but in many cases also more efficient than a uniform approach. A competition distortion would emerge if, in the absence of a European environmental policy, an industry would have cheaper access to natural resources (or opportunities for emissions) because of laxer standards compared to another country. A second source of competition distortion would be if the implementation of European environmental policies imposed less costs to industry because of laxer standards measured compared to the European standards in the implementation. Hence, not every difference in the costs for industry represents a market distortion, but lower costs may be part of the competitive advantage of a country or an indication of higher preferences. There is no clear cut definition of competition distortion. As variations in costs is not a sufficient attribute, it requires in addition a political judgement. A competition distortion can be expected if

- a Member State remains in its implementation below the agreed European standard
- and this leads to less costs and a competitive advantage for its industry

Such market distortions have to be distinguished from differences in the distance to target: The structure of the industry, the technologies used and the natural conditions are quite often leading to differences in the costs of achieving an agreed European standard. However, by adapting more efficient technologies and changing the structure of industry, this competitive disadvantage can be overcome. While a competition distortion is permanent, a competitive disadvantage because of a greater distance to target is temporary. An appropriate reaction in the first case is a further harmonization, while in the second case, additional time or resources might be granted to achieve the standards.

European environmental policies contribute to a removal of market distortions by levelling the playing field for economic actors. The costs for using natural resources or for the release of emissions to the environment vary considerably because of different natural conditions, but also because of preexisting environmental policies. But even when European legislation is already enacted, the directives or framework directives leave discretion to the member states on the actual implementation. Accordingly, the degree of internalisation of environmental costs still varies across European Member States. For the regulation of products, uniform European standards and norms have been successfully set up, for example the RoHS or recently the REACH regulation. For large segments of products, there are clearly defined and fully harmonized European standards. A competition distortion is not possible any more (although the costs of production may vary across Europe). Even if there are higher (non-discriminatory) national standards, this does reflect higher environmental preferences, but does not necessarily imply a competition distortion.

For process norms, this is different: permitting procedures, process standards etc. are still largely in national responsibility. With our analysis, we can demonstrate that there is an overall tendency for a convergence. The case studies, however, show that there are still unharmonized areas of environmental policies that give advantages to the local industries in one MS compared to others.

In our research approach we distinguish between the notions of competition distortion and changes in relative competitiveness. Most research on competition distortion in the context of the environment relates to taxes and subsidies and is undertaken in economic modelling (e.g. Eichner 2005, Noiset 2003). Empirical research on the effects of environmental policy on business concentrates on the notion of competitiveness. Similarly, industry complaints on European environmental policies focus on the change in relative competitiveness rather than on the levelling of playing field in Europe. Our study is a first attempt to empirically investigate the effects of EU environmental policy from the perspective of competition distortion in relation to the Single Market.

In all of the examined cases, the rules at the European level allow for considerable leeway in the implementation. In several cases, it is difficult to identify the European standard, as the directives only describe procedures, or remain vague regarding the objectives. These are results of political compromises and gives leeway to different interpretations and, accordingly, implementation of the directive. This is motivated by differences in the distance to target and in differences in the preferences of the actors involved. Without a clear target and an according European standard, it is not possible to judge if a national implementation fails to achieve this standard. This is a major caveat of the empirical work, but also for the legal and the political judgement if there is indeed a market distortion or not. We encountered such difficulties for example in the case of the environmental liability directive (ELD) which does not define substantive standards. In other cases, where a European standard is given, it is difficult to assess and dispute if the measures taken are sufficient to achieve the standard: An example is the 0.9 % target of the GMO directive. It is left to the Member States to decide what this implies in regards of the distance of GMO crops to conventional crops. In this case, a European standard on the measures would be easier judged if Member States were meeting the standard rather than having a threshold on the environmental quality only. The VOC directive has similar shortcomings: Although some measures are described, their choice is left to the Member States and the limit value is defined by an overall reduction in the emission. In such cases, an ex post assessment is only possible if the measures taken are appropriate. Only for few cases, the European ideal is readily available and easy to identify. This is the case for example in the limit value of 120g/km CO_2 emissions by cars.

The availability of a European standard can be categorized as follows:

European standard	Examples	Implication for a judgement on market distortions
No measurable European standard; directive is based on procedural law	ELD	Not possible or ex post only
The directive describes a process to develop a common European standard	IPPC	Market distortions cannot be expected if MS bind themselves to the common standards
European standard is based on environmental quality, measures	GMO	Judgement on market distortions is possible ex post

are not defined		only
European standard is defined regarding an overall reduction of emissions, MS may select on measures	VOC, WEED, WFD	Judgement is possible if the impact of the measures on achieving the European standard is known
European standard is clearly defined in the regulation and fully harmonized	120g/km CO_2	Market distortion cannot be expected

From the perspective of the single market, a clear European standard, which includes a definition of measures taken by the Member States, is preferable over vague objectives. If a full harmonisation is not justified, discretion might be given on the measures, but they should be well defined in the directives to allow a judgement on possible market distortions.

The case studies confirm that a leeway for the Member States is legitimate and necessary due to differing economic, social, cultural or administrative requirements. It allows a more efficient implementation. The result of the analysis on individual cases show, however, that there are at least in part very heterogeneous approaches by the Member States that have led to market distortions. The leeway is used by some Member States to stay below the European standard. In all four in-depth case studies, there are Type 2 market distortions ("MS below European 'ideal' of resource use") and partly also Type 3 distortions ("MS implements a costly regulation"). In each of the examined policies, the Member States have had considerable discretional authority in the implementation of these policies. This is particularly relevant to the approach of the administrative implementation, partly also to the extent of the requirements imposed at the national level from the perspective of time and content. In addition to the existing leeway, the Member States have not sufficiently implemented or have failed to transpose parts of the European legislation. And, where the legislation has been transposed, it is not always enforced. With this background, it is not surprising that each concerned industry is being offered very different starting conditions, which influences costs and thereby the competition situation for these industries.

The impacts of the market distortions by the differing approaches of the Member States are not easily quantifiable. There is evidence for large impacts on cross-boundary trade in the case of the European emission trading for the cement industry. In other cases, we were able to identify some quantitative data that indicate market distortions, but the magnitude was so small that cross boundary impacts could not be expected (e.g. WEEED). However, in most cases, statistical data is not readily available. Furthermore, the available data is largely based on industry estimates. The case studies show that industry does not distinguish between changes in the relative competitiveness and market distortions. By mixing the cost categories, potential market distortions are easily exaggerated.

When doing an impact assessment or an ex post evaluation, efforts should be undertaken to distinguish between the different cost categories. For the assessment of market distortions, the following categories are important:

- Costs to achieve the European standards, resp. potential benefits if Member States have not implemented the European ideal. A competition distortion can be expected if the costs for using environmental resources vary because the standard remains below the European ideal. This entails costs for emissions, disposal or extraction of resources. Such categories refer more often to the costs of operation rather than for investments.
- Costs that might arise from differences to the target because of pre-existing national regulation or because of different natural or structural conditions. These costs are more often related to investments: The adaptation to the European standard may require restructuring and investments to adapt to efficient technologies.

- Administrative burden imposed by the implementation of the European regulation. For this cost category, the measurements of administrative burden by the governments might be utilised. However, so far there is no agreed standard for the measurement. For a cross-national comparison, a standardised measurement of administrative burden would be required.

It has to be noted that there is much evidence that stricter standards are not necessarily leading to higher costs. Instead they provide incentives to adopt more efficient technologies, which then turn into competitive advantages.

This might explain that we found surprisingly few complaints by industry on potential market distortions caused by differences in costs. In spite of the unquestionable existence of Member States with laxer standards and accordingly fewer costs for industry, the topic is hardly addressed by economic actors. The following reasons may explain this:

- The magnitude of market distortions is often unclear, and they might be below a value that has impacts on cross boundary trade.
- The resulting costs from differing implementation could be passed on to the consumers and therefore, from the perspective of industry, is of little relevance.
- Although differing implementation might lead to significant cost differences within Member States, the studies underlined that national industry sectors partly favour flexibility in standards. This is an indicator for markets, which keep on being separated; products are either not traded, or they do not compete directly with each other through product differentiation due to high costs of transport.
- Addressing the recurring market distortions would lead to more stringent requirements for industries in the concerned countries. Type 2 market distortions ("MS below European 'ideal' of resource use") for the most deviating Member States create a need to enact more stringent standards. For the concerned industry in these countries, this might lead to higher costs. European industry associations would not normally pick up a theme that could potentially damage a portion of its members. National industry associations from countries that are negatively affected by market distortions are more likely to address the issue, but have less influence on the European level. They will rather stress the topic in the national policy-making process and try to generate a slower or less challenging implementation. Within the framework of the study, this has only partly been verified.
- Their larger members naturally dominate the relevant industry associations. Larger players also have a greater chance to use market distortions to their advantage by strengthening their activities in those locations where the best conditions for them exist. Smaller companies, on the other hand, are often not able to avoid the consequences of the market distortions because they lack the resources either to analyze the situation, but even more importantly, they lack the resources to gain political influence.

European environmental policy has the potential to correct existing market distortions resulting from differing internalization of environmental costs. There are several examples among the case studies, in which either pre-existing national implementation had distorted the markets or a market distortion would have occurred with the increasing importance of cross boundary trade and the creation of the internal market. It is of advantage during this process to concretely define substantial European standards and address the topic of national implementation. The ETS and its accompanying national allocation plans can be considered as a model, even if the case study has shown a need for further improvement of this mechanism. An over allocation of permits at each national industry level should be prevented.

To summarize the findings of the study in a nutshell:

- The concept of market distortions should be clearly distinguished from changes in the relative competitiveness of industries. This should be reflected in impact assessments and evaluations of European policies.
- The distinction between market distortions and changes in competitiveness does imply a differentiation in cost categories that are attributed to the environmental policy and its implementation. It should be distinguished between operating costs, costs for one off investments and administrative burden. The different cost categories need to be standardized. It should be considered to make them subject of the monitoring mechanisms of the internal market.
- European environmental policies have contributed to the removal of existing market distortions because of pre-existing national legislation which caused differences in the costs for using natural resources. The case studies show that without European environmental policies, the internal market would be endangered.
- However, the great degree of discretion for the Member States in the implementation is misused in some cases to stay below the European standard. The magnitude of market distortions that arise from this is difficult to quantify but in most cases does not have impacts on cross boundary trade.
- A further harmonisation does not necessarily require a change in the legal basis and a shift from directives to regulations. As an alternative, the European ideal standard could be clearly described together with a set of effective measures for their achievement. The Member States may be free to choose from this set of measures. To avoid undue disadvantages because of uneven distances to target, the time horizon for the achievement can be extended or costs for investment and restructuring become compensated. However, this should not lead to a vague definition of objectives and measures of the European policies.

2 Introduction

Starting point of the project was the observation that in the European Union a harmonized approach to environmental standards is still missing in a number of policy areas. While many commonly agreed objectives exist on the European level, a relatively flexible approach in Community environmental legislation often leaves it to the Member States how to achieve these objectives best. Consequently, cross-national differences in environmental standards persist. Stakeholders and academics dispute to what extent such differences in environmental standards might cause competition distortions and what effects such distortions might have. Against this background, the project aimed to advance the understanding of the relationship and interactions between European environmental policy and the European Single Market. Essentially, it tried to provide answers to the following key questions:

- For which issue areas of European environmental policies is a standardisation in the EU Member States missing? What are the determinants of the variance in the implementation?
- In how far does the lack of standardisation lead to distortions of the Single Market and possibly to distortions of competition? How can Single Market policies reinforce European environmental policies?
- What are the options for change in the face of upcoming initiatives for further development of the Single Market? How do experts and stakeholders perceive these options?

To this end, theoretical insights about the relation of environmental standards and competition were collected and reviewed and case studies on European policies and their implementation in the Member States were carried out to gain an in-depth understanding of the possible competition distortions caused by European environmental policies.

This report presents a collection of all project papers and tries to outline the main findings of the joint research project. In chapter 3 we give an overview of the academic literature on environmental policy and the Single Market. Chapter 4 discusses the historical development of environmental standards in the OECD context. Chapter 6 and 0 contain the scanning and case studies carried out by the research team over the last month. And in chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** we try to draw some conclusions on the relationship between environmental policy and the Single Market.

3 Literature Review

This chapter contains three literature studies including (1) a literature review on leader and laggard countries in environmental policy, (2) a review of legal work to the integration of market regulation and environmental policy in the European context and (3) a literature review on the economic impacts of environmental regulation. The conclusions of these literature studies will be summarized in chapter 3.4. In-between other criteria they guided us in the case selection for our in-depth case studies.

3.1 *Literature Review on Leader and Laggard Countries*

By Eva-Marie Euchner, Aike Müller and Thomas Sommerer

The following section provides a detailed literature review on leader and laggard countries and their impacts on EU environmental policies. The concept is generally used to describe and analyse why some states lead in the development and implementation of environmental policy and others lag behind. The review combines the insights of relevant contributions from economic, law and political science literature with a clear focus on the latter.

To organise the different literature subsets the review is organised along four major headlines, which are of crucial importance for topic: Section 1 provides a detailed review of the theoretical literature on regulatory competition in the environmental field. This literature usually implies that leader countries could suffer competitive disadvantages. Therefore the main theses of this literature will be presented and critically assessed. Section 2 draws on these findings and reviews the literature that empirically tests the theoretical assumptions of the regulatory competition theory. It will be shown that the empirical and quantitative literature lacks empirical support for the thesis that regulatory competition necessarily leads to "race to the bottom" and that there is even evidence for a clear trend toward a regulatory "race to the top". Section 3 reviews the literature on the innovative potential of leader countries. The section describes the general understanding of the concept of leader and laggard countries. Several authors within this branch of literature argue that leader states could enjoy competitive advantages. Section 4 is concluding this review with a discussion of the relevant literature on the compliance with EU environmental law. Section 5 is offering some general remarks and possible implications for the case studies of the Single Market Project.

3.1.1 Regulatory Competition in the Environmental Field

The aim of the first section of this review is to shed some light on the theoretical literature on regulatory competition. Therefore the main theses and mechanisms of this concept are presented. In a second step, the theory will be discussed against the background of the recent globalisation debate and its main assumptions will be critically assessed. Finally, suggestions on how to refine the theory of regulatory competition in the environmental field are introduced.

The theory of regulatory competition suggests that in the field of environmental policy the presence of regulatory competition leads to a "race to the bottom" of environmental standards (Holzinger/Knill 2004: 25). This thesis is based on the theoretical assumption that the increasing integration of European and global markets, the abolition of national trade barriers, the international mobility of goods, workers and capital pressures nation states to redesign domestic market regulations in order to avoid regulatory burdens restricting the competitiveness of domestic industries (Holzinger/Knill 2004: 27f; Goodman/Pauly 1993; Keohane/Nye 2000). Especially the presence of mobile capital can induce governments to attract capital from elsewhere by lowering environmental standards on the one hand. On the other hand, domestic capital can threaten to exit, because decent environmental standards impose high costs on polluters in high-income economies. To remain competitive, these firms relocate to low-income countries whose people are desperate for jobs and income. Local governments ignore regulation to promote investment and economic growth, allowing businesses to minimize costs by polluting with impunity. Driven by shareholders to maximize profits, international firms follow suit. So rising capital outflows force governments in high-income countries to begin to lower the level of regulation (Wheeler 2000: 2). This way, regulatory competition among governments may lead to a "race to the bottom" in environmental policy, implying policy convergence (Hoberg 2001a: 127; Simmons/Elkins 2003; Drezner 2001: 57-59).

The concept of regulatory competition is based on economic theories of systems competition or regulatory competition (Tiebout 1956; Oates and Schwab 1988; Long/Siebert 1991; Sinn 1993, 1996). It was first used to explain the American experience with corporate chartering. The model rapidly flourished because it provides an explanation of how regulators respond to the demands of mobile factors and sheds light on the evolution of legal norms and policies in a global environment (Barbou 2004: 75). While the economic literature focuses on normative questions (see Holzinger/Knill 2004: 27), such as the effects of systems competition on efficiency or democracy (Vanberg 2000), the political science literature has concentrated on the question whether regulatory competition actually works and whether it induces "races to the top or bottom".

This theory must be evaluated in the context of the controversy over economic globalisation as some critical commentators are concerned that trade agreements and economic integration more generally are undermining the ability of governments to take action to protect environmental values, resulting in a downward harmonisation of regulatory standards. Such arguments played a major role in the rhetoric of the Seattle conflict that thwarted expansion of the World Trade Organisation (WTO) in the Fall of 1999 and raised serious questions about the consequences of globalisation (Hoberg 2001b: 192).

Although the empirical literature generally fails to support (Berger and Dore 1996: VII, Bernauer and Caduff 2004: 100, Drezner 2001: 75, Hoberg 2001b: 194) the hypothesis that regulatory competition necessarily leads to convergence "at the bottom", there is case study evidence for "races to the top" but no systematic confirmation of a "race to the bottom" (Tobey 1990; Vogel 1997; Jänicke 1998; Beers/Bergh 1999; Kern 2000).

The theory rests on a whole number of implicit assumptions. For example, it is assumed that the costs of stricter environmental standards are high enough to cause severe competitive disadvantages to firms exposed to these standards and to lead firms to change their investment locations. However, environmental costs may in fact be relatively low compared to other cost categories and may thus not constitute important facts for the firms' decision-making (Vogel 1997; Jänicke 1998; Jänicke/Jacob 2004: 33). Second, the theory is based on the idea of competition among firms within a common market or a free trade regime. However, in reality it is often permitted to wall off a country against foreign products on the basis of health and environmental reasons. In this case, competitive disadvantages of an industry in a high standard country might be not very serious (Holzinger 2003). Third, the theory does not differentiate between product standards and process standards. However, in case of product standards "races to the top" are more likely than "races to the bottom" (Scharpf 1996, 1997). Fourth, it is assumed that governments react exclusively to the preferences of international capital, ignoring the preferences of voters or interest groups (Jänicke/Jacob 2004: 32)[1].

Another reason for the lack of empirical support for the "race to the bottom" hypothesis may be that the absence of downward pressures is a consequence of the interaction of regulatory competition

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[1] For more assumptions of the theory and a detailed discussion see Wilson (1996) or Levinsion (1996b).

with international regulatory cooperation (Holzinger/Knill 2004). Empirically, regulatory competition is related to regulatory cooperation in two ways.

Firstly, regulatory competition among countries implies economic competition among them within a common market or a free trade regime. This, in turn, implies the presence of international cooperation and institutions creating and preserving the market or the trade regime. Secondly, as in a common market different environmental standards may lead to a potential distortion of competition, the harmonisation of standards is often demanded by political actors. A typical example is the EU with its classical harmonisation approach in environmental policy (Holzinger 2000). The presence of harmonisation can but not necessarily needs to dominate regulatory competition. Thus, the interaction of the two factors may lead to various effects on environmental regulation in the countries concerned.

Esty and Geradin (2000: 235) criticize the theory of regulatory competition exactly at the same point. They argue that both “race to the bottom” and regulatory competition theories are overstated from a descriptive point of view and unsatisfactory from a normative perspective. Regulatory theory must reflect the diversity and complexity of the world. Optimal governance thus requires a flexible mix of competition and cooperation between government actors as well as between governmental and non-governmental actors. Chua (1999: 423) concludes in her study that the ambiguity of empirical results arises partly from three important elements that have been overlooked, but which are being increasingly questioned in the profession. The first factor is the role of environmental innovation, the second is the international diffusion of environmental technologies, and the third pertains to the positive economic feedback effects of a cleaner environment.

Apolte (2002: 389f) argues in his econometric analyses that a “race to the bottom” does not need to follow. First, if not a large number of small jurisdictions but a small number of large jurisdictions compete for quality standards, then the resulting quality standards will end up above the minimum level, albeit still below an efficient level. If no subsidies are allowed in order to compensate for losses by producers working under strict quality standards, quality standards will generally converge to the level of the jurisdiction with the lowest quality preferences, but not below this level. His second argument against a competition of laxity result is that consumers may better judge quality standards of governments than product qualities by producers. As far as this is the case, regulatory competition may even be superior to a harmonized quality standard.

It has already been mentioned that the empirical literature generally does not support the hypothesis that regulatory competition necessarily leads to a “convergence at the bottom”. Competition drives the levels of regulation towards an equilibrium – which is usually thought to be the ‘lowest common denominator’ of the policy of the most ‘laissez-faire’ country (Drezner 2001: 59). Thus, in theory, full convergence can be expected at an imagined end point of the process. In the literature there is an ongoing debate about this end point and the level of convergence. In this context, a distinction is often made between product and production process standards (Scharpf 1996, 1997; Holzinger 2003). While for product standards, several factors might inhibit a “race to the bottom” and even trigger a “race to the top”, a widely shared expectation in the literature is that policy convergence will occur at the lowest common denominator in the case of process standards (Drezner 2001; Holzinger 2002, 2003).

In contrast to the process standards, industries in both low-regulating and high-regulating countries have a common interest in harmonizing product standards to avoid market segmentation. Whether harmonisation occurs at the level of high-regulating or low-regulating countries depends on a number of additional factors, most importantly the extent to which high-regulating countries are able to factually enforce stricter standards. If it is possible to erect exceptional trade barriers (e.g. for health or environmental reasons under EU and WTO rules) convergence at a high level of regulation is likely (Scharpf 1997: 523; Vogel 1995; Epiney 2000; Sandhoevel 1998). If such exceptional trade barriers cannot be justified, by contrast, competitive pressure is expected to induce governments to lower their environmental standards (Holzinger 2003: 192). Moreover, an upward move of regulatory levels can only be expected, if the harmonisation advantage is valued higher by business and governments than the cost difference between high and low levels of regulation (Holzinger 2003: 192).

The classical example of a "race to the top" of product standards is car emission standards. When California raised its emission standards, most US states followed quickly (Vogel 1995). California was permitted to apply its standards to foreign car producers. The harmonisation advantage is large for technology avoiding exhaust emissions. The most important reason for this is that licensing procedures for cars are very expensive and firms want to avoid multiple licensing procedures. Although, empirically, these patterns must not necessarily lead to complete similarity of policies, the degree of similarity is expected to increase significantly (Holzinger/Knill 2004: 31f).

An additional clarification of the concept allows an analysis from a game theoretic perspective, which models collective action problems regarding the provision of (environmental) common goods. The analysis of common goods needs to look more closely at the characteristics of the goods and of the social context of their provision. This shows that the exact strategic constellation that determines whether regulatory competition leads to a "race to the top" or a "race to the bottom", or to neither one, varies with several factors; in particular with the type of trade regime, the heterogeneity of actors preferences or market shares and the exact object of the regulation – namely products or production processes. Under recognition of these factors no general "race to the bottom" could be predicted (Holzinger 2003: 206-207).

Wheeler and Birdsall (1993: 137) conclude from a case study in Latin America and from econometric evidence that protected economies are more likely to favour pollution intensive industries, while openness actually encourages cleaner industry through the importation of developed-country pollution standards.

The theory is also applied in an interstate context, for example in the United States. Revesz (1992: 1) argues that an influential justification for placing responsibility for environmental regulation at the federal level is that otherwise states would engage in a socially undesirable "race to the bottom", making their environmental standards too lax in an effort to attract and retain industry. After discussing the difficulties in empirically testing he shows that "race to the bottom" arguments encounter no support in existing models of inter-jurisdictional competition. He then establishes that even if there were a "race to the bottom" over environmental standards, federal regulation would not be an effective response: faced with strict federal environmental standards, states concerned with attracting industry would relax regulatory controls in other areas.

Vogel (2000: 365f) goes ahead with the argumentation of Revesz (1992) and explains why economic interdependence has not led sub-national, national and regional governments to compete by lowering their environmental standards. He stresses that for all but a handful of industries, the costs of compliance with stricter regulatory standards have not been sufficient to force relatively affluent nations or sub-national governments to choose between competitiveness and environmental protection. In marked contrast to labour costs, the overall costs of compliance with environmental regulations have to date been modest. So the national levels of pollution-control expenditures have had little effect on the growth of economic output. Nor have American states with stronger environmental policies experienced inferior rates of economic growth and development (Vogel 2000: 267). He even explores various mechanisms by which economic integration has contributed to the strengthening of regulatory standards. He argues for example that domestic political preferences and interests primarily determine environmental standards. They tend to be stronger and better enforced in affluent nations with influential green pressure groups. They also tend to be strengthened during periods of economic prosperity and stabilized or weakened during periods of slower growth.

3.1.2 Quantitative Tests and Empirical Evidence

It was already mentioned that the empirical literature generally lacks empirical support for the hypothesis that regulatory competition necessarily leads to a "convergence at the bottom" (Bernauer/Caduff 2004: 100, Drezner 2001: 75, Hoberg 2001b: 194). There is even evidence for a "race to the top" process (Holzinger/Sommerer 2007: 208; Jänicke 1998: 9).

There are nonetheless a few studies, which confirm some of the basic assumptions of the theory. For example, the assumption that strict environmental regulation leads to high compliance costs, which results amongst other costs in a reduced productivity growth. And also the assumption that firms faced with increased operating and investment costs in developed countries choose to relocate production or concentrate new investment in less regulated jurisdictions (cf. Jenkins 1998: 3). Meanwhile, no statistical study confirms a "convergence to the bottom" by measuring the policy outputs, like limit values for SO_2 emissions.

This paragraph proceeds as follows: First of all, several quantitative tests, which show empirical evidence for the basic mechanisms of the theory of regulatory competition are presented. In a second step, a review of the large number of empirical studies, which verify the "race to the top" thesis is given. Finally, conditions are discussed which determine the empirical results.

3.1.2.1 Race to the Bottom

There are studies, which find evidence at the firm level that more stringent pollution regulations deter new firms entry in pollution-intensive and non-pollution intensive sectors (Becker/Henderson 1997, 2000; Gray 1997; List/Co 2000). List and Co (2000: 2) use four measures of environmental stringency to understand two potential dimensions of a state's regulatory agenda: first, how hard states are trying to regulate polluters and second, firms´ perceptions of the stringency of environmental regulations. Becker and Henderson (1997: 1) examine in particular effects of air quality regulation on decisions of polluters, using plant data from 1963 to 1992. They find that, ceteris paribus, non-attainment status reduces expected births in polluting industries by 40-50%.

Empirical evidence for increased compliance costs, reduced productivity growth as well as rising foreign direct investment is found in heavily polluting industries (Gray/Shadbegian 1993, 1997; Greenstone 2001, Lee/Roland-Host 1994; Xing/Kolstad 2002). A paper by Gray and Shadbegian (1993, 1997) of plant-level productivity in the pulp and paper, oil refining and steel industries shows a negative relationship between environmental compliance costs and both the level and growth of productivity, and that regulated plant had lower levels of productivity and slower productivity growth than less regulated plants. Kalt (1988) also concludes in this study that the United States lost competitiveness in pollution-intensive manufacturing industries between the late 1960s and the late 1970s as a result of increased compliance costs. The paper of Greenstone (2001) estimates the effects of environmental regulations on industrial activity with data on both regulations from the Clean Air Act Amendments` division of counties into pollutant-specific non-attainment and attainment categories. He finds that in the first 15 years after the Amendments became law (1972- 1987), non-attainment counties (relative to attainment ones) lost approximately 590,000 jobs, $US 37 billion in capital stock, and $US 75 billion (1987 $US) of output in pollution intensive industries. His estimates are derived from a statistical model for plant-level growth that controls for various variables. Even more important is, that these findings are robust across many specifications, and the effects are apparent across a wide range of polluting industries.

Competitiveness of an industry is usually related to performance in international trade. A variety of different measures are used, either based on total exports or net exports, to see whether there is evidence of capital flowing from the more polluting industries to countries where environmental regulation is relatively lax (cf. Jenkins 1998: 8). Investigating these assumptions, evidence is found for example in the United States, Japan and Indonesia (Lee/Roland-Host 1994; Robison 1988; Sorsa 1994; Xing/Kolstad 2002). The average pollution-intensity of the US imports increased relative to its exports between the early 1970s and the early 1980s, suggesting a relative loss of competitiveness in more polluting industries (Robison 1988). Xing and Kolstad (2002: 1) present a statistical test of the impact of environmental regulations on the capital movement of US polluting industries like chemicals and primary metals as well as electrical and non-electrical machinery and transportation equipment. The empirical study is conducted by examining the foreign direct investment (FDI) of these industries. The statistical results show that the laxity of environmental regulations in a host country is a significant determinant of FDI from the US for heavily polluting industries and is insignificant for less polluting industries.

A study of Japanese and Indonesian trade confirms the relative pollution intensity of Japanese imports compared to exports, and the way in which this has risen over time (Lee/Roland-Host 1994). Sorsa (1994: 29f) also shows in her study that Japan is the clearest case of lost comparative advantage in sensitive goods. At the same times, she stresses that industrial countries with high environmental standards have both gained and lost competitiveness in environmentally sensitive industries. Japan on the one hand, and Austria and Finland on the other are the two extremes. Austria and Finland, with high shares of environmentally sensitive goods in their exports and one of the highest environmental expenditures among industrial countries, have increased their world market shares in these goods.

We have seen that a large body of empirical literature has been focused on the question of whether state differences in environmental regulatory stringency influence private sector investment decisions. As noted above, there is an emerging consensus that economic investment does, all else equal, move to jurisdiction with less stringent environmental regulatory requirements (cf. Konisky 2007: 856). But little literature is found which confirms a clear trend towards systematic relaxation of state environmental protection (Drezner 2001; Holzinger 2003: 203, Holzinger/Knill 2004: 25).

3.1.2.2 Race to the Top

There is even evidence for a clear trend towards a regulatory "race to the top" (Holzinger 2003; Holzinger 2007; Holzinger/Sommerer 2007). Here we can also distinguish between studies which measure on the one hand the change of environmental pollution as a consequence of strict or rather lax regulation (Bernauer/Caduff 2004; Gallagher 1999; Princen 2004; Vogel 1995, 1997; Wheeler 2000) and on the other hand the (in-)direct assumptions of the theory along indicators like productivity growth and capital flows (Beers 1998; Levinsion 1996a; List et al. 2002). Besides, there is a lot of literature which verifies a regulatory "race to the top" in the interstate context in the United States (Goklany 1998; Konisky 2007; List/Gerking 2000; Oates 1998; Potoski 2001; Sigman 2002).

The results of Wheeler's study (2000:6) strongly contradict the "race to the model". Instead of racing toward the bottom, major urban areas in China, Brazil, Mexico and the US have all experienced significant improvements in air quality. The improvements in Los Angeles and Mexico City are particularly noteworthy, since they are the dominant industrial centres in the region most strongly affected by NAFTA. Additionally, neither Gallagher (1999) nor Rabindran (2001) find empirical evidence for a regulatory "race to the bottom" while investigating the Mexican situation. Moreover, Bernauer and Caduff (2004: 99f) also observe that in most areas of environmental and consumer policy in advanced industrialized countries regulation has become much stricter since the 1970s.

Holzinger et. al. (2008a, b) Holzinger (2007) and Holzinger/Sommerer (2007) find further empirical evidence. They tested the assumptions of the theory of regulatory competition with data out of the "Environmental Policy Convergence in Europe" (ENVIPOLCON) project. The sample of 24 countries includes 40 policies, which were collected over a period of 30 years (1970-2000). None of these cases verifies the assumption of a "race to the bottom" – on the contrary, most of the policies demonstrate a "race to the top". Possible explanations for these results are harmonisation effects of EU-legislation and international environmental regimes as well as the growing influence of transnational communication emulation and learning [2].

A very popular example for a process of convergence within the interstate context of the United States presents Vogel (1995, 1997). During the 1990s, a number of US states quickly followed the "environmental forerunner" California in adapting strict car emission standards. However, Fredriksson and Millimet (2002: 737) also investigate California's leadership role during the early 1970s. Using state-level panel data from 1977 to 1994 on abatement costs, their results indicate only a minor role for California. Other states, in particular California's immediate neighbours, do not appear to use California as a guideline.

Other studies examine in particular the early 1980s for an investigation whether President Reagan's policy of "New Federalism" induced states to lower environmental standards. They do not find any evidence; indeed, the evidence shows that even during these years of federal intervention several indicators of environmental quality at the state level continued to improve (List/Gerking 2000; Millimet/John 2003). Additionally, Oates (1998: 1) states that the issue of environmental federalism is very complex; but finally also concludes, that the idea that inter-jurisdictional competition inevitably involves a "race to the bottom" and that this constitutes a compelling case for shifting environmental standard-setting to the central level simply is not convincing. Sigman (2002) finds in the case of the US water pollution and hazardous waste regulation some evidence that states authorize to increase the stringency of regulation. Konisky (2007) studies annual state-level enforcement of federal air, water, and hazardous waste pollution control regulation, covering the period from 1985 to 2000. The author found clear evidence of strategic interaction in state environmental regulatory behaviour and concludes that states do not respond in the asymmetric manner suggested by the "race to the bottom" theory.

Quantitative studies generally test the (in-)direct assumptions of the theory along indicators like productivity growth and capital flows. List et al. (2003: 23) examine the location decision of domestic and foreign firms in a single empirical model and find that while domestic firms are influenced by environmental regulation, foreign firms are not. This finding opens up the possibility that localities can introduce more stringent environmental regulations without risking the loss of substantial foreign capital.

Scholars like Potoski (2001) apply the regulatory competition theory within federal states. He tests the assumption within the clean air programs of the American states. Multivariate analyses indicate that states strengthen their environmental program in response to citizens' demands rather than weaken their programs in defence of economic pressures. The study of van Beers (1998) consists of an empirical test of the hypothesis whether OECD-countries with high labour standards experience a lower level of labour-intensive exports than OECD-countries with low labour standards. In correspondence with other empirical studies (cf. Andersen et al. 2000) he could not found a significant impact of labour standards stringency on exports of labour intensive commodities.

Also Levinsion (1996a) couldn't find a systematic effect between interstate differences in environmental regulation and location choices of manufacturing plants. He uses establishment-level data from the Census of Manufactures and the Survey of Pollution Abatement Costs and Expenditures. Unlike previous work in this area, which has focused on particular industries or sets of plants and on one or two measures of environmental regulatory stringency, this study explores the relationship between site choice and environmental regulations using a broad range of industries and measures of stringency. List et al. (2002) used a semi-nonparametric method based on propensity score matching and concluded, besides revisiting the inverse relationship between the stringency of environ-

[2] Insights from the ENVIPOLOCON Project are subject of a separate chapter and will be discussed in more detail within Working Package 1C "Analysis of Dynamics of Environmental Standards".

mental regulations and new plant formations, that traditional parametric methods may dramatically understate the impact of more stringent regulations.

Finally, it should not be concealed that theoretical work suggests a number of conditions and factors under which policy may drive in both directions. (Scharpf 1997; Kern et al. 2000; Drezner 2001; Holzinger 2002, 2003, Fredriksson et al. 2003, Konisky 2007). Most importantly these factors include the presence of economic competition in a field, the type of policy concerned, the relative market shares of the countries involved in competition, or the presence of other interests than business in national politics, such as environmental groups or green parties.

Authors like Jaffe (1995) conclude, that the truth regarding the relationship between environmental protection and international competitiveness lies in between the two extremes of the theoretical debate and make normative recommendations. Environmental goals should therefore be based on careful balancing of benefits and costs. Identifying and implementing flexible and cost-effective policy instruments could reach this.

3.1.3 The Innovative Potential of Leader Countries

The review of quantitative tests of the theory of regulatory competition confirms an apparent lack of empirical evidence of the "race to the bottom" hypotheses and strengthens at the same time the assumptions of a trend towards a regulatory "race to the top". For initiating such a process of convergence the literature debates innovative potential of leader countries that have already developed adequate innovative polices in their domestic context. The following section describes the general understanding of the concept of leader and laggard countries. After presenting the innovative potential of some leader countries possible causes and theoretical explanations of the literature are discussed in more detail. Additionally, some arguments are introduced which explain the positive effects of innovations in environmental policy for the competitiveness of a state.

Since the early days of environmental policy in the 1970s, there have been leader countries setting regulatory trends in the new policy field. National pioneers have been initiating environmental policy innovations such as new institutions, instruments or modes of operation (Jänicke 2005: 130f; Volkery/Jacob 2003). The so-called environmental pioneer state is often defined as a state that in cross-country comparison and at a given period of time effectuates and pursues the most stringent approach in environmental protection as a whole, in a subfield thereof, or in individual measures and thereby intentionally or unintentionally sets an example that can be emulated (Jänicke 1998, 2005; Andersen/Liefferink 1997).

Meanwhile, further studies mention that at the European level the innovation of environmental policy is more than just ensuring strict rules and high standards. It rather entails the shift from reactive and often fragmented policy measures to a more pro-active and integrated approach to environmental problems (Liefferink/Andersen 1997: 10).

The comparative study of governance reveals ample evidence for cross-national, inter-temporal, and issue specific variations in the willingness and ability of the state to effectuate and pursue the relatively most stringent approach in environmental protection (Busch 2008: 3f). The state in some countries is willing and able to effectuate and pursue new policy measures, while the state in other countries is not. Instead, the latter pursues more lenient policy measures and / or introduces policy measures later or not at all (Binder 2005; Jänicke/Jacob 2004; Michaelowa 2003; Weidern 2002; Dryzek et al. 2002; Weider/Jänicke 2002b; Desai 2002; Steinberg 2001; Jordan/Lenschow 2000). These and other studies uncover moreover that the state can be willing and able to act as pioneer in a specific environmental policy area or subfield, but not in others (Jänicke 2005; Vogel 1997, 2005; Weidner 2002; Weidner/Jänicke 2002; Héritier 1996).

Studies that contemplate the evolution of domestic environmental policy measures over time, observe that while the state can be willing and able to assume a pioneering role at one period of time, it can abandon or lose this role in another period of time (vf. Szarka 2006; Jänicke 2005; Lafferty/Meadowcroft 2000; Kennaway 1999; Fernández 1997). Two popular examples in an international context are Japan and the USA. In the last decade they failed to keep their leader position in environmental policy (Jänicke 2007: 12; Busch/Jörgens 2005b).

In a number of cases, studies on the international spread of environmental policy measures reveal that pioneering behaviour of the state can unfold effects on the evolution of environmental policy measures beyond its boundaries. These studies show that policy decisions taken in the environmental pioneer state may evolve into an authoritative source of inspiration or template for emulation in public environmental protection for the state in other countries or in intergovernmental environmental agreements. At least, policy measures of the environmental pioneer state served as role model for successive adoptions of similar policy measures by the state in other countries or even became part of intergovernmental environmental agreements or supranational regulations (Busch/Jörgens 2005b; Busch et al. 2005; Tews et al. 2003; Holzinger 1997: 80).

Studies that compare the behaviour of the state in international environmental governance from a cross-national perspective make observations similar to those that compare the evolution of domestic environmental policy. They reveal cross-national, inter-temporal, and issue-specific variations in the willingness and ability of the state to commit to and comply with intergovernmental environmental agreements as well as—in the case of European Union members—to implement European supranational environmental law (vf. Weale et al. 2003; Börzel 2003; Miles et al. 2002; Recchia 2002; Steinberg 2001; Underdal/Hanf 2000; Young 1999). Eventually, studies on the negotiation of intergovernmental environmental agreements show that the state of some countries and its representatives assume leadership in the process and push through ambitious policies. By contrast, the state of other countries and its representatives do not or to a lesser extent (vf. Drezner 2007; Chadek 2007; Andersson/Mol 2002).

Increasing international economic competition, trade, and the mobility of goods, capital, and services provoke regulatory competition across countries and trigger adjustments or fundamental changes in public environmental protection (vf. Holzinger 2007, Grether/de Melo 2007; Vogel 2005; Esty 1999) as well as the political internationalisation. It becomes manifest amongst others in a sharp increase in the number of international and transnational, governmental and non-governmental environmental institutions, organisations, and actors (Jänicke/Jabcob 2004: 33).

At the same time, there are a lot of critical arguments relating the consequences of growing globalisation on the innovative potential of a state. It's argued that since the beginning of political and economical globalisation a large number of factors are restricting the autonomy and authority of states. The nation-states are increasingly confronted with growing pressure to change and a relatively loss of importance within the decision-making process (Jänicke 2007: 5f). So the fear arose that the increasing globalisation constrains the development of innovative policies at the national level. But for the moment, no empirical study was able to confirm these fears. In contrary, it seems as the process of political and economical globalisations even stimulate the formation of policy pioneers within the environmental governance.

3.1.3.1 Leader Countries in the European Union

The relevant literature on EU environmental policy-making generally distinguishes between following environmental leaders on the one hand and laggards on the other hand: Austria, Denmark, Finland, Germany, the Netherlands, United Kingdom and Sweden are generally regarded as the environmental leaders (Héritier et al. 1996; Holzinger 1997; Liefferink/Andersen 1997: 9; Andersen/Liefferink 1997: 1; Börzel 2002, Farrell/Jäger 2006: 19). By contrast, Greece, Portugal, Spain, and - with qualifications (vf. Coyle 1994) - Ireland are widely conceived as the laggard countries in the field of environmental protection. Belgium, France, Italy, and Luxembourg have been assigned to a "middle group" (Andersen/Liefferink 1997: 6).

Empirical evidence for the diverse innovative potential of the so classified leader states is found in a lot of different articles. Some authors describe Sweden as a pioneer of acidification abatement (Underdal/Hanf 2000: 87f, VanDever 2006: 42, Kronsell 1997: 76), because it has unilaterally adopted more ambitious national emission reduction goals than those demanded by the Long-range Transboundary Air Pollution (LRTP) agreements in 1979. Sweden has successfully implemented for example the 1985 First Sulphur Protocol, the 1988 Nitrogen Protocol and the 1994 Second Sulphur Protocol. Additionally, the authors identify an over compliance in both the SO_2 and the NO_x emissions which is explained by high national sulphur damage costs (Underdal/Hanf 2000: 105). So, Sweden has played throughout a relevant time period the part of a "pusher" and actively lobbied for stringent binding international agreements. The policies of the Netherlands are also a very good example for new forms of regulation (Liefferink 1997: 245f, Weale 2003: 371) which are totally different from the traditional direct regulation that often results in a set of ambient, emission, and technology standards enforced through permitting systems (Bruijn/Norberg 2005. 269f). The Netherlands have developed new approaches to overcome shortcomings of the direct regulation, with the goal to reinforce the adversarial relationships between the public, private and non-profit sectors as well as to stimulate the private sector to invest in technological innovation (vf. Glasbergen/Driessen 2002:4f). Their new conception includes market-based approaches as well as voluntary, collaborative and information-based approaches, the latter being the most central one (vf. Straaten 2001: 400).

A further example is the United Kingdom (UK). In some studies it is called as a new world leader in designing emissions trading schemes and other complex instrument packages that fit together different types of 'new' environmental policy instruments (NEPIs) (Jordan et al. 2003: 179). The findings of the study suggest that the UK's institutional setting has restricted and strongly conditioned the development and functioning of voluntary agreements VAs, as well as of market-based instruments MBIs. But the arrival of tradable permits, complex policy packages and various other eco-taxes is indicative of a pattern of genuine innovation (vf. Weale 2003: 394).

The essential question is, when and how such pioneering policies are likely and feasible at the national level (Jänicke/Jacob 2004: 33; Andersen/Liefferink 1997: 16f; Konisky 2007). There is a wide discussion in the EU literature. A very popular theoretical framework for analysing the conditions for becoming a leader country has been established by Jänicke (2005: 130f). First of all he stresses that countries need (1) a certain capacity, which could be defined over (1a) the existing strength of the 'green' advocacy coalition (Sabatier 1999) together with (1b) the existing institutional, economic or informational opportunity structure. Pioneer activities are (2) issue specific and strongly depending on (3) situative factors (policy windows) that support or restrict the full use of a given capacity. The last factor which should be given for the sufficient explanation of a given effective pioneer role is (4) a question of strategic factors: the 'will and skill' of using a given capacity and situative context.

A variety of authors claim that a stricter regulation also leads to competitive advantages (Huebner 2002: 707). This conception is driven from a very dynamic view of competitiveness, which gives a central role to technological change (Jenkins 1998: 2f). This "win-win" view has been espoused not only by the European Commission, but also by former US Vice President Al Gore, the World Bank and Michael Porter (1995; Porter/Linde 1996). Other authors argue that innovations that reduce environmental damage often lead to reduced costs and increased competitiveness. These "innovation offsets" can arise in a number of ways. From a physical point of view, pollution is simply a form of waste generated in the production process. Environmental regulation, which leads the firm to seek ways of increasing resource productivity in order to reduce such waste will also reduce the costs of inputs. Alternatively regulation may lead the firm to find ways of converting the waste into saleable products, which provide additional revenues (Porter/Linde 1996). Thus environmental regulation can either reduce costs or increase revenues and hence improve competitiveness.

A further way in which competitiveness may be increased is where a firm is able to obtain a niche market by preceding a "greener" product (Jenkins 1998). This can be seen as a form of product differentiation which enables the company to charge premium prices for its product, compared to less environmentally friendly products. Some firms have indeed established their market position on the basis of their environmental image. Increased environmental awareness amongst consumers and the growth of eco-labelling may increase the importance of such considerations in the future.

Another way in which stricter environmental regulation may contribute to competitiveness is through the development of a new industry producing pollution monitoring and control equipment (Sorsa 1994). Again, a country, which is in the forefront of environmental regulation is likely to give its environmental equipment industry a first mover advantage in international markets.

Finally it is important to add that some case studies conclude that technical environmental innovations are largely a consequence of governmental actions. Environmental innovations are not only stimulated by higher environmental preferences of consumers in a particular country, but also by special promotional measures or by political intervention in the market (Jänicke et al. 2000, Jacob et al. 2005).

3.1.4 Compliance with EU Environmental Law

The European Commission as well as the academic literature have denounced a growing compliance deficit, which is believed to be systemic to the EU (Krislov et al. 1986; Weiler 1988; Snyder 1993; Mendrinou 1996; Tallberg 1999) although there are scientists who could not find evidence for the thesis (vf. Börzel 2001: 804; Börzel 2003: 5, Keohane/Hoffmann 1990: 278).

But the processes of European integration and 'globalisation' necessitate the mutual harmonisation of a large number of policy areas – including environmental policy – in order to guarantee freedom of trade, to prevent the distortion of competition among nations as well as to face with challenges regarding growing 'ecological interdependence' (Hanf 2000: 4). The European Union therefore aims to achieve a single internal market within Europe (Arts et al. 2002: 207f, Esty/Geradin 1997: 267, Börzel 2003: 4).

Hence, the innovative potential of leader countries is needed to be a source of inspiration for modelling new environmental policies at the European level on the one hand, and on the other hand to be a template for implementation in public environmental protection for other Member States. However, the real question for a laggard country is not whether new approaches should be used, but rather how they should be used. Many articles conclude that there is not one way to stimulate the fundamental innovations in the different Member States, but a carefully designed concept is needed to fit with and complement the other elements of a nations' environmental policy system (Bruijn/Norberg 2005: 281, Duina 1997: 175).

For reducing implementation deficits of the so-called laggard countries, it is important to analyse the main causes and mechanisms. A range of theories are found in the academic literature which can be summarized into eight central aspects (Etherington 2006: 115): institutional design of the EU, homogeneity of Member States, economic compliance costs, domestic support, nature and fit of domestic structures, experience of policy sector, communication issues and instrument type and content. The reminder of this section will analyse these arguments in more detail:

One of the features of the European Union, which has led to increasing tensions across all Member States has been the dislocation of EU institutions from the public. As well as the problems associated with a Parliament considered by many to have little connection with the electorate, at the administrative level the Commission and the ECJ are dissociated both geographically and politically from what goes on at ground level in Member States (Jordan 1999). A further aspect of the institutional design of the EU has been the shift to 'Qualified Majority Voting' on some issues of environmental policy. Removal of the veto in such cases might be considered to increase the likelihood of non-compliance, and of variation in compliance between Member States (Mbaye 2001: 263). There has also been something of a conflict in the philosophies of the Commission and many Member States. The Commission has traditionally been a 'maximalist' actor, with powerful incentives to introduce legislation, which imposes its primary costs on those charged with implementing it. As this is coupled with a need to underplay the full implications in order to gain approval from the Member States, it is perhaps not surprising that things become difficult at the national implementation stage (Jordan 1999).

A second obvious factor in explaining differential implementation between Member States is the differences between them. These might be economic, geographical, political, social, or other aspects. The EU is not a classic federal system per se and so it lacks many commonalities of political and legal structure (Jordan 2002, Weale 2003: 143f). Obviously, political cultures and legal traditions in Member States are fairly heterogeneous. As a result, slow, or at least differential implementation is probably inevitable. *The question, which is debated in the literature is how far national practices should be allowed to deviate from European norms* (Jordan 1999). In fact, some studies consider that given national, local and regional peculiarities, the national political, legal and social structures have demonstrated a remarkable ability to approach transposition similarly, by using their own 'standard operating procedures' (Dimitrakopoulos 2001).

One of the more obvious factors, which might influence a Member States' capacity, or willingness, to implement a directive is the economic compliance cost (Macrory 1992, Levinsion 1999: 1, Weale 2003: 329). Mitigating factors can include derogations for particular difficulties, or EU funding to counterbalance the impact.

A fourth decisive factor is domestic support. A variety of individuals and organisations may have special interests, financial or political, in a particular policy area. Such vested interests can play a significant role in the success of any policy initiative. Additionally, the public opinion is important because implementation is likely to be more successful over time where the political culture is stable and democratic (Mbaye 2001). The existence of a genuine internal political will to take the necessary measures is likely to have a significant effect on whether gaps in the law will remain (Macrory 1992). This demands both the dynamic participation of citizens and amenity groups and the active recognition by the national courts and administrators/agencies of their roles in giving effect to EU obligations. At the more general level, one factor relevant to public support at EU level might be the level of support within a Member State for the EU project in general (Duina 1997: 160). At the same time, some of the academic literature suggests that this is not the case and that, if anything, the reverse is true (Bursens 2002; Mbaye 2001).

Even more important is the nature and "fit" of domestic structures. Member States vary quite considerably with regard to their administrative systems and, given the principle of institutional autonomy in particular, these differences can affect implementation significantly (Etherington 2006: 117f; Knill 1998). Knill and Lenschow's (1998: 595) main argument is that the extent to which administrative traditions affect implementation effectiveness is less dependent on the "real" costs of adaptation than on the level of embeddedness of existing structures. In general terms, any policy action will require some degree of administrative resources and the success of such action will depend in part upon the availability of such resources and the ability to cope with the pace and technical requirements of implementation (vf. Hille/Knill 2006: 538; Quermonne 1998). Relevant aspects of this can include general wealth/ poverty, efficiency in the machinery of government (Duina 1997: 157), levels of corruption etc (Mbaye 2001). As well as affecting the Member State's ability to implement successfully, factors such as complexity of domestic administrative systems can also affect the ability of that Member State to "upload" its own policies and approaches to the EU level, which then affects the resulting implementation "download" requirements (Bursens 2002: 181).

One factor, which appears to have a clear link with implementation difficulties relating to the domestic structure is the extent to which political power is devolved within a Member State. Intuitively it would seem likely that increasing the numbers and autonomy of actors and the levels of action required for implementation would produce additional barriers to compliance, so that it is more of a problem in federal than centralized Member States (Mbaye 2001: 265). In addition, this is likely to increase the degree of "institutional jealousy" (Bursens 2002: 188f) within a Member State, further inhibiting timely and full implementation. Not having mixed regional and national competency, and so avoiding these "vertical" co-ordination issues, appears to positively affect a state's ability to "upload" its own policy to the EU level (Bursens 2002: 181).

As well as 'vertical' complexity, 'horizontal' complexity can affect ability to implement properly. Not only is the degree of complexity in domestic arrangements and administrative structures important, but also the extent to which these match or 'fit' with the structure at EU level, which can result in "administrative and legal adaptation pressure" (Bursens 2002: 190). Heritier et al. (1996), Knill (1997), Börzel and Risse (2000) and others have argued that high legal and administrative adaptation pressures trigger major internal reforms, potentially causing delays and problems during transposition processes. When policy measures cut across a Member State's traditional structural boundaries this can result in very significant implementation problems, and this is one facet of the issue of challenging domestic structures, processes, laws (Bursens 2002) and interest groups (Duina 1997: 157, Weale et al. 2000: 295f). Where policies challenge only those traditions outside the deeply entrenched 'core' of national administrative institutions, even where substantial, they can be expected to be more successful than where they actually challenge that core and so contradict the logic or philosophy behind administrative structures (Knill/Lenschow 1998). Of course national administrative traditions are dynamic and so the capacity for domestic reform of the core structures is a relevant factor in compliance (Knill/Lenschow 1998).

A more persuasive factor in this failure is the imperfect understanding of environmental sciences, which may exacerbate the problems of 'cognitive deficit' with regard to policy interactions, whereby effects or outcomes cannot be linked easily to specific measures (Glachant 2000, Falkner 2004: 452).

Communication at a variety of levels influences implementation. First, there is the degree of consultation with Member States and other affected parties at the EU level, which is generally considered not to be as effective as it should be (Jordan 1999). Secondly, communication between national implementers and negotiators during the policy formulation stage can be crucial. Where states have efficient state machinery, including, for example, "corporatist" interest group representation, potential implementation problems can be avoided or mitigated (Bursens 2002: 190).

Finally and of special interest to the single market project, the quality of the content of legislation itself as well as the instrument type can affect transposition and implementation. Policy areas may be the subject of a complex 'patchwork' of directives and other measures at the EU level (Reid 2006). Directives can suffer from poor drafting (Jordan 1999), and many contain ambiguities, which result partly from differing legal traditions across Europe and partly from negotiation across a wide range of interests. The multi-lingual nature of EU legislation can also cause problems (National Audit Office 2005), with the need to translate concepts with clarity and precision an increasing challenge with expansion of the EU. Although the nature of EU law demands some compromises and sacrifices from which vagueness can result (Dimitrakopoulos 2001). Vagueness and lack of clarity, in particular, cause problems for national officials, obliging them to make difficult choices when transposing these into national law (Weale 2003: 324). Although one would expect significant differences between the Member States, given differences regarding their implementing instruments such as their legal systems, national procedures and mechanisms for transposition demonstrate a remarkable similarity, so that there is a "European style" of transposition (Dimitrakopoulos 2001).

The increased detail in directive obligations and the introduction of phrases or concepts which might not have a particular definition or meaning in national laws has increased the pressure for what is known as 'copy out' transposition (Etherington 2006: 121). Copy out is designed to avoid the risk of incorrect elaboration leading to infringement proceedings, or of over-implementation as a result of a precautionary approach to elaboration. This latter issue, known as 'gold plating', occurs when transposing measures go beyond the minimum requirements of a directive's obligations, and such 'over implementation' is a significant concern because of the unnecessary compliance costs which might be imposed. Whilst the avoidance of gold plating may be a matter of EU law in cases where directives provide for total harmonisation of a policy area, avoiding the extension of implementing measures beyond the strict scope of a directive will very often be a matter of domestic pressures to avoid 'excessive' regulation.

Closely related to the 'leader and laggard' literature but from a different theoretical angle Richard Perkins and Eric Neumayer (2007) offer the only political science oriented large n-study on the topic. The authors empirically investigate why states comply or fail to comply with legal obligations to implement multilateral environmental agreements that are subject to different EU environmental regulations. In order to assess the variations of 15 individual EU states the authors put forward four different theoretical approaches that help to explain the (non-)compliance with legal EU obligations in a single econometric model. Their models include 'domestic adjustment', 'reputation', 'constructivist' and 'managerial' models (Perkins/Neumayer 2007: 13f). The study makes several interesting observations: Though highly debated in the literature it can be observed that compliance decisions are subject to rational and calculative behaviour. Accordingly it can be observed that states with a higher share of manufacturing and (or) pollution intensive industries have higher economic costs of implementing EU environmental policy requirements and on this account more opposition from different actors. This in turn leads to a worse record of implementing environmental directives. The authors also find that more populous states have a worse record of compliance, which is consistent with the predictions regarding lower reputational penalties faced by powerful states in defecting from treaty obligation. On the other side, recent entrants to the EU face strong motives to establish a reputation as a good European candidate and thus are more likely implement environmental directives. The study also supports a constructivist view that norms concerning the role of supranational governance and environmental protection influences compliance activity. Perkins and Neumayers findings also support managerial models of compliance: In countries where national veto players hinder political actors, implementation of EU legislations is less likely. Countries with a Scandinavian legal system on the other hand have fewer infringements for non-compliance as the system is more compliance oriented and involves less adversarial legal culture (Perkins/Neumayer 2007: 34ff).

Although the insights of this study are debateable on different accounts they explicitly show that the variations in the implementation of EU directives can only be explained on the basis of a whole set of determinants which can be derived from different conceptual models that should not be seen as mutually exclusive.

3.1.5 Conclusion and Implications for the Case Studies

It is important to stress that environmental leaders may often face the same substantial difficulties in complying with European environmental policies like environmental laggards (Börzel 2003: 5). But, if the member state is able to 'upload' national policies to the EU level, it will have more favourable implementation conditions (Bursens 2002: 181f). This uploading mechanism refers to the capacity of one particular member state to convince the others to develop common European directives according to its own policy. Since European directives have to be implemented by all Member States, those that have been able to sell their model to the rest will be able to download European policies with less effort than those who have not. In other words, those that have been unsuccessful in their uploading strategy will be confronted with more transposition problems than those that have succeeded (Börzel 2002: 193). Transposition problems can also result from the quality of the content of the involved legislation and instrument type. Environmental regulation is subject to different EU directives that sometimes suffer from poor drafting that contains ambiguities, which result partly from differing legal traditions across Europe and partly from negotiation across a wide range of interests.

With respect to the main aim of the Single Market Project this literature review can confirm a gap in the theoretical and empirical literature, which addresses questions whether a lack of standardisation of EU environmental policies could lead to competition distortions within the EU Single Market. The question is nonetheless addressed indirectly in the theoretical and empirical regulatory competition literature and the discussion on leader and laggard countries in the environmental field, which has been discussed in detail in this review section.

Concerning the regulatory competition theory the overview showed that some basic assumptions of the theory can be confirmed but that the empirical literature on the whole lacks empirical support for the thesis that regulatory competition leads to a convergence at the bottom. No statistical study confirmed this assumption by measuring the policy outputs like limit values for different emissions. Little literature is also found which confirms a clear trend towards systematic relaxation of state environmental protection. On the contrary, the literature found evidence for a race to the top.

Anecdotic evidence from this literature review suggest that regulations that affect energy- and emission intensive industries or industries which are of crucial importance to some but not all EU Member States (e.g. the automotive industry in Germany) could be a good starting point for the selection of valuable cases. In these cases the likelihood of potential market distortions is higher than in cases where smaller non energy-intensive industries are involved.

Also recent EU entrance candidates (and its relevant industries) could be an interesting case to look at. According to the literature these countries face strong motives and pressures to implement environmental directives very fast in order to establish a reputation as a good European candidate. Compared to the 'old' Member States the accession countries could fear competitive advantages as the established Members States already introduced the relevant regulation[3]

Another starting point for potential case studies might be EU regulations that at least partly built on successful national environmental regulations of leader countries as these countries could have enjoyed competitive advantages over other Member States which could in an extreme case lead to market distortions. The review has identified a group of countries that are generally regarded as environmental leaders (Denmark, Finland, Germany, the Netherlands, the United Kingdom and Sweden) or laggards (Greece, Portugal, Spain, Ireland). Though such groupings need to be assessed with some caution they nonetheless could offer some guidance for case selection. Some countries already introduced more ambitious emissions reduction goals than demanded be international regulation and suffered no observable competitive disadvantage.

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[3] In other areas than the environment an opposite argument could be made. The old Member States feared competitive disadvantages due to the growing Single Market and the lower wages in entrance countries. These provisions led to several interim arrangements in the free movements of services and workers inside the EU Single Market.

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3.2 *Single Market Regulation and Environmental Policy - The Legal Perspective*

By Kerstin Tews and Henrik Vagt

3.2.1 Introduction

Literature on the interrelation between single market and environmental policy has revealed synergies, but has equally focused for a long time on the inevitable tensions between the functioning of the single market and the implementation of environmental policy. The Commission Communication 99/263 "Single market and Environment" gave new impetus to the longstanding political and scientific debate of this issue. Therein the Commission sketches this well discussed tension: "Environmental standards are sometimes perceived as barriers to market access, open markets as a threat to the quality of the environment"(COM(1999)263 final: 3).

Legal scientists question the compatibility of single market law and environmental regulation. So far the desired compatibility suffers from the multitude of contradictory rules and principles regarding both targets in EU law. In principle, the issue furthermore suffers from an inherent dilemma (cf. Dalhammar 2007): If the Community wants to promote regulatory competition and a substantial "race to the top" in environmental standards, it must allow for substantially greater regulatory diversity. Regulatory diversity, in turn, will automatically lead to distortions in the free movement of goods and thus infringe one of the founding principles of the Union. Interpretations and decisions of the European Court of Justice (ECJ) therefore gain in importance to balance these tensions (e.g. Macrory 2004, Winter 2004, Wiers 2003, Torre-Schaub 2006, Vedder 2003).

The aim of this literature review is to summarise central approaches applied in legal literature, concerning the means of integrating single market regulation and environmental protection in the EU.

Policy scientists have made substantial contributions in analysing the tension between market integration and environment. Different types of policy coordination regarding market integration (negative coordination mode) and environmental policy (positive coordination mode) are described as results of different interest constellations among member states concerning both goals (e.g. Scharpf 1996). This results in different types of harmonisation and the respective legal provisions. Market integration within the EU is a politically driven process of eliminating trade and investment barriers as well as competition distortions between the members of the EU. In fact single market integration is a process of integration by replacing differing national legal provisions concerning these issues by harmonised European legal provisions.

Environmental protection within the EU – although equally a field of European action with a legal mandate since the adoption of the European Single Act in 1986 – can rely much less on this type of total harmonisation (Scharpf 1996; Torre-Schaub 2006). Only with regard to environmental standards, which directly affect single market requirements a similar type of total harmonisation is observable (product norms). However, regarding environmental standards national legal provisions are usually not fully replaced by European rules and sometimes Member States are authorised by European legal provisions to diverge from Community Law. The latter often causes infringements of single market regulation.

Thus, from the legal perspective the question what integration is about can be formulated as such: Under which circumstances an infringement of community rules on competition and the free trade of goods can be legally accepted for reasons of environmental protection? Furthermore the question has to be dealt with by which means and who defines these circumstances.

Legal scientists study the above formulated questions against the background of two approaches to integrate the single market target and the environment target: a) the legal work on the one side and (e.g. Torre-Schaub 2006; Macrory 2004), and b) the case-law decisions of the Court and the Commission on the other regarding their characteristics and effects for integration (e.g. ibid.; Wiers 2003; Temmink 2000).

3.2.2 Legal Work to Integrate Market Regulation and Environment

The likely conflict of interests between environmental protection and the completion of the European single market has been manifested in the legal provisions of the European Union since environmental concerns were first subject of community law in 1986 (Torre-Schaub 2006:12 pp.; Pagh 2006:3). Divergences especially arose (and arise) around the question about how much discretion should be left to the member states on environmental matters especially when a stricter national approach comes into conflict with basic single market rights. Moreover, this tension has not been fully resolved by any of the amendments of the EU's Treaty provisions (Torre-Schaub 2006; Wiers 2003). On the other hand, there is Article 6[4] of the Treaty, commonly known as integration principle, which requires the integration of environmental concerns into all community policies. The majority of legal scientists interpret this provision as legal obligation for all community activities including free trade requirements and competition policy. Vedder even argues that competition policy is clearly a subject to the integration principle, but he is equally aware of other interpretations (Vedder 2003: 69; 429).

This is due to the vague nature of this principle on the one side and to the parallel existence of contradictory basic provisions at the same level of the norm hierarchy (Torre-Schaub 2006: 14, Vedder 2003; Winter 2004; Wiers 2003:63, 65). For example, regarding the potential tension between free trade and environmental protection Article 28 of the treaty prohibits any domestic environmental measure that has a possible effect on trade and therefore each such measure can be challenged as violation of EU-law. But next, the provisions of Article 30, which is strictly defined by the Court as an "'exception to the fundamental principle of free movement of goods'" (quoted in Wiers 2003: 65), offer justification for such measures, insofar as they permit infringements of the free circulation of goods for reasons of public security, public policy and order, the protection of health and life of humans, animals and plants etc.

Thus, principles and rules in the treaty provisions are not ranked. There is more a "living together" of contradicting targets, rules and principles (Torre-Schaub 2006). Without prioritisation all principles are equal (Winter 2003:17).

However legal scientists not necessarily interpret this fact as a full lack of integration but as limited integration (Torre-Schaub 2006; see also Pagh 2006), as integration by principles, requiring in the case of conflict with other principles further interpretation (Winter 2003; de Sadeleer 2004). Others see law making in the EU in a transition phase between non- to integration (Vedder 2003).

3.2.2.1 Limited Integration

Torre-Schaub (2006) looks at the legal work from the perspective of legal harmonisation between member states in environmental matters. She argues that approaching the integration task by legal work will always be limited, as the harmonisation in environmental policy of the various member states is characterized by flexibility (except environmental standards regulating product norms) and the opportunity for stricter national measures, which maintain and cause disparities according to the protection level in the several member states and so potentially also competition distortions and barriers to free trade. Thus, legal work will always perpetuate non-integration (ibid.:13). In legal literature we often find a distinction regarding the degree of harmonisation. This degree is defined in the legislation under concern. The assumption is, the lesser the degree of harmonisation the more

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4 All Articles in this document without further specification refer to the EC Treaty.

disparities between member states and so potential conflicts with Single market regulation arise (see for example Torre-Schaub 2006: 20 pp).

Torre-Schaub distinguishes between four degrees of harmonisation:

1. Total harmonisation, where uniform Community rules replace differing national provisions;
2. Minimum harmonisation, where EU-minimum standards are established, while member states are free to maintain or enact stricter measures;
3. Optional harmonisation, where national measures that existed before harmonised EU-legislation remain in effect, and
4. Mutual recognition of standards, where no harmonised rules exist, but the rule to recognise the equivalence of another state's standard (ibid.; see also Temmnik 2000).

Exemptions to the basic rules of competition and free trade are allowed for environmental reasons in various Articles of the treaty and specified in secondary legislation. However, the Commission has to be notified (under Article 175) and/or exemptions have to be proved by the Commission (under Article 95) and very often the unclear provisions in primary and secondary legislation call for Court decisions, which are not always consistent with regard to the consideration of integrating environment into all other policies (Torre-Schaub 2006: 17; Vedder 2003: 437, see next chapter).

Peter Pagh (2006) is even more critical about the worth of the so-called derogation clauses in basic Treaty provisions (Article 95(4-6), Article 176). In detail these Articles grant

member states the discretion to maintain or enact stricter measures when the EC adopted environmental legislation under Article 175 (Article 176) and

the Commission, under certain circumstances, the discretion to permit a member state to maintain or enact stricter measures (Article 95 (4-5).

These provisions gained much attention in the political and legal debate and are sometimes even seen as examples of the integration of environmental concerns into other community objectives – as for example single market completion. Pagh argues in an opposite direction: In fact these provisions would have no substantial effect regarding environmental protection due to his following central objections:

1. The stricter approach keeps environmental protection as a matter of member state sovereignty (ibid: 15). In the Treaty perspective "environmental protection is not an obligation – but an option left to member states – because the Treaty does not contain any provision on environmental protection which is comparable to the free trade obligation" (ibid.: 10, emphasis by author).
2. By analysing cases notified to the Commission and case-law of the ECJ he comes to the conclusion, that the "stricter measure" claim is mainly used "in politically high profile cases to demonstrate the environmental intentions of the national governments (7) or as a "tool for abuse by member states" to justify non-compliance (15), as a "pretext for non-compliance" (11) with secondary environmental legislation, to keep old national regimes. However, as his analysis of the Court decisions has shown, a better fit to national legal and administrative structures, rules and routines (see also Knill and Lenschow 1998) is not the same as a "stricter" measure, as "stricter is not what a member state might find adequate – but [the scope of what is implied] is laid down in the piece of EC legislation in question"(Pagh 2003: 10).
3. The (rarely granted) trade restriction due to a member state's interest in stricter environmental measures or as a tool to punish non-compliance with existing EC measures in the trading partner jurisdiction concerning the way of manufacturing Pagh perceives as a means to impose national or EC standards on other jurisdictions what

> "jeopardizes "fundamental principles of jurisdiction" (ibid.: 11-15). He is very sceptic regarding the real motivations of such trade restrictions. If there really were environmental concerns behind such national actions he would expect much more of them than in reality occur (ibid.: 15).

For Pagh the only way to a real solution of these shortcomings is to abandon the "stricter approach" and "to better balance between economic and environmental interest within the treaty" (11). The latter could only be done by integrating a new provision on environment into the Treaty, which is comparable to Article 28 to Article 30 of the Treaty. "Such a provision must, on the one hand, include a substantial obligation for member states not to substantially damage the environment and, on the other hand, allow for exceptions, as do Article 28 to 30" (ibid.: 11).

3.2.2.2 Transition to Full Integration

Vedder understands the integration of both targets as mutually reinforcing relationship between them (2003: 61 pp.). This could only be achieved by applying the concept of internalisation of external costs into producer and consumer decisions. The internalisation of environmental costs would immediately abolish the tension between competition and environment, moreover "unrestricted and undistorted competition would work for the environment" (ibid 62). Against this background he examines the applicability and the real application of this concept in the legal context. For answering the question of applicability he argues, that an implementation of this concept requires transition periods, where restrictions and distortions of competition must be allowed by European authorities in order "to advance, at a later time, two steps" (ibid.: 63).

For the European context he states that the "internalisation is actually a process under way" (ibid.: 431). This is due to the "very structure of the competition provisions with the omnipresent possibility of exemptions from the basic rules" for environmental consideration (ibid.: 68) and "the very structure of the Treaty, [which] leads to the conclusion that achieving sustainable development and ensuring a high level of environmental protection are among the objectives of competition law" (ibid.:69).

However, the legal provisions in the treaty and secondary legislation with regard to the circumstances of how to follow the principle of integration (Article 6) and how to justify infringements to basic rules of free trade and competition for environmental protection are defined too vague to offer clear guidance. Therefore this guidance must come from further interpretations and political practice. With regard to this, he analysed the Commission's practice and the judgements of the ECJ and concludes "the role played by environmental concerns in EC competition law differs widely between the various provisions" and between the two authorities (ibid.: 432, see also Torre-Schaub 2006: ; see next chapter).

3.2.2.3 Role of Principles for Integration

Analysing the legal significance of environmental principles in the contemporary European legal system has gained much importance in legal science (e.g. Macrory 2004; Epiney 2006). To understand the legal nature of principles it is first recognised that principles and rules are distinctive with regard to the character of direction they give (Macrory 2004: 6). "Principles are open for balancing against other principles whilst rules have to be applied in any case" (Winter 2004: 15). Nevertheless, they have to be distinguished from pure objectives, ideals or policies as they are intended to have a legally binding effect (ibid.: 13pp). The basic environmental principles are all contained in the EC Treaty, notably the precautionary principle, prevention, the polluter pays principle, rectification at source and the principle of delivering a high level of protection (Article 174(2)). As such, principles stand in the background of rules and influence their interpretation and application and the development of new rules. Furthermore they "help to fill regulatory gaps and guide discretionary power and inform about necessary exceptions to a rule" (Winter 2003: 16). Especially the introduction of the polluters-pay-principle into the primary legal framework of the treaty has been characterised as expression of the policy objective to internalise external cost – as such the means of integration of free markets and environment (Macrory 2004: 4; Vedder 2003: 430).

However, environmental principles have to be balanced against contradicting principles and vice versa. Winter argues that this requires the transformation of the principle into a rule, which has to integrate opposing principles such as the principle of proportionality or economic freedom. (Winter 2003: 19) So far this has been done not at the level of legislation – as there is no rule which establishes a ranking between contradictory principles (ibid.: 16) – but by ECJ case law solutions in defining rules and principles and their relation in individual cases in a more precise way. Torre-Schaub states that these case law solutions of the ECJ facilitated a "hierarchy of Community objectives [...] although many grey areas remain" (Torre-Schaub 2006: 14)" Court judgements will create a "legal corpus" to facilitate the subsequent interpretation of similar matters (ibid.)

Nevertheless one might ask, whether the environmental principles have a real legal bite, or whether they are purely political statements. Regarding this, Macrory summarizes various and differing finding in the following manner: "...the actual practice is much subtler than [these] more simplistic views" (Macrory 2004: 8). One of the main distinctions about the differences in their legal bite is the extent to which these principles have been raised in litigation and whether they are expressly referred to in national legislation or policy of member states (ibid.; Winter 2004: 22pp.). This turns the perspective away from legislation to the handling of these principles in judiciary in influencing the outcome of disputes about conflicting rules and principles.

3.2.2.4 Interim Conclusion: Integration by Legal Work and Provisions

Referring to the question rose above, whether at the level of legal work the circumstances are defined which allow for infringements of single market regulation for environmental considerations we can state:

1. Primary and secondary legislation consider the opportunity of derogation from free trade and competition law for environmental considerations and the possibility to go beyond harmonised secondary regulation.
2. Primary and secondary legislation equally considers the derogation from environmental protection and even regulation for economic considerations (e.g. proportionality principle).
3. The circumstances of derogation are not defined in clear legal rules. Legal principles and even rules often remain vague and need further interpretation.
4. Principles have to be balanced with contradictory principles. There is no hierarchy of principles in the legal provisions of the Treaty. Environmental principles formulated in Article 174(2) are not uncompromising, instead conditioned by certain economic considerations, as for example: the availability of technical and scientific data, advantages and drawback of the activity, regional considerations and the social and economic development of the community.

However legal scientists perceive that flexible, vague and contradictory nature of rules and principles as the very nature of contemporary law (de Sadeleer 2004). Against this background attention must be paid to the case law decisions of the ECJ and the decisions of competition authorities in the Commission in order to detect tendencies in applying environmental principles and so their real legal nature.

3.2.3 Case Law by the European Court of Justice and Commission's Practice

Case Law as defined by the European Court of Justice (ECJ) as well as the Commission's practice in granting derogations from Community provisions are an important element of the framework for national environmental measures in the EU. The scope for derogations from primary or secondary

European law is eventually not defined by the Member States, but by the ECJ. It has thereby adopted a positive attitude toward environmental issues in European law: "The Courts have almost always tried to interpret existing legislation in a way which is favourable to the environment and to formalise the concept of environmental law which has often been rather general and vague" (Krämer 2003: 45).

The following sections will shed light on tendencies and main lines in the jurisdiction of the ECJ and of the Commission concerning the conciliation of single market and environmental requirements. Since the legal framework for Member States' environmental actions differs depending on whether harmonisation measures exist or not, it will be distinguished between situations where no Community-wide environmental harmonisation measures exist and those situations where Community measures have already been enacted. It will also be taken into account how environmental principles, like e.g. the precautionary principle (cf. Scott 2004), have shaped case law and leeway for derogatory action. Finally, a short section will briefly introduce into the Commission's and the Court's practice with regard to the relation between environmental protection and competition policy.

3.2.3.1 Jurisdiction where no Environmental Harmonisation Exists

In the absence of harmonisation measures, the provisions of Articles 28-30 determine the scope for national measures. However, there remain a number of unclear situations and fundamental questions regarding the scope of prohibitions under Articles 28 and 29. Additionally, the conditions under which environmental protection can be invoked as a principle for derogations from Articles 28 and 29 are not entirely clear and have been elaborated by the ECJ in its jurisdiction. The problematic character of these stricter measures has been mentioned in the first part of this review (cf. also Pagh 2006), and the Court always carefully has to assess whether a Member state is not trying to enforce its rules on other Member States, either by restricting import from or export to another Member state's territory.

Import Restrictions (Article 28)

As far as non-tariff restrictions of the Treaty are concerned, Articles 28-30 are relevant, covering quantitative restrictions and "measures having equivalent effects" on imports and exports between Member States. The actual scope of these provisions, especially the exact meaning of the elusive term "measures having equivalent effects" is not defined in the legal text itself and has therefore been clarified by the Court's case law in a number of important decisions in the last three to four decades. The Court has thereby moved from a very broad understanding to a narrower definition of the measures falling under Article 28, thus substantially shaping the scope for Member States' actions in areas where no Community legislation for environmental measures exist. Originally in 1974, the Court applied a very broad notion of what was covered under the Article 28. In Dassonville it stated "all trading rules by Member States capable of hindering, directly or indirectly, actually or potentially, intra-community trade are considered as measures having equivalent effect" (C-8/74, Para. 5). This wording of "all trading rules" in the so-called Dassonville formula is wide, and a close following of this provision would lead to a situation where hardly any measure of trade policy that does not have any influence on intra-community trade were included. The Court therefore restricted the Dassonville formula in subsequent case law and created the background for derogations from Article 28 by Member States' actions, especially in its well-known Cassis de Dijon (C-120/78 and Keck (C-267/91) decisions. Generally, the ECJ jurisdiction now accepts two kinds of exceptions from the prohibitions of Article 28:

> Exemptions following the provisions of Article 30 (not longer possible when full or total harmonisation directives have been adopted)

Exemptions with reference to the mandatory requirements, as established in Cassis de Dijon and constantly elaborated in subsequent case law

a) In general, the ECJ only accepts the application of Article 30 or the mandatory requirement justification according to the so-called "rule of reason" doctrine: The Court will thus establish if the national measure is suitable to protect the interest at stake (principle of necessity), and if no less trade-restrictive measure seems to be possible (principle of proportionality). The latter principle, which can be regarded as the more overarching of the two concepts, has been a general principle in Community Law since the very beginnings of the European Coal and Steel Community (ECSC). It demands a sufficient link between a measure and its (legitimate) objective. To verify whether the proportionality principle has been respected, the ECJ applies a three-pronged test of the measure at stake: It will examine whether the measure is 1) appropriate for attaining the objective, 2) necessary, i.e. no less restrictive measure being available and 3) not disproportionate in the narrow sense, that is to weigh the damage to individual rights against the benefit accruing to the general interest. In German Crayfish (C-131/93), the Court explicitly applied the principle of proportionality by stating that a German import ban was to be considered disproportionate because Germany had not presented less trade-restrictive measures and not convincingly argued that the ban did not follow pure economic reasoning. It would furthermore be contrary to the proportionality principle if national rules required imported products to comply exactly with the provisions for domestic products, at least in cases where the imported products afford users the same level of protection (Wiers 2003). However, the Court's jurisdiction concerning exemptions in Article 30 or the application of the proportionality principle has been fairly inconsistent, even "erratic" (Jarvis 1998; cf. for a discussion of different wordings Wiers 2003: 73f.). The ECJ sometimes uses the full proportionality test, while in other cases it opts only for the necessity test, without showing clear signs of consistency (Vedder 2003). As a general rule, it will nevertheless first verify if less restrictive measures exist, then proceed to a true proportionality test.

b) The wording of Article 30 mentions the protection of health and life of humans, animals or plants, but not environmental protection as exemption categories for the scope of Articles 28 and 29. However, a number of additional policy objectives, including environmental protection, have been added to the list of so called mandatory or imperative requirements, which may allow derogating from the provisions of Article 28 and introducing trade-restrictive measures. The often-cited Danish Bottles case (C-302/86) has served as a landmark decision on this issue. In Danish Bottles the ECJ ultimately made clear that environmental protection was to be considered a mandatory requirement following the exemption rules of Article 30 and that environmental considerations do justify limitations of basic Treaty provisions. The Court in cases like Walloon Waste, PreussenElektra or Bluhme further elaborated the establishing of environmental protection as a mandatory requirement and the determination of the width of this concept. In Bluhme (C-67/97), the ECJ, referring to the exemptions in Article 30, authorised a Danish wildlife measure, which aimed at an import prohibition of any species of bee other than the endemic subspecies Apis mellifera mellifera into a Baltic island. The decision constitutes a broad interpretation of the notion of animal health and especially the conditions of environmental protection. The ECJ referred to the Convention of Biodiversity in its decision and thus considerably widened the scope of environmental principles that can be invoked by Member States for their actions. PreussenElektra is an interesting example since the ECJ partly justified the German promotion of renewable energies by making reference to the exemptions in Article 30 and the measure's contribution to environmental protection. However, environmental protection is not mentioned in Article 30. To justify this reasoning, the Court therefore argued that the promotion of renewable energies was necessary to enhance environmental protection, which in turn would lead to the protection of the life of humans, animals and plants. In contrast to environmental protection, these are explicitly mentioned in Article 30. This line of reasoning has been subject to a lot of criticism (opinion Advocate General Jacobs; Bronckers/Vlies 2001). Jacobs (2006) furthermore argues that the German measure was the clear example of a "buy local" obligation, and that the ECJ had not assessed the proportionality or the discriminatory character of the scheme, but instead immediately went to search for justifications under Article 30. Especially as regards the proportionality test, "it is difficult to see why electricity from renewable sources produced in another Member State would not contribute to the reduction of gas emissions in Germany to the same extent as electricity from renewable sources produced in Germany" (Jacobs 2006: 191f.).

Since Walloon Waste (C-2/90), the Court, in a number of cases, appears to have blurred the line between Article 30 and the 'rule of reason', accepting discriminatory restrictions to the free movement of goods, without making an explicit reference to the basis for the exemption. In Walloon Waste, the ECJ had to decide upon a conflict concerning the dumping of foreign waste in the Walloon region. The Court concluded that the contested measures of the Walloon regional government to prohibit the import of foreign waste were indeed justified by the imperative requirements of environmental protection. This judgment is surprising, since it implies that measures distinguishing between domestic and imported goods may be deemed compatible with the mandatory requirements. In Walloon Waste, the Court applied this understanding at least to goods of a "special kind", notably waste (Lavrysen 2006). Jacobs (2006) notes that the decision in Walloon Waste was "remarkable, because the measure constituted an outright ban on imports of waste produced in other Member States, and the ECJ's finding that it was not discriminatory is widely regarded as unconvincing; indeed, the measure was directly discriminatory" (Jacobs 2006: 189). Additionally, as in PreussenElektra, the Court did not apply any kind of proportionality requirement (Vedder 2003: 126).

It is interesting to note that in Spanish Strawberries (C-265/95) the Court further extended the scope of Article 28 by stating that a Member State may contravene Article 28 also by failing to take appropriate actions (cf. Temmink 2000). French farmers had organised partly violent actions against importers of Spanish and Belgian agricultural products and shops and supermarkets, which sold these products. The ECJ judged that the French government had failed to take all necessary and proportionate actions to prevent these obstructions by private actors. In Spanish Strawberries the ECJ made clear that Member States are obliged to take all appropriate measures to ensure that private parties act in compliance with European environmental law.

It can be concluded that the ECJ leaves a considerable margin of appreciation to the Member States and is ready to accept national arguments for deviations. This finding is especially valid for cases in which scientific uncertainty about risks prevails, and where it is possible to establish the threshold above which the product in question poses health hazards (Wiers 2003; Toolex Alpha (C-473/98)). In Eyssen (C-53/80) the Court decided that Member States do not need to present conclusive and incontestable evidence in order to demonstrate an existing hazard to life and health. This applies also to situations where other Member States consider a product safe.

Export Restrictions (Article 29)

Case law regarding the provisions of Article 29 (prohibition of export restrictions) paints a different image of the possibilities for derogations on environmental grounds than with regard to Article 28. The Court has made clear under which conditions a national measure must be deemed incompatible with the Treaty. The relevant doctrine was elaborated in the Court decisions Groenveld (C-15/79) and Oebel (C-155/80). In these cases the Court stated that a national measure is prohibited if

1. it has as its specific objective the restriction of patterns of export, and
2. the measure discriminates by providing a special advantage for national production or for the domestic market of the state in question.

It is interesting, and the reasons do not seem to be entirely clear (Vedder 2003: 412), that this formula is much narrower than the Dassonville definition for Article 28. It explicitly links to the "discriminatory element" of a measure, whereas the Dassonville formula contained all measures "capable of hindering, directly or indirectly, actually or potentially, into community trade as measures having an effect equivalent to quantitative restrictions". Accordingly, Article 29 does not cover rules that might fall under the provisions of Article 28 according to current case law (cf. Temmink 2000: 81).

The rationale behind the prohibition of export restrictions is to prevent situations where domestic measures in one state are intended to impose national standards on other Member States (cf. Pagh 2006). In Compassion (C-1/96), the Court prohibited the transfer of stricter national rules on other Member States by deciding against a British export ban on live calves. British animal welfare bodies had challenged the British Minister of Agriculture's refusal to restrict the export of veal calves to other Member States. In the UK, the contested rearing in veal crates had already been prohibited before. The ECJ, however, argued that the national restriction could not be justified because the interest had already been covered by Directive 91/629/EEC Laying Down Minimum Standards for the Protection of Calves.

Against the background of extraterritorial demands enforced by export restrictions, Pagh (2006) argues that especially in the case of waste policies Member States have actively sought to enforce their own standards on the territory of other Member States. He quotes seven cases from 1992 to 2002 in this context. In Dusseldorp (C-203/96), e.g., the Court had to decide on the question whether a Dutch law rightfully prohibited the export of waste to foreign installations. This included the obligation to hand over waste to a special Dutch incineration plant unless the treatment abroad was to a higher environmental standard. The Dutch company Dusseldorp was accordingly not allowed to export waste oil filters for treatment to Germany. Export restrictions in this case were very obvious, and the ECJ made clear that "the protection of the environment cannot serve to justify any restriction on exports", however without saying that this applies to all kinds of waste exports (cf. Lavrysen 2006). In DaimlerChrysler (C-324/99) the ECJ stated that Regulation 259/93 on the shipment of waste had exhaustively regulated on reasons for objections against imports or exports of waste, and that there was no further scope for stricter measures and thus the imposition of German standards on the treatment of German waste at a Belgian disposal facility. From these and a number of other cases, Pagh (2006: 14) concludes that while generally Member States cannot impose their standards for waste treatment to other Member States, there remain three exceptions to this rule: 1) to prevent transboundary nuisance on the territory of the exporting State, 2) to prevent waste for disposal being shipped as waste for recovery which is necessary to ensure compliance with Regulation 259/93, and 3) to prevent the treatment of the exported waste from conflicting with EC standards for waste treatment.

3.2.3.2 Jurisdiction where Community Measures Exist

Where harmonisation of subject matters has been achieved by Community legislation, Member States can no longer invoke the provisions of Article 30 in order to derogate from harmonised law. The extent to which Member States can derogate from Community law is first defined by the degree of harmonisation as laid down in the respective measure itself (see Torre-Schaub 2006). This refers, e.g., to questions of the legal base of the provision in question (i.e. whether the directive or regulation has been adopted under the internal market harmonisation Article 95, or the environmental protection Article 175). It further has to be clarified how relevant Case Law has substantively shaped a certain subject matter.

However, it is not always fully clear to what extent a specific subject matter has in fact been harmonised by Community measures. Although a directive or regulation may exist for a special issue, this does not automatically imply that the national measure cannot be tested against Article 30 of the Treaty (cf. Temmink 2000). E.g., in the already cited case Compassion (C-1/96), the Court decided that a national restriction on the export of veal calves could not be justified by the protection of animal health as mentioned in Article 30, because this interest had already been covered by Council Directive 91/629/EEC (minimum standards for the protection of calves). On the other hand, the Court in Compassion also examined whether a Member State could rely on the protection of public policy or public morality, being safeguarded by Article 30. The mentioned directive did not cover the protection of public policy or public morality, which therefore belonged to a non-harmonised area.

Temmink (2000: 66ff.) accordingly distinguishes between four conceptions to determine the reserved powers of Member States following harmonisation.

1. Even if community legislation has been fully adopted, the regime of Article 30 still fully applies and Member States still retain competences to adopt provisions justified by Article 30 when the implementation period has not yet expired, or when the harmonisation measure requires that more detailed rules must be adopted.
2. The question whether the subject matter has been dealt with exhaustively must be answered. A Member State's possibility to invoke the provisions of Article 30 or the doctrine of mandatory requirements ceases to be possible as soon as the commission has provided for exhaustive harmonisation (cf. *Gourmetterie van den Burg*, (C-169-89); *Compassion* (C-1-96)), derogation would then have to be dealt with within the framework of the directive.
3. The "harmonisation technique" chosen for the regulation of an issue must be kept in mind, which refers to the degree of harmonisation of a particular subject. It is furthermore important to consider the legal basis of a Community measure in order to assess the scope for Member States to derogate from Community legislation. Both Article 95 and Article 175 allow Member States to adopt stricter environmental measures under certain conditions. Article 176 mentions that such measures be compatible with the Treaty, thus assuming conformity with Articles 28-30. Article 95(4) states that stricter measures must be based on grounds of major needs referred to in Article 30 and therefore also indicates that a test of Articles 28-30 plays a role here.
4. The fourth consideration concerns the situation in which directives and regulations are implemented and/or applied on the national level. A directive may involve the issuing of individual authorisations by decentralised administrative bodies, which have to respect national implementing legislation as well as the Treaty provisions relating to goods.

The legal base of environmental secondary legislation

As already mentioned in part one of this review, both Article 95 and Article 175 offer justifications regarding a stricter approach of member states for environmental reasons, which under certain circumstances might even infringe single market rights. However, they are distinct with regard to

1. the object they deal with, and
2. the institutional procedure to grant stricter national measures.

Both is relevant, as it affects the room of manoeuvre for Member States, the Commission and the Court with regard to the enactment and granting of national environmental measures which go beyond EU legislation.

Regarding the object they deal with it is important to note that Article 95 deals with the approximation of member states law relevant for the functioning of the single market. Article 175 explicitly and exclusively deals with environmental law making in the EU and its member states.

Regarding the institutional procedure to grant a member states stricter approach it is interesting to note that secondary legislation under Article 95 provides for the necessity that the Commission has to prove the stricter measure's compatibility with the EU law. In contrast to that, under Article 175 Member States "only" have to notify the commission, but they do not need a Commission's approval to enact these measures (see the wording in part one of this review).

Consequences are the following:

- Stricter measures than those laid down in Community legislation following Article 95 are proved by the Commission by applying a much stricter proportionality test, even stricter than that used by the Court in assessing national measures under Articles 28-30 (Wiers 2003: 90).

This is not surprising, since national derogation from EU-legislation under Article 95 is taking place in an area where European legislation has already struck the balance between contradictory principles on a Community level. Moreover, according to Article 95(7) the Commission, in case it authorises a Member State to derogate from Community measures as foreseen in Article 95 (4) and (5), must immediately examine whether to propose an adaptation of the harmonisation measure in question. Derogations from Community rules, if authorised, may thus trigger a Community-wide development of harmonisation measures. It is furthermore interesting to note that even in cases where the Commission rejects national requests for derogations, this sometimes triggers new discussions, which in certain cases lead to reconsiderations of harmonisation measures (Onida 2004).

- Stricter measures than those laid down in Community legislation following Article 175 do not need the Commission's approval, the Commission can therefore only decide whether the Community legislation will be altered or whether it will start an infringement procedure against the Member State. It is thus the Court, not the Commission that eventually decides about a measure's compatibility with Community law. In case of Community measures under Article 175, the Court has explicitly stated, e.g. in Fornasar (C-318/98), that Community rules do not seek to effect complete harmonisation in the area of the environment. The higher discretion for Member States to enact stricter measures has therefore been acknowledged by the ECJ (Wiers 2003: 87). Nevertheless, as already mentioned in part one of this review, the Court made clear in several cases, that "stricter" is not the same as a "better fit", instead the scope of what "stricter" implies is defined in the legislative act under concern (Pagh 2006).

However, the Community is not entirely free in deciding on which Article a rule can be based. The Court has made clear that measures based on Article 95 must have the improvement of the internal market as objective (Germany vs. Parliament and Council, C-376/98). In general, the decision about which Article may form the basis of a measure depends on the "centre of gravity" of the respective measure (cf. Misonne et al. 2004). It often seems rather unclear, however, where the legal basis for regulation of production standards should be based. A double legal basis is possible, but at the moment remains an exception. It is open to investigation whether there is a trend toward applying a double legal basis for Community directives. One concern regarding the choice of a double legal basis is that the respective law may be challenged before the Court because the legal basis was incorrectly chosen (Dalhammar 2007; Pagh 2006).[5]

While it must be noted that product regulation and especially New Approach directives[6] are generally based on Article 95, thus leaving less possibilities for Member States to derogate from Community legislation, there are some product restrictions that have been based on Article 175. Examples are restrictions on substances, which deplete the ozone layer (Regulation 2037/2000) or the ban on heavy metals in cars (Directive 2000/53 EC).

3.2.3.3 Environmental principles in Case Law

With regard to environmental principles as mentioned in part 1 of this review, the ECJ has in a number of cases referred to different principles and has partly based its decisions on the relevant principles. The precautionary principle, e.g., was underlined in several cases, such as Toolex Alpha (C-473/98), BSE /(C-157/96) or Alpharma (T-70/99). Furthermore, the Commission contributed to this

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5 The Batteries directive 2006/66/EC, e.g., was based on a double legal base, referring to both Article 95 and Article 175. Only very recently, the Commission's proposal for a directive on the promotion of energy from renewable sources (COM (2008) 30 final) was equally based on both Article 95 and Article 175.

6 See for extensive information on the New Approach and a list of New Approach directives http://ec.europa.eu/enterprise/newapproach/standardization/harmstds/index_en.html

issue with its Communication (COM (2000) 1) on the Precautionary Principle. In Toolex Alpha, the Court explicitly stated that it accepts national arguments for deviations in case of product safety with regard to the precautionary principle. In BSE the Court authorised the intra-Community ban on British beef although the direct link between BSE and the Creutzfeldt-Jacob disease had not finally been proved. However, the ECJ argued with reference to Article 174(1) that European policy should aim at preventative action and the protection of public health. Toolex Alpha was to be judged on the basis of Articles 28-30. The Court stated that the Swedish authorities' measure was proportional and necessary to achieve the objectives of Article 30. Since no scientific threshold of safe exposure to the substance in question, trichloroethylene, could be objectively defined, the ECJ concluded that Sweden was entitled to adopt the most stringent measure.

Clearer guidelines how derogations from Community measures can be justified according to environmental principles were given in Monsanto (C-236/01). In Monsanto the ECJ emphasised that Member States, in order to derogate from Community legislation regarding novel foods and especially genetically modified organisms (GMO), had to provide a risk assessment with specific evidence making it possible to conclude reasonably that the measure was necessary to avoid food posing a risk to public health. This presumed risk has to go beyond the general food policy of the Member State and cannot be based on purely hypothetical risks and presumptions.

Other principles, like e.g. the principle of rectification at source, the polluter pays principle or the objective to secure a high level of protection (Article 174(2)) have been asserted by the ECJ in a number of decisions (cf. Winter 2004; Epiney 2006). Winter (2004) notes that the Court will review governmental action differently depending on whether the authorities have made use of a principle or not. That is to say, in cases where "the principle is used to empower an authority, the review will be thorough. By contrast, if the governmental body has refused to act, although the principle may oblige it to, the courts will tolerate such passivity" (Winter 2004: 22). Winter argues that the reason for this lies in the separation of powers between the judiciary and democratically legitimated governmental bodies. In the first case (when a principle was used by an authority), the Court will assume that the authority has weighed the principle against opposing principles. It is thus a matter of judicial self-restraint if the Court applies different guidelines in the above situations.

The Court furthermore allows for wide legislative discretion if the affected rule is itself very open (Winter 2004: 25). This can be shown in Safety High Tech (C-284/95) where the ECJ did not rule against Community legislation about the ban of hydrochloroflurocarbon (HCFCs) for fire fighting. While the Court accepted that general principles, like the high level of protection in this case, do have a legally binding character, it also stated that the Community legislator disposes of substantial discretion to define the level of protection and the application of the respective principle, and that only a manifest error of appraisal would constitute an infringement of primary law: "[R]eview by the Court must necessarily be limited to the question whether the Council, by adopting the regulation, committed a manifest error of appraisal regarding the conditions for the application of Article 130r [now 174] of the Treaty" (C-284/95, para. 35). However, Epiney (2006) also argues that the ECJ has thus far only given scarce input in this area, and that it "has the tendency to grant the Community legislature too wide a margin of discretion" (Epiney 2006: 38)

In Standley (C- 293/97) the Court assessed the compatibility of Directive 91/676 (concerning the protection of waters against pollution caused by nitrates from agricultural sources) with the principle of rectification at source and the polluter-pays principle. It was argued that the Directive left enough discretion for Member States to be implemented with respect to the two principles – a breach of primary European law could therefore not be stated. The principle of rectification at source was further elaborated by the ECJ in the already mentioned Walloon Waste case, where the Court authorised measures to ban the import of goods of a special kind, notably waste.

It can be concluded from the ECJ's case law that environmental principles can influence or even determine the outcome of cases. However, the character of principles implies that an annulment of

Community legislation will only be acceptable if the relevant principle has been blatantly disregarded (cf. Douma 2000).

3.2.3.4 Competitiveness and the Environment

The following section will briefly review some contributions to the interaction between environmental policy and competition policy and the conflicts that might arise from the Treaty provisions, notably Articles 81, 82, 86, and 87. As competition is a basic principle of EU law, possibilities for derogation are rare. However, environmental protection sometimes requires voluntary agreements, the granting of state aid and exclusive rights (London 2006: 143). These means of environmental protection may conflict with the provisions for competition and state aid rules as defined in the treaty.

The Commission as well as the ECJ have decided upon these questions and came to the conclusion that environmental considerations may under defined circumstances and on the basis of a case-by-case analysis supersede competition rules (ibid.; Vedder 2003; Torre-Schaub 2006).

Prohibition of Agreements Between Undertaking that Restrict Trade or Hinder Competition (Article 81)

Since the beginning of the 1990s the Commission as well as the OECD have recommended to complement the regulatory approach by incentive instruments to encourage initiatives of private undertakings, such as voluntary environmental agreements. Article 81(1) provides that all agreements between private undertakings that may affect trade between Member States and which have as their object or effect the prevention, restriction, or distortion of competition are incompatible with the Internal Market. There are, however, environmental agreements that do not fall under the prohibition rules of Article 81(1), in particular those that do not impose precise legal obligations upon the different parties (London 2006: 146). The agreement of the European automotive industry under the auspices of the European Association of Manufacturers of Automobiles (ACEA) was considered by the Commission not to infringe Article 81(1) because it only loosely established a sector-wide target.

Environmental agreements which almost always fall under Article 81(1) are those which do not truly concern environmental objectives, but serve as a "means to engage in a disguised cartel, such as price fixing, output limitation or market allocation, exclusion of actual or potential competitors" (London 2006: 146). In VOTOB (22nd Commission Report on Competition Policy [1992]) the Commission decided that a waste management agreement by six tank storage operators that was financed by a fixed fee constituted a restriction of competition since the fixed fee harmonised the costs. It thus stressed that restrictions for third parties such as price-fixing could not be tolerated by the Treaty provisions. On the other hand, there might be environmental agreements which only may fall under Article 81, and thus require an examination whether the application of exemption rules provided in Article 81(3) are fulfilled. Agreements likely to be caught by Article 81(1) are those which "appreciably restrict parties' ability to device the characteristics of their products or the way in which they produce them, thereby granting them influence over each others production or sales" and agreements that "reduce or substantially affect the output of third parties, either as suppliers or as purchasers" (London 2006: 146p).

One condition for granting an exemption is the condition that the economic benefit of an environmental agreement must outweigh its negative effects on competition (ibid.: 147). This requires that an agreement's provisions which "prima facie may be deemed not indispensable must be supported by an cost-effectiveness analysis showing that alternative means of attaining the expected environmental benefits, would be more costly" (ibid.).

Article 81(3) provides for exemptions from the provisions of Article 81(1). The Court has explicitly acknowledged the fact that Article 81(3) allows for trading off non-competitive benefits with competition restrictions from private undertakings. In Métropole (T-543/93) it stated that "the Commission is entitled to base itself on considerations connected with the pursuit of the public interest in order to grant exemptions under [Article 81(3)]". However, the Commission's considerations of environmental concerns seem to have remained merely supplementary to economic arguments (Boute 2006). By insisting on balancing costs and benefits of an agreement, the "Commission's practice does not allow for integration of environmental improvement as such in the evaluation of restrictive agreements" (Boute 2006: 158, emphasis in the original). At present, the Commission seems to be neither ready to accept the "rule of reason" and thus a recourse to the mandatory requirements, nor an interpretation of Article 81(3) in the line of Article 30, implying that it would apply a full proportionality test. Vedder strongly criticises the Commission for its failure to apply the model of integration as provided for in Article 6: "By opting for a standards competition law-approach, the Commission forgoes the possibility to apply Article 81(3) with the longer-term objective of achieving sustainable development (Vedder 2003: 434). Similarly, Boute (2006) highlights a certain inconsistency in the Commission's approach to Article 81, since "it encourages the use of voluntary agreements as 'the most appropriate and flexible means of addressing environmental issues' for industry and, on the other, it restricts their implementation by a rigid interpretation of Article 81(3)". The lack of clear guidance by the Commission's case-to-case practice might lead to different interpretations of the rule by Member States, and to a situation where Member States eventually go beyond Commission rules when they themselves apply Article 81(3).

Exclusive Rights (Article 86) and the Prohibition of State Aid, which Restrictively Influences Competition and Trade (Article 87)

Environmental concerns seem to be well established with regard to the application of Article 86 and the assessment of state aid programmes (Article 87). Since the decision in Sydhavnens Sten & Grus (C-209/98), Article 86(2) allows for a direct balancing of environmental goals with the need to apply the Treaty rules (Vedder 2003). However, Vedder (2003: 323) also notes that Article 86(2) is limited to cases where privileged undertakings have been entrusted with the performance of a special (environmental) task. London, in turn, points to the fact that with its decision in the above mentioned case the Court has managed "to go a step further in favour of environmental protection" (2006: 156). The Court decided that "even if the grant of an exclusive right led to a restriction of competition in a substantial part of the common market, that grant could be regarded as necessary for the performance of a 'task serving the general economic interest" (London 2006: 157, emphasis in the original). In doing so, the Court has – as it is perceived by Torre-Schaub (2006) – established a "value, which has since become fundamental and common to all member states: that of the general economic interest Environmental protection" (Torre-Schaub 2006:35) .

Regarding the integration of environmental concerns into the application of Article 87(3), it can also be added that for Article 87(3), which does not mention environmental protection either, the Commission has adopted a more environmentally friendly position than for Article 81(3). The Court has accordingly balanced environmental considerations against the free movement of goods and competition under Article 30 and Article 86(3) respectively.

It can thus be concluded that Community institutions seem to be much more reluctant to assign an important role to environmental considerations when private undertakings are concerned than when Member States invoke them (see Vedder 2003).

3.2.4 Conclusions:

In the passage of time the Commission's and Court's case law shows a better integration of environmental consideration into free trade and competition law. The Court has added substantially to the Treaty provisions and has strengthened the role environmental considerations can play in Community legislation. It has furthermore added to the flexibility of modern European law (cf. de Sadeleer 2004).

However, the case-by-case nature of the Court's and Commission's solutions with its inherent inconsistencies has also demonstrated the limits of such an approach. Case-by-case solutions do not impose a rapid and total harmonisation of protection standards, and they have limits concerning juridical security (Torre-Schaub 2006). The legal situation of what is possible under primary and secondary Community law is not always clear. This can lead to undesired effects with regard to Member States' perception of their opportunities to enact environmentally ambitious rules. Dalhammar (2007) points at the danger of a lack of regulatory action for environmental protection in the Member States. This "regulatory chill" risks occurring in case of unclear provisions by EU (and equally WTO) rules. Situations of anticipatory obedience to the Court's and the Commission's decisions might arise in the Member States. Afraid from eventually being overruled, Member States will refrain from taking ambitious action and instead wait for supra-national actors (especially the European Commission) to take decisions. Therefore, while it appears from a number of different cases that the Court is ready to accept national derogations on grounds of stricter environmental standards, Member States seem to be rather cautious in actively "challenging" the Commission.

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3.3 *Literature Review on the Economic Impacts of Environmental Regulation*

By Adarsh Varma and Henry Leveson-Gower

3.3.1 Introduction

The following section of this interim report provides a literature review on the economic impacts of environmental regulations on the Single Market, which primarily arise from their lack of standardization across the European Union. High environmental standards are seen as being important for both competitiveness and cohesion by the European Council, but there is much debate as to whether a competitive business environment can go hand-in-hand with environmentally sound regulations, as well as how regulation can be smoothly implemented across the EU-27. The European Community has seen much benefit from the Single Market, seeing a 2.2% per annum increase in GDP since its inception (Single Market for Citizens, Interim report to the Spring European Council, 2007). Nonetheless, finding the right balance between the harmonization and mutual recognition of environmental regulations is difficult, and there has always been an emphasis on using tools which complement existing national legislation.

The following sub-sections will describe the theoretical and empirical bases which examine the interactions between environmental regulation, trade distortion, innovation, productivity and competitiveness. Particularly, these interactions give rise to the following debates:

- whether the lack of standardized implementation of environmental regulation leads to trade distortion within the European Union, and to what extent;
- whether more stringent forms of environmental regulation lead to greater productivity, by encouraging both innovation and greater resource efficiency; and
- how the interactions between the impacts of environmental regulation on trade and innovation can impact overall competitiveness.

Particular emphasis is put on distinguishing the differences in impact by type of regulation, stringency of regulation and context of regulation – including industry, size of firm and market structure. Most of the literature highlights that the conditions surrounding regulation can be more important than non-standardised implementation.

3.3.2 Impact on Trade and competition distortion

Environmental standards are often seen as barriers to market access. As national provisions are not necessarily replaced by European rules, this lack of standardization could potentially lead to a distortion in the movement of goods, an idea that does not mesh with the ideals of the Union (Commission Communication 99/263 1999). Harmonisation of all policies, including environmental policy, is seen to be essential to both the free-movement of goods and the harmonisation of environmental goals within the Single Market (Hanf 2000). This trade distortion is manifested through two mechanisms: the inability for products to enter national markets and the unequal costs of implementation across Member States. The former is the direct result of *product* regulation, while the latter is influenced by both *product* and *process* regulation. In addition, further competition distortion is seen when firms choose their location based on the strictness of environmental regulation.

3.3.2.1 The inability to enter the market – product regulation

High product standards may prohibit firms from entering a national market (Esty & Geradin 1997). In particular, Article 100A of the Single European Act allowed Member States to have the right to increase levels of environmental protection beyond EU legislation and deny the entry of non-compliant goods, as long as the Commission is notified beforehand. The Commission would have to verify that the more stringent policies were actually environmentally motivated, and not a hidden restriction on free trade. (Torre-Schaub 2006). However, there is little empirical evidence backing this theory within the Single Market, as common labelling mechanisms have become more standardized.

For example, in a study exploring the differences between the British and German approaches to EU legislation, it was revealed that non-standardised environmental protection measures do not automatically impede the trade of goods (Bailey 1999). The study focused on the Packaging Waste Directive, which requires member states to have packaging waste recycling systems.

Also, trade agreements have the ability to counter the potential negative impacts of product regulation on competition (Hoberg 2001). The stringency of environmental regulation does not differ significantly enough across the Single Market in order to have a noteworthy negative impact on trade. The underlying theory that differences in environmental regulation impede trade is more of a concern within international trade, rather than within a single trading bloc.

3.3.2.2 The Marginal Cost Differences in Implementing Environmental Regulation – Product and Process Regulation

The cost of implementing EU environmental legislation may differ by Member State, depending on the State's previous environmental standards and its stringency in implementing new environmental standards. Member States with previously lax standards have higher compliance costs as they have more changes to make in accordance to any new policy, and Member States which require stringent implementation of policy have similar consequences. While this is not a trade distortion, the differing costs can lead to certain markets in which goods can be produced at cheaper prices, thereby potentially increasing their profitability and market share (Esty & Geradin 1997).

Nonetheless, there is little empirical evidence to show that markets with lower environmental standards are benefiting economically; the costs of labour, transportation and other inputs usually outweigh the cost of environmental compliance (Esty & Geradin 1997).

A US study, which examined the differences in environmental regulation among the fifty states has shown that more stringent environmental policy did have a significant impact on local competitiveness, though more positive. States with more environmental regulation saw lower business failure rates, which was largely attributed to the following: the cost of environmental compliance was minimal in compared to the cost of labour and resources, businesses were well-informed and well-prepared to make necessary changes, and states with higher environmental regulation were often more competitive regardless of environmental regulations (Meyer 1999).

However, some studies have argued that the cost of regulation goes beyond the simple cost of compliance. They have argued that 'hidden costs' are often omitted from such calculations (Joshi, Lave, & Krishnan 2001). These 'hidden costs' refer to the costs associated with changing production processes; often, the necessity to change the composition of raw materials in a product puts an extra strain on the production process. While this may lead to new innovative processes, the initial costs have put a burden on some industries. The study by Joshi, Lave and Krishnan showed that a 1 USD increase in 'visible' (compliance) costs was actually 10-11 USD in total costs.

Another US study has shown that greater regulation leads to lower productivity levels and slower productivity rates in the manufacturing industry. According to this study, a 1 USD increase in environmental compliance costs leads to decrease in total factor productivity by approximately 3-4 USD (Gray & Shadbegian 1993).

3.3.2.3 Investment Flows and Firm Relocation

The high cost of environmental compliance may lead firms to change their investment location, leading to further competition distortion. This theory does not differentiate between product and process standards, and there is again little empirical evidence of a firms' decision-making process based solely on environmental regulation. The cost of regulation, only when coupled with other cost categories, is a major underlying criterion for a firm's choice of location (Vogel 1997). In addition, firms base their location decisions on a wide variety of factors, including local skills, infrastructure, etc – with environmental compliance only comprising a small part of their decision-making framework.

In a study on investment flows into Brazil and Mexico, it had emerged that access to capital and access to relevant skills was more important than low levels of environmental regulation (Smarzynska & Wei, 2001). Furthermore, investment decisions are now more likely to be based on international location, access to consumer markets, and agglomeration economies (Brunnermeier & Levinson 2004).

However, this changes for the most polluting, or 'dirty' firms. A study looking at county-level and regional data in the United States has shown that the most polluting industries tend to respond radically to environmental regulations and their location is influenced by the strictness of environmental regulation (List, Millimet, Fredriksson, & McHone 2002). Such firms may relocate either to regions with less stringent regulations, or take their businesses to other countries where environmental standards are more lax and production costs are lower. In relation to the Single Market, this may force more polluting industries to relocate to Member States with less stringent policies and possibly outside the EU.

Furthermore, such regulations have an impact on both foreign direct and inward investment. Similar to other studies, it was found that environmental regulations in a host country have a significant impact on the location of heavy-polluting industries, but an insignificant impact on the location of less-polluting industries (Xing & Kolstad 2002).

3.3.2.4 Context of Regulation and Trade/Competition – Type of Regulation and Policy Context

Though greater stringency in certain Member States could lead to inequitable advantages and trade distortions, the conditions surrounding the environmental regulation can often have stronger impacts than the stringency or type of the regulation itself.

There is little literature that differentiates between types of regulation (SQW 2006). While some studies have focused on specific regulations, such as air quality (Peterson, 2003) or water quality and others have looked at regulation as a whole, there is little empirical evidence that the type of regulation has any significant impact. There is one study, however, which distinguishes between 'flexible' and 'inflexible' regulation tools (Majumdar & Marcus 2000). It was found that 'flexible' regulation tools allow companies to better adapt to the environmental regulation, and they could have more control over their compliance costs; this reduces the burden and does not have a significant impact on production costs or productivity. In addition, further studies have on regulation type have distinguished between market-based regulations, such as taxes, and control mechanisms such as pollution or emission levels. The theory is that market-based regulations tend to provide less of a burden than strict pollution controls or production standards. However, there is little empirical evidence, and most studies also do not distinguish the effect of market-based and control mechanisms. The conditions surrounding the implementation of the regulation have proven to be more important in determining the impact on the Single Market.

3.3.2.5 Context of Regulation and Trade/Competition – Market Structure

One major factor in determining the impact of stringent environmental regulation is type of industry – both in terms of factor-intensity and energy-intensity. Though empirical evidence has shown that the costs of environmental compliance are not a major deterrent to trade (SQW 2006), specific industries in certain countries may be more affected then others. Factor intensity, when coupled with its factor abundance in a country, is a strong determinant of an industry's response to regulation. In a country in which a factor is scarce and an industry intensively uses the factor, environmental regulation tends to adversely affect overall productivity, and there is a decline in exports. This is regardless of the strictness of implementation. This was seen in a study in Germany, the Netherlands and the US—specifically with textiles and fabricated metals in the Netherlands and the US (Mulatu, Raymond, & Florax 2001). However, some still contend that the decrease in exports within a specific industry is small when compared to overall trade and that environmental regulation should have more of an impact on developed-developing country trade patterns, rather than in the context of the Single Market (Jaffe & Stavins 1995).

Energy-intensive industries are also negatively impacted by environmental regulation, which gives a disadvantage to Member States whose economy relies on these sectors. Anecdotal evidence has shown that when the stringency of certain regulations has a greater impact on particular industries, certain Member States are at a temporary disadvantage until they are able to develop less emission-intensive processes. Member States, which rely heavily on emission-intensive industries would be harder-hit by emissions regulation than the rest of the EU; for example, the automotive industry in Germany may be greatly impacted by more stringent emissions regulation, thereby negatively impacting the potential for German exports. An additional study has also shown that pollution abatement costs have a greater negative impact on energy-intensive industries; these industries have been losing competitiveness through a decrease in export of these goods (Jenkins 1998).

3.3.3 Impact on Innovation and productivity

While high environmental standards may lead to additional costs to firms, these costs may be offset by innovation and increased efficiency (van der Linde & Porter 1995). The Porter hypothesis is one that suggests that environmental regulation leads to radically new technology (Roediger-Schluga 2004). Porter's hypothesis stresses that this innovation will benefit the greater social welfare, and the innovation will benefit the region as a whole through spill-over effects and greater overall productivity. In addition, product innovation can also lead to the emergence and expansion of new eco-industries, such as recycling and waste management (Gurtoo & Antony 2007).

While there is some theoretical and empirical support for this view, it is often contested though the following views: that the concept of 'innovation' is too nebulous to measure and that the environmental regulation itself was not the main catalyst for the innovation. That is, Porter's hypothesis assumes that firms need the environmental regulation as an incentive to innovate—that they overlook opportunities to innovate on a regular basis.

Further work by SQW has distinguished between 'innovation' and 'diffusion', attempting to further define the concept. The former is more related to Porter's hypothesis, with 'innovation' referring to entirely new R&D technologies, and 'diffusion' referring to the adaptation of existing technologies to meet environmental regulation (SQW 2007). While both could potentially lead to greater productivity, 'diffusion' tends to take place at the firm level with little spill-over benefit. Most research does not distinguish between 'innovation' and 'diffusion', which is often used as an argument against the idea that economic regulation and innovation are correlated. What might have previously been labelled as 'innovation' may actually just be minor changes in production processes.

Nonetheless, the context of environmental regulation plays an important role in determining both the regulation's role on innovation and innovation's potential role on competitiveness – for the Member State and the European Union as a whole.

3.3.3.1 Context of Regulation and Innovation – Policy

While there is some evidence that Member States with more stringent environmental regulation have seen more innovation and better efficiency (SQW 2007), the necessary conditions must be present. It is difficult to capture empirical evidence for a company's willingness to innovate in light of new regulations, but there has been literature on the necessary conditions for innovation to take place.

One main factor is the method in which a policy is implemented and the quality of information firms is given prior to implementation. In order for firms to react positively, they must be informed with sufficient advanced notice. Examples of such campaigns include the UK Climate Change Levy, where businesses were engaged in detailed negotiation on energy efficiency targets, which caused them to find opportunities for cost-effective energy efficiency improvements which they had previously overlooked (Ekins & Etheridge 2006). In this case, businesses were more inclined to take measures to adhere to the policy, as well as create more efficient processes.

Evidence has also shown that policies need to be tailored to specific industries in order for innovation to take place. This often means that a mix of policies is used, instead of single, stand-alone arrangements (Varma 2003). An example of this is the UK's climate change policy, in which a mix of levy and permit trading provided a good solution for a wide-range of businesses; emissions trading was used for the production of goods and services involved in international competition (in accordance with the EU Emissions Trading Scheme), and energy taxes were used on smaller-scale production lines where emissions were difficult to monitor. Similar results were seen in implementing Urban Waste Water Directive in Spain, which originally required a wastewater levy to be imposed on all point source discharges; in 2003, the levy was amended to take into account the volume of discharge, which allowed for a mix of policies (European Environment Agency, 2005). In these cases, innovation is more likely, because the mixture of policies enable businesses to respond more effectively to regulation (SQW 2007).

Another condition for innovation is the need and ability to innovate; there is little incentive to innovate when environmental targets can be met by existing technologies and when firms do not have sufficient knowledge or access to finance (Jaffe, Newell & Stavins 2002).

As a result, innovation is more likely to take place when the regulation is combined with other policies, which benefit businesses. Empirical evidence has shown that innovation has been induced in markets where environmental regulation has been complemented with business support programmes, such as R&D assistance or information on potential methods of innovation. Specifically, SMEs need to have the knowledge of existing technology and potentials for R&D (Newell et al 2006).

Also, there has been some research on the impact of policy-type. There is some theory that suggests market-based regulations are more likely to encourage innovation and diffusion (Jaffe & Stavins 1995). Jaffe and Stavins suggest that market-based regulations, such as emissions taxes, give firms a greater incentive to continue innovating while environmental performance standards merely encourage them to innovate up to a certain point. However, empirical evidence remains thin and further research is necessary.

3.3.3.2 Context of Regulation and Innovation – Market Structure

The market structure of the region and Member State plays an important role in fostering innovation.

Firstly, the size of industry and the size of businesses is an important determinant of a region's likelihood to innovate. Regions with larger industries and larger companies are more likely to innovate to meet environmental regulations (Management Institute for Environment and Business 1996). This is because larger firms have the ability to benefit from economies-of-scale when dealing with certain regulations such as waste treatment (Jenkins 1998). They also tend to have more resources dedicated to overall R&D. Spill-over benefits are also more likely in regions with large, dominant industries.

In addition, the type of product and its relation to the type of regulation is also a factor in determining a firm's propensity to innovate. For example, product regulation is more likely to affect firms with potentially environmentally unfriendly products, such as domestic cleaning solvents; process regulation would provide a greater incentive to innovate for firms that are subject to environmentally unfriendly by-products (Management Institute for Environment and Business, 1996). The density of these type of firms impacts overall regional innovation.

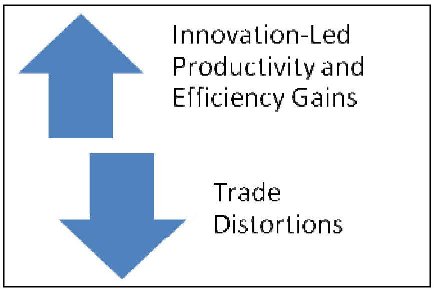
Lastly, Member States must have the necessary conditions for innovation – high levels of human capital, intellectual property rights, and resources to fund R&D.

3.3.4 Competitiveness

The impact of environmental regulation on trade and innovation interact to influence the competitiveness of Member States and the European Union as a whole. While some econometric modelling predicts that regulations do not have an effect on competitiveness, general equilibrium models suggest that regulation may adversely affect competitiveness through increased costs of compliance (SQW 2006). How this would impact the Single Market still needs to be examined.

The key factors of national competitiveness (productivity and trade flows) counteract one another to have an overall net impact on economic growth.

Figure 5: Counteracting factors on competitiveness



This interaction will have different effects on individual Member States. The lack of standardisation of regulations will give certain Member States an advantage. However, it cannot be concluded that the strictness of regulation will be the only determining factor; a Member State's ability to adapt to these regulations is equally important. Environmental regulation affects competitiveness directly though businesses and industry – mainly through how the industry is affected by the regulation. More energy-intensive industries in Member States that are less endowed with these resources are the most affected (SQW 2006). In addition, when favourable conditions are present (such as awareness, more funding for R&D, skills, investment etc), the negative impacts on competitiveness are more easily offset.

Furthermore, in order for productivity to lead to overall competitiveness, there needs to be a market demand for energy-efficient and environmental products. This is specifically true to product regulation, but can also have an impact on process evaluation as consumers become more aware of environmental policies (i.e., having an affinity for buying from environmentally-responsible companies). A study on regulation on passenger vehicles has shown that market demand is an important determinant of overall competitiveness; exporting or selling fuel-efficient cars in a market where demand for these goods are high will result in more benefits than exporting or selling in a market where demand is low (Beise & Rennings 2005).

Individual Member States may also benefit from spill-overs; however, in order for spill-overs to occur, there should be similar marginal costs in implementing the innovation across the EU, as well as for firms within the same Member State. Empirical evidence has shown that firms within a Member State need to innovate at a similar rate in order to increase their overall competitiveness, and that when there is a more equal implementation of environmental regulation, innovation is more likely to spill-over effects into other regions and Member States (Butraw 1996).

3.3.5 Conclusions

The economic impacts of environmental regulation are two-fold, both affecting trade flows and innovation/productivity. While there is no conclusive empirical evidence on the magnitude and direction of trade impacts in all cases, there are some examples, which have demonstrated that certain Member States will adapt more easily than others. In addition, anecdotal evidence has demonstrated the necessary conditions for innovation to take place in light of environmental regulation.

Theory has suggested that there are negative impacts on trade are seen through both the inability for products to enter national markets and through unequal costs of policy implementation. However, we have also seen the idea that regulations do not differ significantly enough across the Single Market to impede trade.

Further case studies must examine the interaction between these innovation/productivity and trade distortions, including:

- How the cost of implementation and stringency of implementation differs across Member States
- Examples of innovation induced by environmental regulation
- Evidence of market-entry barriers
- The different effects of different forms of regulation (Market-based vs. Control Regulations)
- The impact of regulatory instruments in both energy-intensive and non-energy-intensive industries, and in Member States, which rely heavily on these industries.
- Greater evidence of best practice "policy packages" that enable businesses to respond more rapidly and effectively to stringent regulations

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3.4 *Synopsis*

Literature reviews were conducted in three key areas: (1) leader and laggard countries, the regulatory competition literature and it's critics, (2) the juridical foundations of the Single Market and environmental protection offered by EU legislation and (3) the economic impacts of environmental regulation.

The review on leader and laggard countries could confirm that there is indeed a gap in the theoretical and empirical literature, which address the question if a lack of standardisation in EU environmental policy leads to competition distortions. However, this question is dealt with indirectly in environmental policy literature on leader and laggard countries. While the traditional regulatory competition literature argues that leaders in environmental policy could suffer from economic disadvantages there is no empirical evidence for this assumption. No empirical study confirmed the thesis that environmental policy tends to converge at the bottom due to economic competition. However it was possible to identify some empirical evidence for a "race to the top" in European environmental policy.

The review of the legal literature shows that legal provisions have mainly strengthened the position of the environment through the establishment of the Single Market. However, consistency in the representation and realization of environmental interests is still lacking. Indeed, in many instances, the European Court of Justice decides cases involving environmental protection on a case-by-case basis. Without a precise legal framework to guide the judges' decisions, a widely differing and often confusing range of judgements are passed. Although we might conclude from our literature review that the Court is ready to accept national deviations on grounds of stricter environmental protection standards, Member States seem to be rather cautious to use this discretionary space. This may be a result of the fact that the legal situation of what is possible or even allowed under primary and secondary Community law is not always clear. Insofar European case-by-case law and a lack of a precise legal framework leads to undesired effects in Member States' opportunities to enact environmentally ambitious rules.

Lastly, the review of economic effects revealed that environmental policy does indeed affect trade flows as well as innovation and productivity. From theory we might derive the assumption that negative impacts on trade flows through environmental policy could evolve from (a) the inability of goods to enter national markets and (b) through unequal costs of policy implementation. While there is no conclusive empirical evidence on the magnitude and direction of trade impacts in all cases, some examples demonstrate that certain Member States will adapt more easily than others. However, at the first glance the stringency of European environmental regulation seems not to differ enough between the Member States to have noteworthy negative impacts on trade flows. Most literature seems to indicate that the theoretical assumption that differences in environmental regulation impede trade is more accurate in the international context.

All literature reviews have implications for the selection of the case studies. The literature review on leader and laggard countries (3.1) has shown that the likelihood of potential market distortions is higher in cases where the EU regulation affects energy and emission intensive industries or when industries are affected, which are crucial to some but not all Member States. This idea is backed as well by the findings of the review on economic impacts (3.3). The literature review on leader an laggards has further shown that a starting point for the case selection could be to identify EU regulations that at least partly build on successful national environmental regulations of leader countries. Those leaders could gain a comparative advantage over other Member States, since they face lower implementation costs of the new regulation.

The review on economic impacts of environmental regulation (3.3) stresses similarly that it is the lack of harmonisation, which gives certain Member States a comparative advantage. However, it was shown that this doesn't imply that the strictness of regulation is the only determining factor. Therefore it is necessary to take a closer look at the ability to adapt to new regulations of Member States to identify possible market distortions. As already outlined above some Member States will adopt more easily to new regulations than others. This indicates again that it could be worth looking at those countries, which are suspected to adapt slower to new regulation than others (probably laggards in environmental policy).

Finally we have learned from the juridical literature review (3.2) that it is worth looking at those regulations, which allow greater discretion than other regulations. This touches the question of the legal basis of regulation. We may observe e.g. that it makes a difference if a regulation has been adopted under the internal market harmonisation Article (Art. 95), or the environmental protection Article (Art. 175) of the Treaty. This insight too has to be considered for the case selection.

4 Analysis of Dynamics of Environmental Standards

By Thomas Sommerer and Aike Müller

4.1 *Introduction*

On the basis of the ENVIPOLCON database and an extension of it, this part offers an analysis of the overall development of level of environmental protection over the period from 1970 to 2005. Variance in national standards and the transposition of EU law will be studied for 24 European and Non-European Standards. The aim of this analysis is to reveal characteristics in the dynamics of national environmental policy change. Thereby, it should contribute to the selection of case studies. It is obvious that an aggregate statistical analysis is alone not appropriate to select in-depth case studies for the analysis of market distortions. However, it will give a comprehensive overview on the policy developments in the past. But insights from the scanning studies and the literature review can be combined with conclusions from the ENVIPOLCON dataset, which in turn could lead to the isolation of promising candidates for further in depth-study. This paper is organised as follows. Section 4.2 provides a background on the ENVIPOLCON Project and section 4.3 presents the results of an empirical analysis of direction, similarity of national policies, country rankings and implementation speed.

4.2 *The ENVIPOLCON Dataset*

4.2.1 The ENVIPOLCON Project

The data for the analysis of environmental standards is taken from the ENVIPOLCON-Database. This data has been collected in the EU-funded project 'Environmental governance in Europe: the impact of international institutions and trade on policy convergence' (ENVIPOLCON), in the RTD programme 'Improving the human research potential and the socioeconomic knowledge base'.[7] This project was carried out between 2003 and 2006 by the University of Konstanz, University of Hamburg, Free University of Berlin (Germany) as well as the University of Salzburg (Austria) and Radboud University Nijmegen (Netherlands).[8]

Its primary goal was to investigate environmental policy convergence across European countries and to identify the underlying driving forces and mechanisms. In this context, the extent and direction of convergence of national environmental policies in Europe since the beginning of an environmental policy at the national and international level have been analysed and several important questions have been raised: do countries really grow more similar over time, and to what level do national environmental policies converge? Are countries generally reaching out to the most stringent and most effective models available, or does increased international competition rather force them to adopt less demanding levels of regulation?

Second, and perhaps even more important, the driving forces of environmental policy convergence have been studied: do the economic interests of individual states mainly fuel the process? Or does

7 Indirect RTD action under the specific programme for research, technological development and demonstration on "Improving the human research potential and the socioeconomic knowledge base"

Part D: Key action: Improving the socioeconomic knowledge base Part 1, Theme 1: The Challenge of Socio-economic Development Models for Europe contract no. HPSE-CT-2002-00103.

8 An extensive overview of the project is available on the project website under: http://www.uni-konstanz.de/FuF/Verwiss/knill/projekte/envipolcon/project-homepage.php

policy coordination by, for instance, the European Union (EU), the Organization for Economic Cooperation and Development (OECD) or specific environmental treaties play a decisive role? Or, finally, could it be that there are no international mechanisms at work at all? Could policy convergence simply be a matter of similar, but independent responses to similar problems occurring in different countries?

To answer these questions, the first part is built on a large-n statistical analysis of the development of 40 environmental policy measures, using data on national policies, i.e. formal laws, decrees, ordinances, over 30 years from 1970 to 2000 in 24 countries, including the former EU-15, CEE countries, EFTA countries as well as USA, Mexico and Japan for reasons of comparison. The purpose of this statistical approach was to provide an encompassing overview on the aggregated pattern and main causes of convergence.

The statistical analysis has been complemented by qualitative case studies with the objective of further elaborating and differentiating the theoretical model. Six policy in-depth case studies, each conducted in the Netherlands, France, Hungary and Mexico, have been carried out in the qualitative part of the ENVIPOLCON project in order to increase the understanding of the precise dynamics of international harmonization, communication, regulatory competition and relevant domestic factors. They also strove to reveal mechanisms that explain some of the surprising results of the quantitative analysis such as the limited evidence for regulatory competition.

Overall, both the statistical and qualitative analysis in the ENVIPOLCON point to several interesting findings: First, the extent to which convergence has been observed is strongly affected by the specific approach to measure convergence (Sommerer, Knill and Holzinger 2008; Heichel, Pape and Sommerer 2005; Holzinger 2006). Second, in contrast to often feared scenarios of environmental 'races to the bottom', the ENVIPOLCON results show that there rather is an overall increase in the strictness of environmental standards over time (Arts et al 2008; Holzinger and Sommerer 2007). Third, the major driving forces of policy convergence refer to harmonization activities at the level of the EU and international organizations (Holzinger, Knill and Sommerer 2008; Sommerer, Holzinger and Knill 2008; Arts et al. 2008). There is evidence that environmental leaders are able to pull along the laggards, by legally binding agreements at the international level that typically imply that low-regulating countries adjust their standards to the level of the environmental forerunner countries. Mere communication and information exchange can also induce laggard countries to raise their standards, as they seek to avoid the blame of being perceived as 'pollution haven'. At the same time, there is evidence that activities of transnational communication play an important role in driving cross-national convergence. On the other hand, there is no confirmation for the hypothesis that economic competition has negative effects on environmental protection.

The case studies brought further insights regarding the mechanisms pattern observed in the statistical analysis. International harmonization leads to notable policy change and accounts for growing policy similarity in all countries, but it is often only the final step in a longer convergence process. Regulatory competition and transnational communication between countries frequently precede the decision to harmonize policy and - more importantly - tend to produce initial policy adaptation on the national level. In other words, countries begin moving towards common policies much prior to the decision for an obligatory international policy or standard. International harmonization, however, succeeds in bringing on board the remaining policy laggards. Second, transnational communication already proved highly relevant for policy convergence in the quantitative part of the project. The case studies confirmed this by relating different patterns (e.g. policy promotion and emulation, lesson) to different roles countries play on the international scene. Third, considerations of international competitiveness do matter in national environmental policy making, although these concerns need not necessarily result in international policy convergence; patterns of regulatory competition are both more complex and less visible than the theory predicts.

4.2.2 The Data Collection and Sample

The Dataset consists of information on 40 different environmental policies (table 10). Those represent issues where legislation or related measures (e.g. governmental plans or programs) are likely to have been put in place in each country at some point in time during the observation period 1970-2000. This policy sample covers various environmental media, air, water, soil, waste, noise, resources, climate, nature protection and general guiding principles, such as sustainability. The selection includes trade-relevant policies and policies that are not subject to competitive pressures, e.g. nature conservation measures. To investigate effects of the obligatory potential (international harmonization) of international institutions, the policy compilation covers not only so-called "obligatory" policy-items for which a legally-binding standard at the international level such as a EU policy was introduced between 1970 and 2000, but also "non-obligatory" measures for which no internationally harmonized rules were in force before the end of 2000 and which were thus still within the sphere of national autonomy. Different policy dimensions have been distinguished: the presence of a policy, i.e., the extent to which countries have developed a particular policy or not with regard to a certain problem, the instruments applied, as well as environmental standards, such as an emission limit value for a certain water pollutant resulting of industrial processing.

The goal of this research project is to study convergence of environmental policies in Europe. The sample is therefore primarily composed of European countries. From the pool of all European countries, 21 were selected. As Figure 6 shows, the country sample represents all steps in the process of EU enlargements, and therefore, over time it includes a sufficient number of non-EU countries. The EU founding members Belgium, France, Germany, Italy and the Netherlands form the core group of the sample.[9] Until 1980, Denmark, Ireland and the United Kingdom had become EU members, and until 1990, the Southern enlargement countries, Greece, Portugal and Spain had acceded.

Table 10: List of Environmental Policies, complete ENVIPOLCON dataset

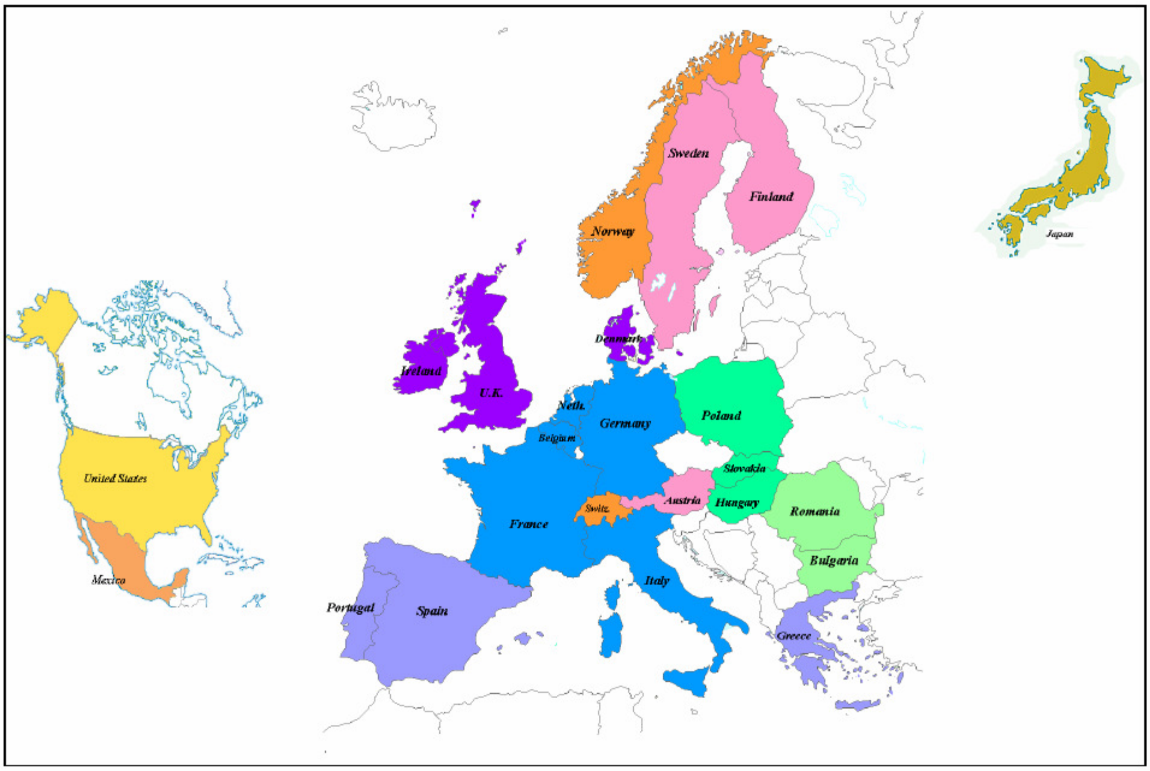
	Policies	Instruments	Standards	Trade-related policies	Obligatory policies (since...)
Sulphur content in gas oil	•	•	•	•	1975
Lead in petrol	•	•	•	•	1978
Passenger Cars NOx emissions	•	•	•	•	1977
Passenger Cars CO emissions	•	•	•	•	1970
Passenger Cars HC emissions	•	•	•	•	1970
Large Combustion Plants SO^2 emissions	•	•	•	•	1988
Large Combustion Plants NOx emissions	•	•	•	•	1988
Large Combustion Plants Dust emissions	•	•	•	•	1988
Coliforms in bathing water	•	•	•		1976
Hazardous substances in detergents	•	•		•	1973

[9] The exception is Luxemburg for which data for some and especially the economic variables are not separately available. It has therefore been excluded.

	Policies	Instruments	Standards	Trade-related policies	Obligatory policies (since...)
Efficient use of water in industry	•			•	
Industrial discharges in surface water Lead	•	•	•	•	
Industrial discharges in surface water Zinc	•	•	•	•	
Industrial discharges in surface water Copper	•	•	•	•	
Industrial discharges in surface water Chromium	•	•	•	•	
Industrial discharges in surface water BOD	•	•	•	•	
Soil protection	•				
Contaminated sites policy	•	•			
Waste recovery target	•				1994
Waste landfill target	•				1994
Glass reuse/recycling target	•	•	•		
Paper reuse/recycling target	•	•	•		
Promotion of refillable beverage containers	•	•		•	
Voluntary deposit system beverage containers	•			•	
Noise emissions standard from lorries	•	•	•	•	1970
Motorway noise emissions	•	•	•		
Noise level working environment	•	•	•	•	1977
Electricity from renewable sources	•	•		•	
Recycling construction waste	•			•	
Energy efficiency of refrigerators	•	•		•	1992
Electricity tax for households	•	•	•		
Heavy fuel oil levy for industry	•	•	•	•	1992
CO^2 emissions from heavy industry	•	•		•	
Forest protection	•	•			
Eco-Audit	•			•	1993
Environmental impact assessment	•				1985

	Policies	Instruments	Standards	Trade-related policies	Obligatory policies (since…)
Eco-labelling	•			•	1992
Precautionary principle: reference in legislation	•				
Sustainability: reference in legislation	•				
Environmental/ sustainable development plan	•			•	

Figure 6: ENVIPOLCON Country Sample



At that time, EU Member States constitute still less than half of the sample (11). The former EFTA members Austria, Finland and Sweden acceded to the EU in 1995. The group of EU members in 2000 is complemented by two groups of countries from Central and Eastern Europe: with Hungary, Poland and Slovakia three countries are included that became EU members in 2004. Finally, Bulgaria and Romania belong to the sample that acceded to the EU last year. With the EFTA member states Norway and Switzerland two further countries complete the European group. Several other European countries were omitted from our sample. The Czech Republic is not included, as only one successor state of former Czechoslovakia should be part of the sample. This is to avoid an artificial bias towards convergence, because these countries had the same policies until 1990. The same applies to Germany, where only the Western part is included for the period before 1990, whereas the German Democratic Republic has been excluded. For similar reasons, as well as for problems of data accessibility, no country from the former Soviet Union (the Baltic states) or former Yugoslavia is part of the sample. In order to control for the EU harmonization effects and to increase variance regarding several crucial covariates, the sample includes three non-European countries, the United States and

Japan, as countries with a high level of economic development and a high trade volume, and finally Mexico as a recent OECD- and NAFTA member state.

The period of observation reaches from 1970 to the year 2000. This longitudinal perspective assures that the data on environmental policy is more than a current snapshot, and that policy changes can be studied in the long term. This is indispensable to each study that aims to analyse processes of convergence. The year 1970 has been chosen as a starting point because at that time, environmental policies began to develop at the national, as well as at the international level (e.g. with the 1972 UN Conference on the Human Environment in Stockholm). By practical constraints (the project started in 2003), the observation period ends in 2000, and the research design is based on the measurement of policy similarity at four points in time: 1970, 1980, 1990, 2000.

The data had to be collected in the project.[10] This was necessary as existing data bases do not cover a large number of countries in a comprehensive and comparable way that take into account the history of the entire legislation. Existing databases only cover current legislation. In a strong effort, a group of 24 (one for each country) national policy experts from the outside of academic institutions (lawyers and political scientists) and national bureaucracies completed an extensive questionnaire on the policy sample compiled by the project. In addition, the data has been crosschecked with existing databases in a long and resource-intensive process, with extensive communication between experts and the project team harmonized and transformed into an electronic data base.

4.2.3 Dataset specifications and caveats for the analysis of environmental standards

Only a subset of the ENVIPOLCON data will be used in the following analysis, the 21 environmental standards (see Table 11 to Table 13) which can provide information on the dynamics of national environmental policies. For this purpose, the dataset has been extended up to 2005 in a strong effort, and time series have been reconstructed for selected standards, where formerly only four points of measurement existed. The sample of 24 countries will be compared to a sub-sample of EU Member States.

Some *caveats* regarding the interpretation of the results should be mentioned. The ENVIPOLCON dataset is not an aggregation of in-depth case studies – thus, the data has to be seen exemplary with a certain error tolerance – a typical characteristic of this kind of data.

Furthermore, the dataset has been collected to analyse policy convergence, not the implementation of European standards – thus, the dataset includes information on the implementation of the first directives, not on subsequent ones – though major policy changes on the national level are considered without exception.

The dataset contains information on policy outputs: regulations, laws, decrees and other official policies, not on actual changes in the environmental quality. Finally, the data is historical; ongoing cases in the present political process are not regarded.

Notwithstanding these restrictions, the ENVIPOLCON database represents a unique and innovative data source for an analysis of environmental standards in a historical perspective, for EU Member States as well other European and Non-European countries.

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[10] There are also no accessible compilations from international organizations collecting such data systematically. The excellent ECOLEX database of environmental law (developed by the World Conservation Union, FAO and UNEP) can be considered to come close to such information "storage". However, it is not complete; early national environmental legislation is often lacking. Besides, in many cases it only provides legislation in national language which makes its practicable use rather difficult.

4.3 *Analysing the Dynamics of Environmental Standards*

4.3.1 Graphical Illustration

The analysis of environmental standards will be structured as follows: first, a few graphs illustrate the trend of environmental standards. Then, the development of the mean regulatory level is analysed for various subgroups of policy items. In a third step, the frequency of upward/downward shifts is displayed, convergence scores for the selected standards are reported and finally changes in rankings of regulatory stringency are given. Finally, differences in the in the speed of implementation of EU directives are studied across different standards. The results will be interpreted in the light of possible conclusions for the selection of case studies.

Figure 7: Product Standard: Sulphur Content in Gas Oil (vol %) 1970-2005 (Countries under EU-legislation)

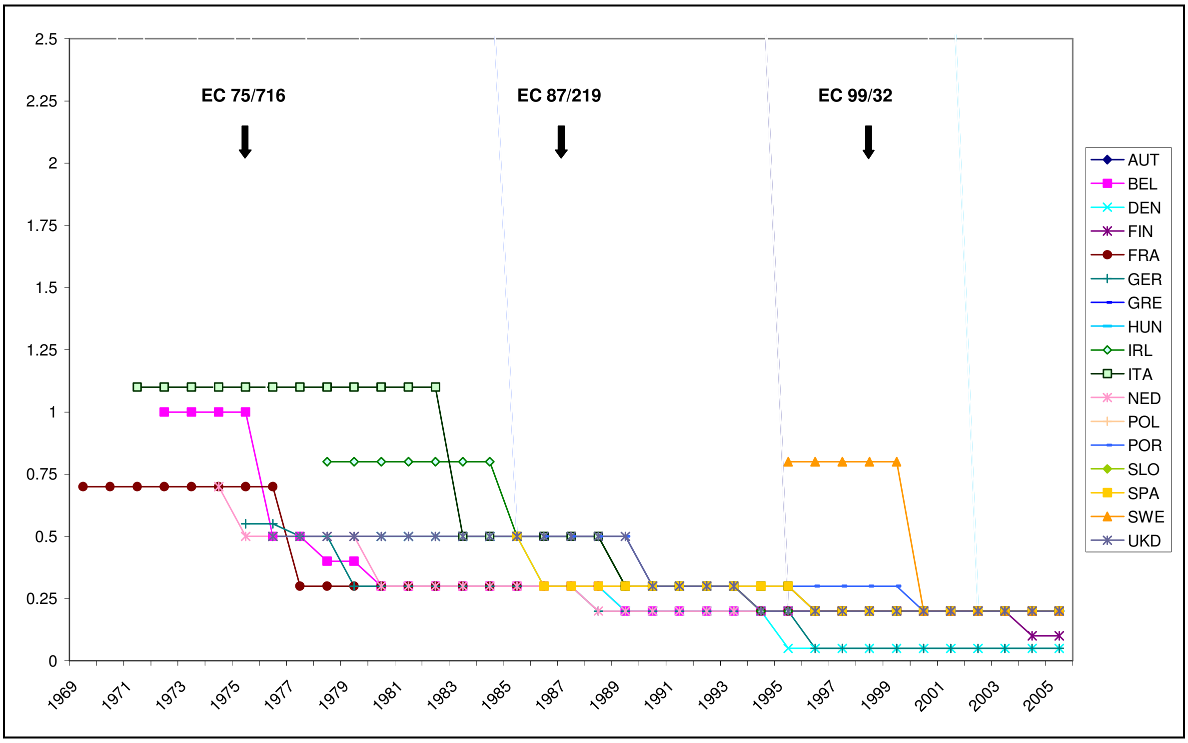


Figure 8: Product Standard: Sulphur Content in Gas Oil (vol %) 1970-2005 (All 24 Countries of the ENVIPOL-CON Database)

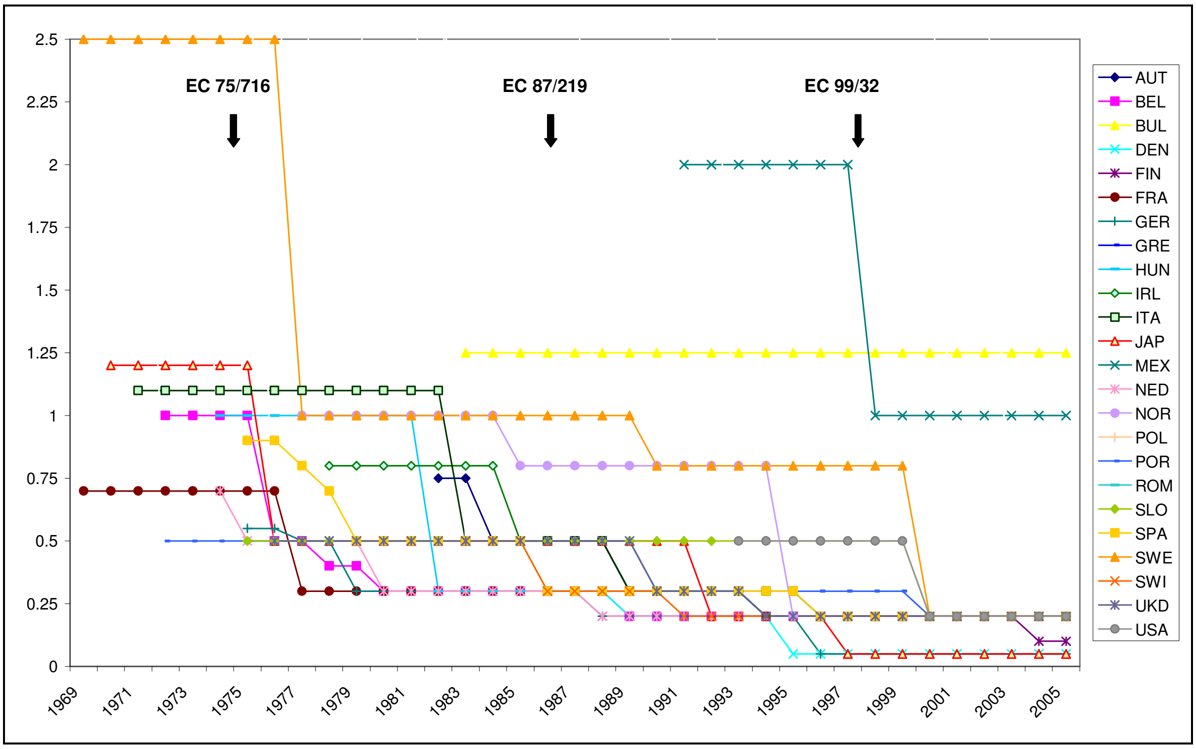


Figure 9: Process Standard: Large combustion plants, SO² emissions (mg/m³) 1970-2005 (Countries under EU-regulation)

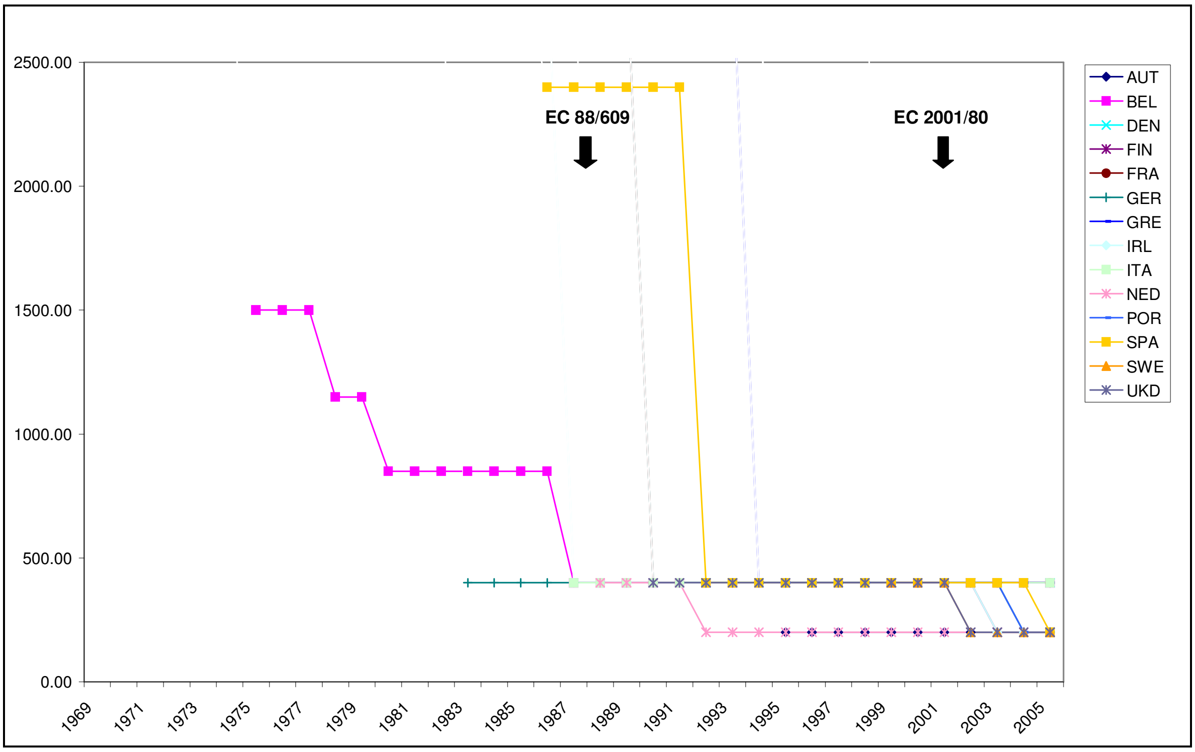
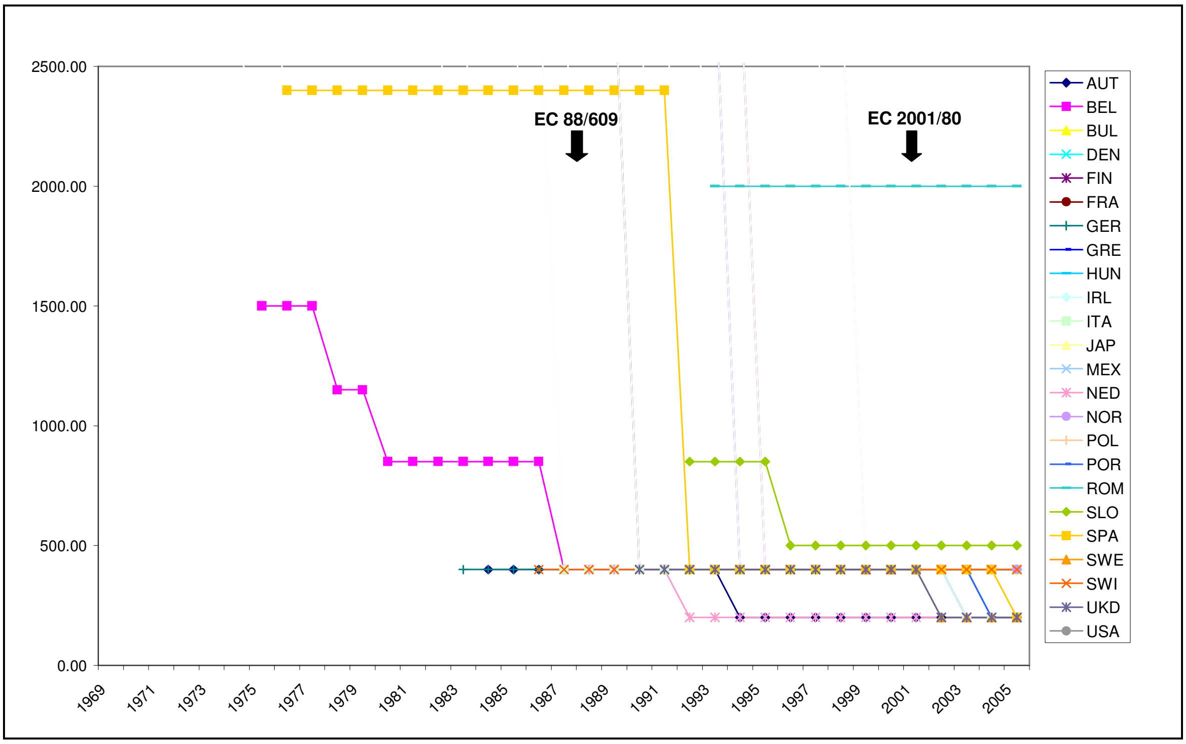


Figure 10: Process Standard: Large combustion plants, SO² emissions (mg/m³) 1970-2005 (All 24 countries of the ENVIPOLCON Database)



For the sulphur content in gas oil, both Figure 7 and Figure 8 show a strict tendency of national regulation towards stricter emission limits. Variation among EU Member States, where the sulphur content is regulated first in directive 75/716 with to follow-up directives in 1987 and 1999 is smaller compared to the whole sample and decreases over time; the overall degree of homogeneity in 2005 is very high. Exemptions from this pattern stand for lags in the implementation process, like for Italy in the early 1980s and for Sweden in the late 1990s. Finally, the second directive seems to have had a stronger effect on harmonisation than the first one.

Figure 9 and Figure 10 display the level of national standards regulating the SO^2- content in emissions from large combustion plants. Both show a similar, but less distinctive different picture than the two preceding ones. A tendency towards stricter regulation over time is visible, but the variation of national standards is higher. While there have been only very few regulation on SO^2-emissions before the EU passed the 88/609 directive (Figure 9), a harmonization effect is clearly visible in the following period. Remaining differences among EU Member States can be explained by high implementation costs and the consequences of minimum standards: some countries applied stricter limits in their own jurisdiction.

4.3.2 Development of Regulatory Mean, EU-member / 24 countries, 1970-2000

Measuring the development of regulatory mean values over time can reveal the directional aspect in the dynamics of national environmental standards. Table 11 to Table 13 show mean values for 19 standards (not 21, due to data restrictions) form the ENVIPOLCON data base. Table 11 gives the figures for product standards, all regulated at the European level since the late 1970s. While the level of mean values does not differ strongly between both samples in the first part of the observation period, it can be observed that EU Member States apply stricter standards than the rest of the sample since 1990. However, the regulatory level outside the EU is remarkably high.

Table 11: Product Standards with EU-regulation

	EU regulation since	1970		1980		1990		2000		2005	
		EU	All	EU	All	EU	All	EU	All	EU	All
Passenger Cars											
CO emissions	1970	43,19	38,65	32,49	30,81	7,85	7,31	2,59	2,80	2,36	2,50
HC emissions	1970	5,81	6,36	2,61	3,00	1,05	1,05	0,25	0,31	0,20	0,26
NOX emissions	1977	∅	∅	2,60	2,35	0,81	0,81	0,18	0,22	0,18	0,21
Noise Emissions Lorries	1970	91,20	90,38	89,00	88,75	85,56	85,95	81,15	82,90	80,00	80,21
Sulphur Content Gas Oil	1975	∅	1,80	0,63	0,73	0,27	0,35	0,20	0,35	0,18	0,26
Lead in Petrol	1978	∅	0,78	0,43	0,44	0,23	0,22	0,06	0,06	0,01	0,01
N. Countries		5	24	8	24	11	24	14	24	17	24

Table 12: Process Standards with EU-regulation

	EU regulation since	1970		1980		1990		2000		2005	
		EU	All	EU	All	EU	All	EU	All	EU	All
Large Combustion Plants											
SO2 emissions	1988	∅	500.0	∅	1250.0	628.6	527.8	358.0	372.5	288.2	385.7

	EU regulation since	1970		1980		1990		2000		2005	
		EU	All	EU	All	EU	All	EU	All	EU	All
NOX emissions	1988	∅	∅	∅	∅	533.3	559.4	495.4	508.1	361.8	388.1
Dust emissions	1988	∅	325.0	∅	166.7	50.0	55.6	50.0	62.1	47.2	58.6
Heavy Fuel oil Levy Industry	1992	∅	3.3	∅	7.5	∅	37.8	47.9	43.7	-	-
Noise Level Working Environment	1977	∅	75.0	∅	85.0	87.9	86.5	86.1	86.0	-	-
Coliforms in Bathing Water	1976	∅	∅	10000	1000	7875	4420	8583	6616	-	-
N. Countries		5	24	8	24	11	24	14	24	17	24

Table 12 shows the mean values for process standards which are regulated by the European Union. A trend towards stricter national policies can be observed as well, yet less dominant than for product standards. In addition, before 2000, Member States are not frontrunners regarding the rest of the sample. Mean values for the overall sample might be influenced by the fact that many low-regulating countries in the first decades did not have any process regulation at all. Since 2000, the EU-part of the sample applies significantly stricter policies than the rest. Note that high-regulating countries like Sweden and Austria joined the EU during the 1990s.

Table 13: Process Standards without EU-regulation

	1970		1980		1990		2000		2005	
	EU	All	EU	All	EU	All	EU	All	EU	All
Industrial Discharges Lead	0.10	5.05	0.20	2.38	0.43	0.52	0.46	0.36	0.42	0.36
Industrial Discharges Copper	0.20	12.60	0.30	5.92	0.67	0.95	0.40	0.93	0.37	0.87
Industrial Discharges Zinc	5.00	5.00	3.00	3.60	3.17	3.00	1.74	2.19	1.67	2.16
Industrial Discharges Chromium	0.50	25.25	2.50	11.80	1.75	1.67	1.04	0.95	0.94	0.94
Industrial Discharges BOD	25.00	50.00	47.50	72.50	34.00	44.29	27.86	40.07	24.20	36.33
Motorway Noise Emissions	∅	∅	▯	40.00	53.00	50.00	51.56	53.56	51.72	53.26
Electricity Tax for Households	▯	▯	▯	∅	0.05	0.01	0.02	0.03	-	-
N. Countries	5	24	8	24	11	24	14	24	17	24

Table 13 gives the figures for the remaining process standards where no European regulation is in place. At first sight, the development towards stricter standards is not easily visible. Mean values for the regulation of industrial heavy metal discharges into surface water decrease over time for the whole sample, while they remain relatively constant or show only a weak decrease for EU Member

States over time, yet at a high level. To conclude from increases of the mean in the first part of the observation period on a weakening of standards might be misleading – it is simply caused by new adoptions in lower regulating countries that had no policy before.

For further illustration, three examples from this table visualize this development for the CO_2 emission limits for passenger cars, the regulatory level of dust emission form large combustion plants and standards for industrial zinc discharges. Figure 11 to

Figure 13 compare the regulatory mean for the EU Member States with the mean of the complete sample.

Figure 11: Regulatory Level of Passenger Car Emissions

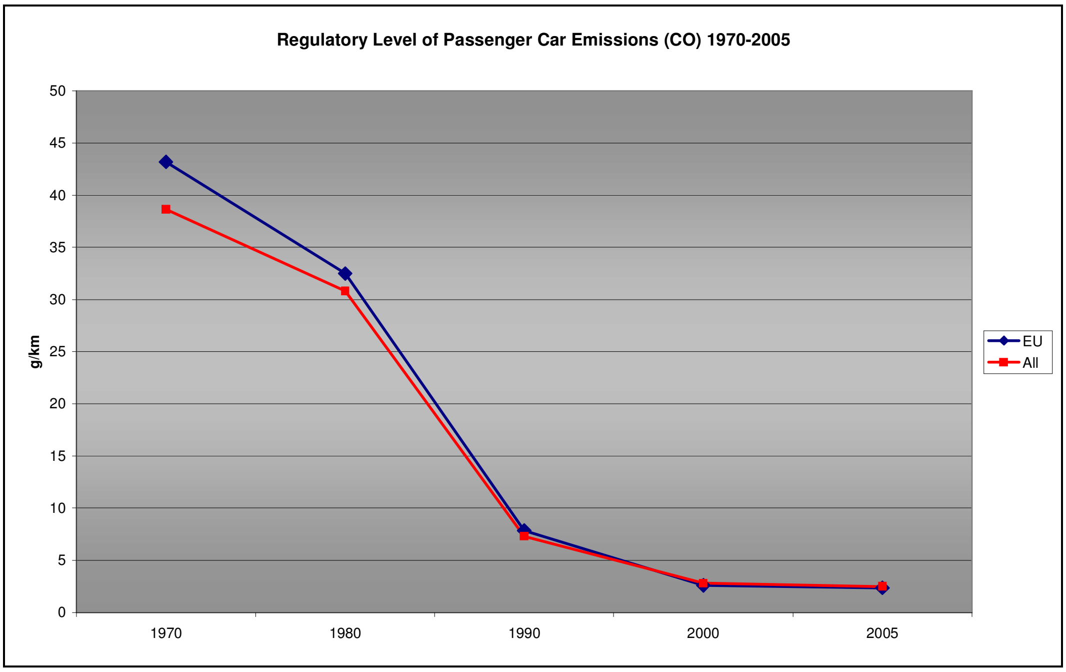


Figure 12: Regulatory Level Dust Emissions LCP

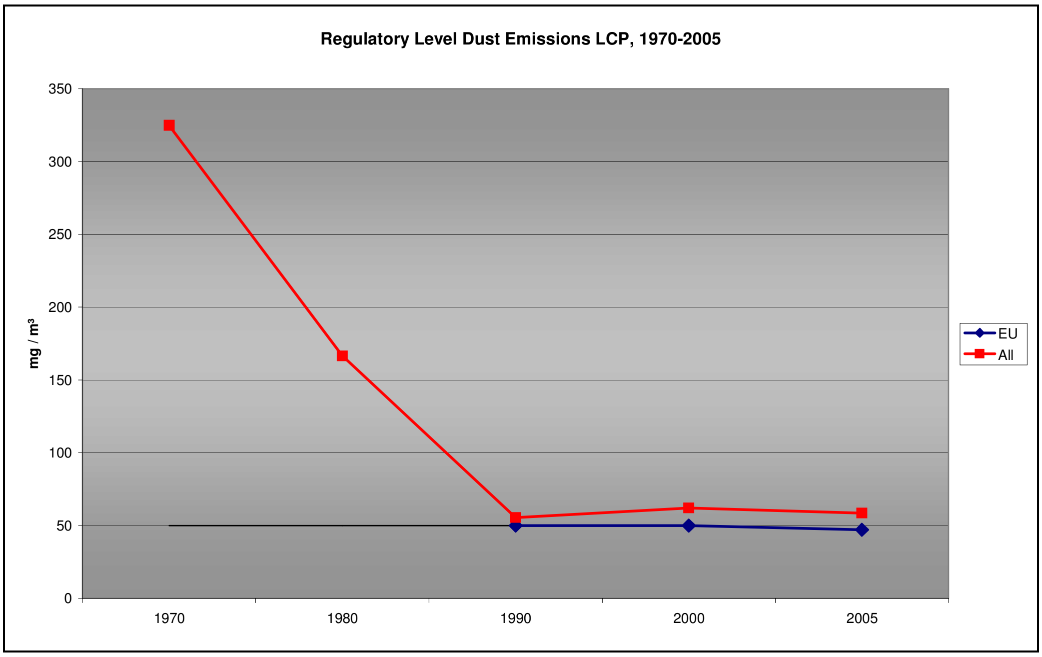
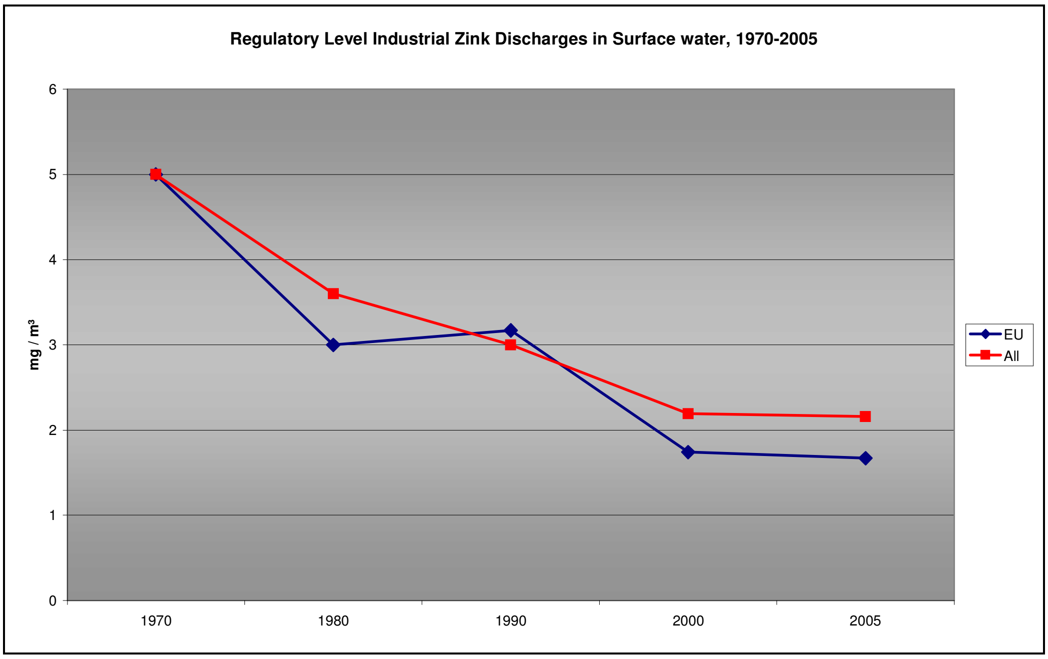


Figure 13: Regulatory Level Industrial Zink Discharges in Surface Water



4.3.3 Upward and Downward Changes

A second approach to the directional analysis of national standards refers to the frequency of regulatory upward and downward changes in the sample. Table 14 gives the figures for the subset of those 15 standards where ENVIPOLCON data on directional shifts is available until 2005. The frequency for policies with EU regulation is listed in the first part of the table; standards, which are not harmonised at the international level are listed in the second part of the table.

Table 14: Frequency of Regulatory Upward Change, 1970-2005

	EU Reg.	1970-79		1980-89		1990-99		2000-2005		Sum	
		EU	All	EU	All	EU	All	EU	All	EU	All
Passenger Car CO emissions	1970	18	32	16	29	31	40	12	20	77	121
HC emissions	1970	17	29	16	26	31	40	12	21	76	116
NOx emissions	1977	8	16	17	26	19	26	12	20	56	88
Sulphur Content in Gas Oil	1975	9	23	13	22	9	19	4	7	35	71
Lead in Petrol	1978	7	19	18	34	7	19	7	10	39	82
Noise Emissions Standard Lorries	1970	8	20	14	27	13	20	1	5	36	72
Large Combustion Plants Dust emissions	1988	0	5	1	8	9	18	8	8	18	39
NOx emissions	1988	0	1	1	11	7	17	9	9	17	38
SO^2 emissions	1988	0	5	1	10	9	19	8	8	18	42
Total		65	150	97	193	135	218	73	108	370	669

	EU Reg.	1970-79		1980-89		1990-99		2000-2005		Sum	
		EU	All	EU	All	EU	All	EU	All	EU	All
Industrial Discharges Water BOD		2	10	2	3	1	2	1	3	6	18
Copper		2	9	5	8	2	4	1	2	10	23
Chromium		2	9	5	8	2	4	1	2	10	23
Lead		2	10	5	8	2	5	1	2	10	25
Zinc		2	8	5	8	2	3	1	2	10	21
Motorway Noise Emissions		0	2	4	9	6	8	0	0	10	19
Total		10	48	26	44	15	26	5	11	56	129

In sum, 669 upward changes for national environmental standards where there is a EU directive can be counted in 35 years, from which 370 took place in Member States. Most of theses changes have been carried out in the 1990s, while the figures in the last columns point at an upward trend at a constantly high level since 2000. Over the whole observation period, a linear and permanent growth can be stated, for product standards earlier than for process standards. Compared to this, there are 119 upward changes in non-EU-regulated areas, among a similar share can be found among EU Member States (Table 14, lower part).

The dominance of this upward trend is more than clear compared to only 20 downward changes counted for EU-regulated areas. From this small group, 12 refer to a new calculation of the share between NOx and HC passenger car emission values. Six changes refer to the adoption of EU-car emission standards where formerly stricter US-Standards have been in place. Furthermore, a change in Danish legislation on large combustion plants, lessening its NOx standards from 200 mg/m³ to 650 mg/m³ is a clear example of a downward move, the same counts to a minor degree for British legislation on noise emissions from lorries, where in 1978 the standard was relaxed from 89 dB(a) to 91 dB(a) EU-standard.

For the non-regulated standards, 23 downward moves have been observed – they mainly refer to the revocation of not consequently implemented yet theoretically strict standards in water regulation in several CEE countries and Mexico, which have be replaced by less ambitions limit values in the last decade.

4.3.4 Convergence of Environmental Standards

Graphical impressions from Figure 7 to Figure 10 above let assume that standards become increasingly similar over time, in other words, they converge. Thus, a measure of convergence is applied to the ENVIPOLCON data. Therefore, countries are compared in a pair wise mode, and similarity between a country pair is assessed in percentage points (Holzinger, Knill and Sommerer 2008; Sommerer, Holzinger and Knill 2008). Table 15 shows the results of this analysis for all standards from the ENVIPOLCON database from 1970 to 2000.

Table 15: Pair Wise Similarity of Environmental Standards 1970-2000 (%)

	All Countries				EU Member States			
	1970	1980	1990	2000	1970	1980	1990	2000

	All Countries				EU Member States			
	1970	1980	1990	2000	1970	1980	1990	2000
Settings (21)	0%	7%	17%	33%	3%	16%	29%	43%
Settings obligatory (3/8/11/12)	2%	16%	27%	44%	21%	40%	45%	63%
Settings non-obligatory (18/13/10/9)	0%	1%	6%	19%	0%	2%	10%	16%
N. of Country Pairs	276	276	276	276	10	28	55	91

The left half of Table 15 shows a strong increase of similarity for the group of 21 standards. In the year 2000, the repertoire between countries of the sample reaches a level of 33% of similarity. When compared between standards that are regulated at the European level and standards without such an obligation, it can be observed that similarity is higher in the first group, while it only very lately increased for non- obligatory standards. The right part compares these results for the overall sample of 24 countries with the subgroup of ERU Member States. As expected, the similarity between them is significantly higher, in particular, when it comes to the subset of standards regulated at the European level. However, the level of similarity is about 63 percent, not 100 percent – this relates to different speeds in implementation between groups of Member States and the opportunity to establish of stricter regulation in the case of minimum standards. Finally, EU Member States are not more similar towards each other than the rest of the sample when it comes to those standards without international obligations.

4.3.5 Dynamics in the Relative Position of Regulating Countries

Data from the ENVIPOLCON database shows that national standards converge and move towards stricter regulation. In the third part of the analysis not only the direction and similarity of policies, but the relative position of countries towards each other is analysed. First, it will be assessed if there are changes in ranking positions at all – this would indicate that a process of catching up and overtaking between states. The mobility of rankings is measured by the gamma coefficient. This coefficient takes values from -1 to 1. A value of 1 indicates that no changes have taken place in a country ranking between two points in time; the lower the coefficient, the more change took place; a complete reversal of a ranking would lead to a value of -1 (Heichel, Pape and Sommerer 2005; Heichel and Sommerer 2007, Sommerer, Knill and Holzinger 2008).

Table 16 shows gamma coefficients for 15 environmental standards from the ENVIPOLCON database. The coefficient for all countries is compared to the subgroup of Member States. Regarding the mobility of EU-regulated standards, the figures for the whole sample are lower than for EU Member States: countries change their relative position, latecomers catch up and former frontrunners fall back. In the EU subgroup however, there is almost no mobility in the ranking of countries since 1990, and only few in the time before, a consequence of ongoing harmonisation. Furthermore, progressive EU regulation let Member States 'overtake' former environmental frontrunner countries like Japan and the United States.

Among Member States, mobility in the rankings can only be found for the 1970s and for large combustion plants and lead regulation in the last five years of observation. For the whole sample, mobility is found across the whole observation period and across all standards.

Table 16: Mobility of country rankings (gamma-coefficient)

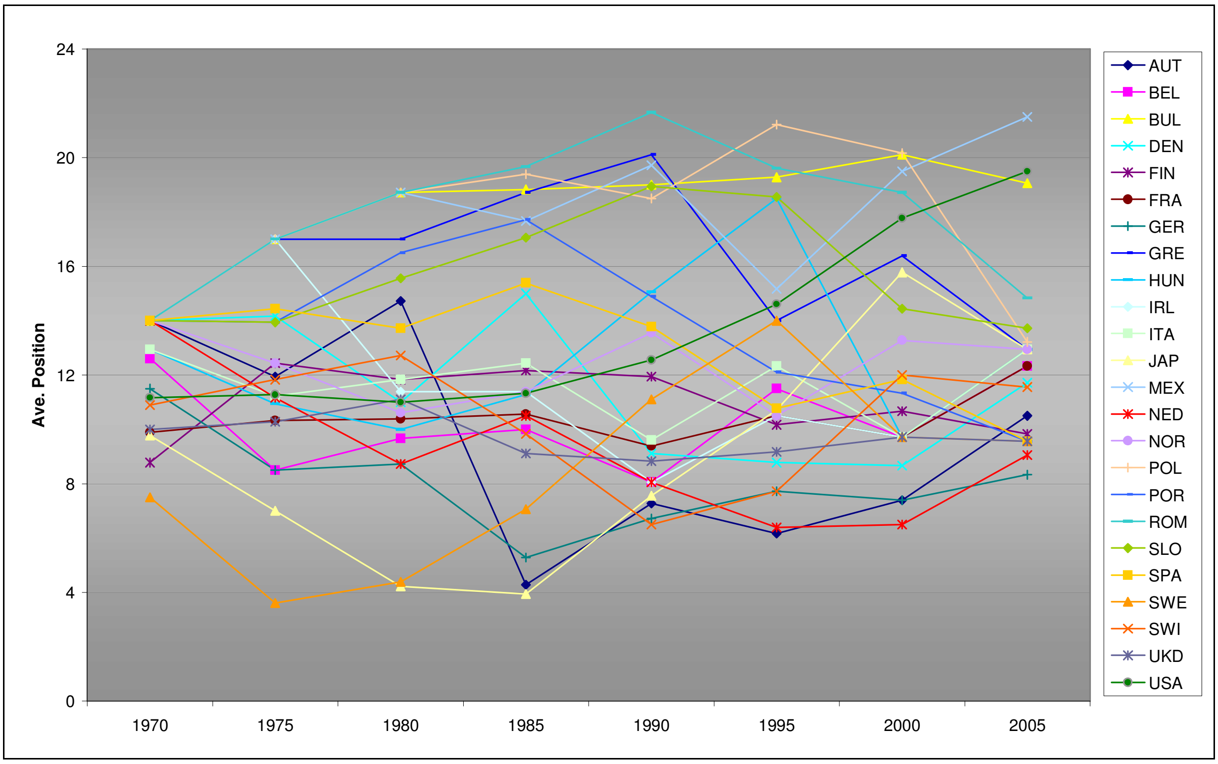
	1970-1980		1980-1990		1990-2000		2000-2005	
	All	EU	All	EU	All	EU	All	EU

	1970-1980		1980-1990		1990-2000		2000-2005	
	All	EU	All	EU	All	EU	All	EU
Sulphur Content Gas Oil	0.57	1.00	0.68	0.93	0.79	1.00	0.93	0.94
Lead Content in Petrol	0.65	0.00	0.70	0.44	0.93	0.90	0.73	0.33
Passenger Car Emissions CO	0.75	-0.33	0.86	1.00	0.29	1.00	0.65	1.00
Passenger Car Emissions HC	0.91		0.59	1.00	0.69	1.00	0.58	1.00
Passenger Car Emissions NOx			0.68	1.00	0.30	1.00	0.69	1.00
Large Combustion Plants SO2	0.78	0.67	0.26	0.13	1.00	1.00	1.00	1.00
Large Combustion Plants NOx	1.00		-0.05		0.66	1.00	0.76	0.41
Large Combustion Plants Dust	0.90		0.50	1.00	0.80	1.00	0.73	0.57
Noise Emissions from Lorries	0.31	-0.67	0.32	-0.71	0.50	1.00	0.73	1.00
AVE	0.73	0.13	0.50	0.60	0.66	0.99	0.76	0.81
Motorway Noise Emissions			0.74		0.84	0.76	1.00	1.00
Water Protection – Lead in Industrial Discharges	0.90		0.79	0.56	0.79	0.93	0.80	0.74
Water Protection - Copper in Industrial Discharges	0.86		0.84	0.58	0.67	0.90	0.88	0.87
Water Protection – Zinc in Industrial Discharges	0.71		0.76	0.58	0.69	0.87	0.95	0.96
Water Protection – Chromium in Industrial Discharges	0.95		0.81	0.50	0.80	0.82	0.93	0.92
Water Protection - BOD in Industrial Discharges	0.73		0.90	0.88	0.74	0.80	0.79	0.75
AVE	0.83		0.81	0.62	0.76	0.85	0.89	0.87

On the other hand, the persistence of ranking is higher when it comes to non EU-regulated standards, as can bee seen by the average figures in Table 16. This can be traced back to the generally lower number of policy changes in this area. In this case, lower mobility among EU Member States is not visible. Overall, it seems that a new stability of rankings has emerged since 2000 for all standards in the database.

A next logical step is to look at the country rankings. Figure 14 shows the course of country rankings over time. The y-axis indicates the average ranking position of a country (across all standards), with 1 as the highest possible rank and 24 as the lowest. First, high mobility of countries as changes in their relative position can be confirmed. Second, these results confirm what is already known from literature regarding the role of leaders and laggards (see literature review on leaders and laggards, WP 1a). Since the 1990s, the group of frontrunners not only in the EU, but also in the whole sample of OECD countries consists of Austria, the Netherlands and Germany. During the 1990s, this troika is complemented by Switzerland and Denmark, while in 2005, countries like Sweden, the United Kingdom; Portugal, Finland and Spain also belong to this group. The situation has been completely different in the first half of the observation period. At that time, from European countries only Sweden took a lead in environmental strictness while Japan was far ahead of most EU Member States. Finally, movements from the bottom to the top of the ranking show that a process of catching up took place from former laggard countries when they joined the European Union.

Figure 14: Strictness of Environmental Standards: Country Rankings 1970- 2005



4.3.6 Different Speeds of Implementation

The final step in this analysis of dynamics of national policies is to look at the implementation lag of EU directives regulating environmental standards. In Table 17, policy items with implementation lags can be identified, comprising the implementation data for the first directive, not successive ones; it covers the observation period until 2000. Implementation is measured from the release of a directive or the accession date, if later.

Standards with the highest mean implementation lag in years are lead content in fuels, sulphur content in gas oil and the number Coliforms in bathing water, all passed in the 1970s. The maximum lags for some standards are also considerably high, up to twenty years, and in some cases about ten years. The highest number of countries with a delay is found in the implementation of the bathing water quality and the passenger car emission directive with 11 and 8 countries (out of 14 EU Member States). In general, no clear difference between product standards and process standards can be seen. Here again, dividing the sample of 24 countries can form similar country groups.

Table 17: Implementation Lags in Years, between 1970 and 2000

	Sum Years	Average lag in years	Max lagin years	Number ofCountries with lag
Sulphur Content Gas Oil	29	7,3	20	4
Lead Content in Petrol	29	7,3	10	4
Passenger Car Emissions NOx	35	4,4	10	8

	Sum Years	Average lag in years	Max lagin years	Number ofCountries with lag
Passenger Car Emissions CO	31	4,4	10	7
Passenger Car Emissions HC	33	4,1	10	8
Noise Emissions from Lorries	15	3,8	11	4
Large Combustion Plants SO2	19	3,8	6	5
Large Combustion Plants NOx	18	4,5	6	4
Large Combustion Plants Dust	21	4,2	6	5
Noise Emissions Working Place	27	5,4	12	5
Heavy Fuel Oil Levy Industry	8	2,7	6	3
Coliforms in Bathing Water	73	6,6	21	11

4.4 *Conclusion and Implications for the Case Studies*

The analysis of environmental standards on the base of the ENVIPOLCON dataset reveals several general patterns. National standards tend to develop in the direction of stricter regulation, product standards to a higher degree than process standards. For product standards, and to a slighter degree for other standards as well, it has been observed that in the second half of the observation period, EU Member States apply stricter standards than other countries in the sample; however, the regulatory level outside the EU is considerably high. Distinctive races to the top are found for lead content in petrol or car emission limits, while less pronounced for large combustion plants or non EU-regulated limit values for heavy metal discharges into surface water.

A look at the frequency of regulatory shifts displays a similar picture: Upward moves towards a higher regulatory level clearly outnumber the downward shifts. Only few exemptions in the regulation of emissions from passenger cars and large combustion plants can be seen as weak indicators of a race to the bottom, yet only temporary. While the share of Member States upward moves is high for passenger car emission standards, the rate is lower for large combustion plants as well as sulphur and lead regulation. The frequency of regulatory upward change is lower for non EU-regulated standards. Here again, the downward moves are rare, most of them with unambiguous explanations.

The increasing strictness of national standards coincides with increasing similarity between countries – a measure of pair wise convergence indicates growing similarity between national regulations, while it can be seen that EU Member States are not significantly similar towards each other compared to the rest of the sample when it comes to standards that are not regulated at the European Level. Convergence is complemented by a high degree of mobility regarding the relative position of countries: international rankings change over time, and the group of forerunner countries as designated from literature is confirmed in this analysis of the ENVIPOLCON data. Mobility differs between standards and subgroups in the sample: while EU Member States since the late 1980s tend to hold their position, strong perturbations in country rankings can be observed for the 1970s and 1990s. Process standards not regulated by EU directives tend to be more stable regarding the ranking of countries. Finally, a brief analysis of implementation lags shows that some directives have been transposed slower into national law than others, e.g. the first sulphur in gas oil directive or the first lead directive. While for the majority of Member States and cases, no lags or only a short delay are observed, some laggards accumulate a delay of ten or even twenty years. Overall, it can be seen that those policies harmonised at the European level lead to more stringent and more homogenous standards.

Even if the ENVIPOLCON data includes more historical than current cases, it is possible to reveal differences in the dynamic of environmental standards across policies, countries and over time. It is obvious that such an aggregate analysis alone is not able to identify adequate cases for an in-depth analysis. However, it shows a general pattern in the development of national standards. Together with the results of the literature reviews and the scanning studies these findings could determine potential cases for in-depth study.

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5 Methodology, Selection of Cases and Research Protocol for Scanning and Case Studies

By Rüdiger Haum and Klaus Jacob

The aim of the project as described in the original research proposal was „to identify environmental policy areas where a lack of standardisation of environmental policies leads to competition distortions and to develop options for policies to overcome these distortions". With this chapter, some definitions and concepts necessary for the advancement of the project are derived from the literature reviews conducted so far. Furthermore research questions to be discussed in the case studies are developed.

We built our methodological ideas on the insights of the literature review (in chapter 3). The literature review on regulatory competition and leader and laggard countries could confirm that there is indeed a gap in the theoretical and empirical literature, which address the question if a lack of standardisation in EU environmental policy leads to competition distortions. However, this question is dealt with indirectly in environmental policy literature on leader and laggard countries. While the traditional regulatory competition literature argues that leaders in environmental policy could suffer from economic disadvantages there is no empirical evidence for this assumption. It is even possible to identify empirical evidence for a "race to the top" in European environmental policy.

The review of the legal literature shows that legal provisions have mainly strengthened the position of the environment through the establishment of the Single Market. However, consistency in the representation and realization of environmental interests is still lacking. The case law by the European Court of Justice so far has not provided a consistent legal framework for harmonizing standards. While the case law has successfully removed non-tariff barriers for products, the standards for production and the costs for the internalisation of environmental costs have been rarely subject of case law. Although we might conclude from our literature review that the Court is ready to accept national deviations on grounds of stricter environmental protection standards, Member States seem to be rather cautious to use this discretionary space. This may be a result of the fact that the legal situation of what is possible or even allowed under primary and secondary Community law is not always clear.

Lastly, the review of economic effects revealed that environmental policy does indeed affect trade flows as well as innovation and productivity. From theory we might derive the assumption that negative impacts on trade flows through environmental policy could evolve from (a) the inability of goods to enter national markets and (b) through unequal costs of policy implementation. While there is no conclusive empirical evidence on the magnitude and direction of trade impacts in all cases, some examples demonstrate that certain Member States will adapt more easily than others.

5.1 *Competition distortion*

The term "competition" relates in classical economics to the rivalry between economic actors to sell or buy products and services. The theoretical welfare optimum is achieved in perfectly competitive markets in which prices are close to cost and no single company can influence prices. Perfect markets are fully transparent and have competing buyers and sellers, i.e. absence of a monopoly or oligopoly. The aim of the EU single market is to achieve an integrated market with unrestricted movement of all factors leading to increased competition and hence increased efficiency of markets.

Due to the public good character of the environment and other market failures, costs of production and accordingly prices do not fully reflect the use of environmental resources. Environmental economics suggests that costs for using environmental resources should be internalised through policy measures according to the polluter pays principle. Undistorted markets from an environmental economics perspective would be markets in which all firms would internalise and have the same costs for their use of environmental resources. Optimal internalisation would be a situation in which every company would bear the full cost of environmental resource use resulting in environmental protection and fair competition (Ewringman et al. 2001).

Competition distortion denotes a situation in which companies are not competing under equal conditions. The reasons for this might be manifold, e.g. monopolies, trade barriers, etc. (Van der Laan/ Nenjes 2001). From an environmental perspective, competition distortion denotes a situation in which the degrees of internalisation of environmental externalities and resulting internalisation costs differ. Example: Without policy intervention coal based power generation is favoured compared to power generation from natural gas as coal based power generation does not internalise the cost of carbon dioxide emissions. Not internalising environmental costs of CO2 emissions can be interpreted as an unfair subsidy. Internalisation of costs (e.g. through a carbon tax) decreases competition distortion regarding environmental resource use and moves markets towards perfect competition.

However, the introduction of environmental policies that affects some companies more than others (e.g. coal fired plants are more affected of a CO2 tax than a gas fired plant) is interpreted by the regulated companies as a competition distortion as well. What companies refer to is usually a change in their relative competitiveness caused by differences in internalisation costs. Operators of coal based power stations will usually complain that having to buy more emission permits then operators of gas based power station will put them into competitive disadvantage. However, this is exactly the aim of the policy, which intends to force polluting industries to pay for their resource use (Ewringman et al. 2001). Thereby, environmental policy that reduces market distortions by internalising the costs of environmental resource use might still have (at least temporarily) impacts on the relative competitiveness.

Environmental policy however might lead to competition distortion if its differential implementation leads to changes in relative costs, which are not caused through the internalisation of externalities. This might be the case if some EU member states allocate CO2 emission permits through grandfathering and some through auctions (Woerdmann 2001). In this case, companies receiving auctions through grandfathering gain a financial advantage over firms that have to pay for emission allowance through auctions, which might lead to changes in competitiveness. In this case we can speak of competition distortion as the differentiation between auctioning and grandfathering is likely to lead a suboptimal environmental outcome as firms with grandfathering rights have fewer incentives to reduce their CO2 emissions. Hence, the differentiation is not justified by environmental reasons and is to be considered a sup-optimal environmental policy outcome.

5.1.1 Conclusions

From an environmental economic perspective, the application of environmental policy leads to the internalisation of environmental externalities and hence reduces competition distortion as discrimination towards firms already internalising externalities (environmentally friendly producers) is reduced. Differences in the implementation of an EU environmental policy may lead to differences in internalisation and related costs. Central to our approach understands the difference between an "ideal" implementation and the corresponding level of environmental protection set by the EU policy and the implementation within Member States. There are a number of reasons why member states might want to choose different ways of implementing a certain EU policy. These include a better fit of the national administration towards certain instruments, national preferences, but also protectionist measures of national industries.

Competition distortion may arise from government policy when, through differences in its application, it changes the market conditions faced by different businesses or sectors in different ways that are unrelated, or even run counter, to the objectives of the policy, with possible implications for their relative competitiveness. Competitive disadvantages from competition distortions (caused by differentiated implementation of environmental policies) begin with the implementation. They have to be distinguished from competitive disadvantages that arise from historical reasons, grown industrial structures and technologies that previous to implementation had different opportunities to externalise. Furthermore, one has to distinguish between cost arising from internalisation (e.g. the acquisition of new technology) and the cost of regulation (transaction cost associated with a particular environmental policy instrument), which depend on the modalities of the particular implementation.

Case studies must therefore carefully examine how policy is implemented, whether differences in implementation lead to differences in internalisation, whether these affect the relative competitiveness of firms and what the reasons for differences in the internalisation are.

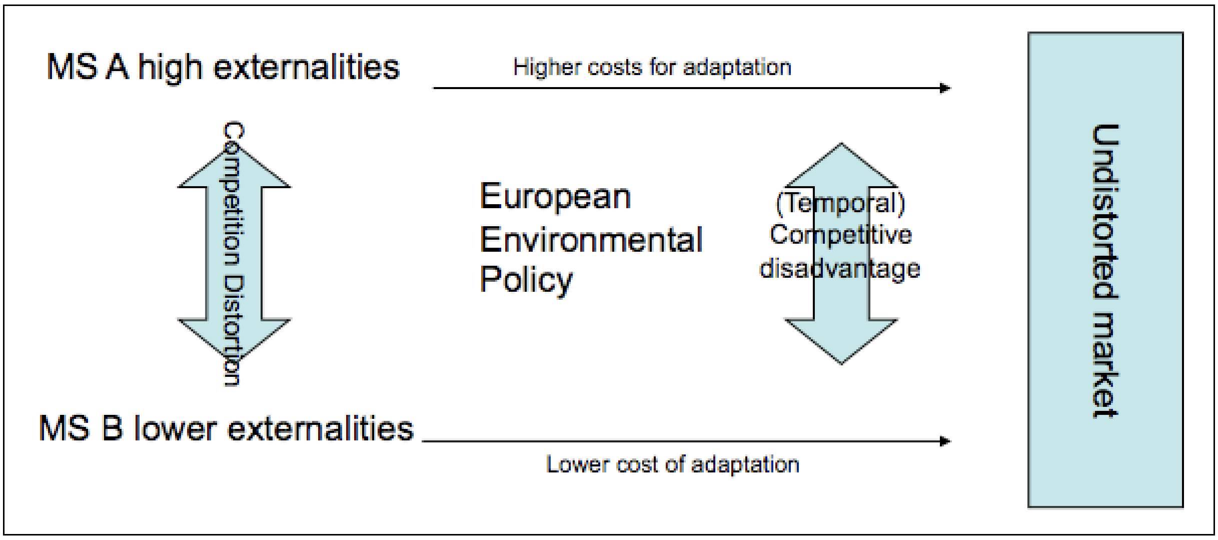
Conceptually, one can distinguish four different cases in which regulated business might experience changes in their competitiveness and accuse EU environmental policy of competition distortion. According to our argument only in two cases competition distortion takes place. The cases are discussed in the following.

5.1.2 Case 1: European policy removes historical market distortion

Industries use different technologies or operate with different costs for using environmental resources. Markets are distorted, because ‚dirty' industries are subsidised. The European policy causes an internalisation of environmental costs. Industry with higher costs for adaptation complaints. There is a temporal competitive disadvantage. As a result of the European policy, market distortions are removed.

Example: uniform 120gr/km for European car industry: higher costs for German producers because of historical reasons.

Figure 15: Case 1 - European policy removes historical market distortion

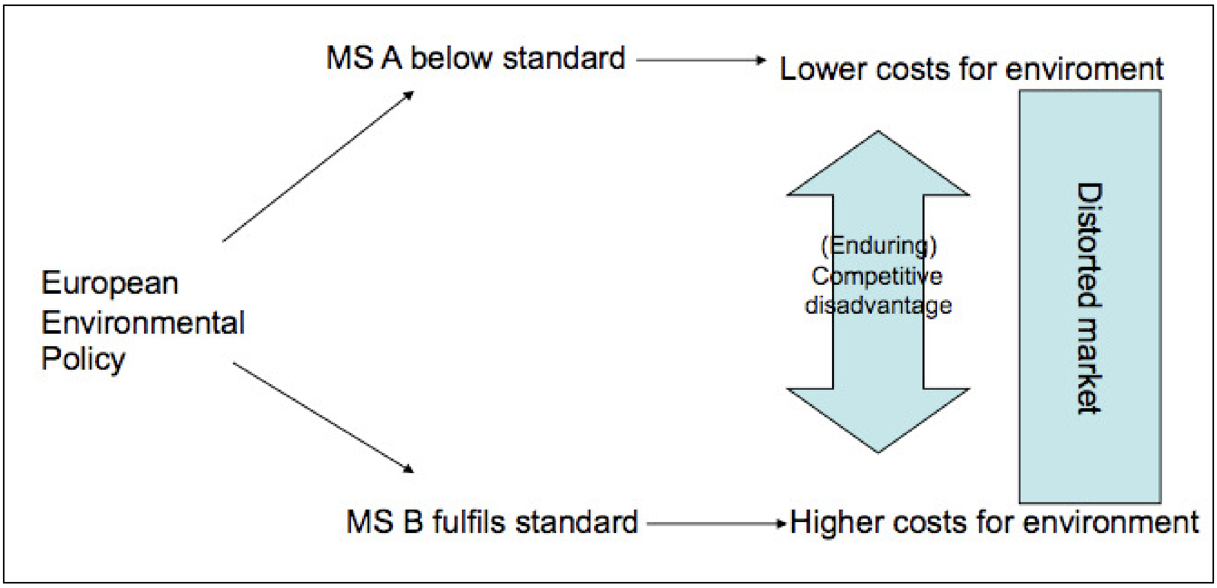


5.1.3 Case 2: MS stay below European ‚ideal' of resource use

Differentiated Implementation of European policy causes differentiated cost and enduring competitive disadvantages. As the cause for different cost is not the internalisation of environmental externalities, this is a case of market distortion.

Example: European Directive allows flexible implementation as a result of political bargaining in favour of countries with a large distance to target. Environmental resources remain to be subsidised in some MS.

Figure 16: Case 2 - MS stay below European ‚ideal' of resource use



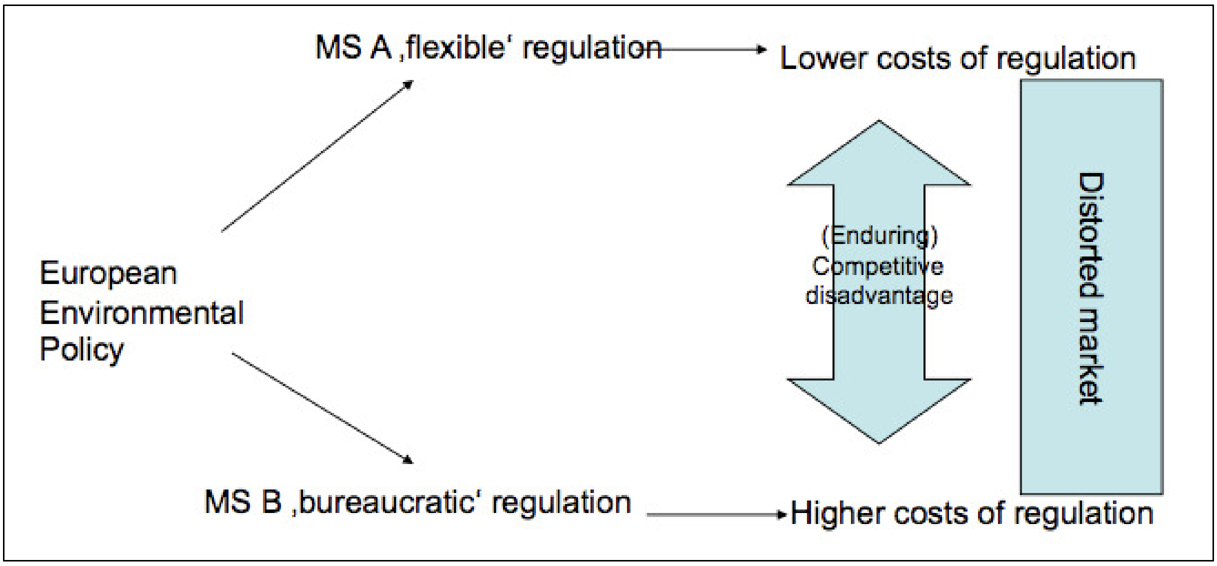
It has to be noted, however, that stricter standards (MS B) may not always lead to higher costs for the firms. The stricter standard may provide incentives for more efficient production which finally saves costs (Porter and van der Linde 1995).

5.1.4 Case 3: MS implement costly regulation

Member States implement a policy with different instruments but aim at the same level of environmental protection (same standards). Some form of implementation is more costly, e.g. because of information requirements. As the additional cost do not lead to additional environmental benefits but to a lasting competitive disadvantage this is a case of competition disturbance, but as it is not counteracting the European environmental goals, this cannot be judged as a competition distortion.

Example: National implementation of a directive has more information requirements than in another country and is thereby more costly.

Figure 17: Case 3 - MS implement costly regulation

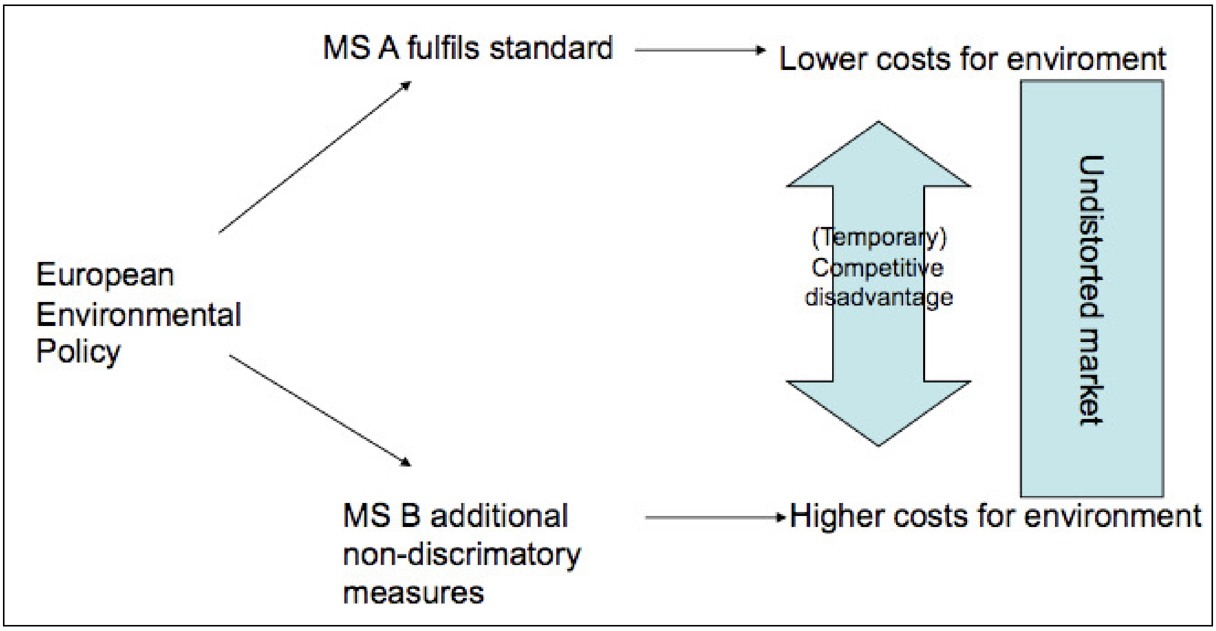


5.1.5 Case 4: Additional Measures on top of EU environmental policies

All Members Sates implement EU policy equally but some Member States undertake additional measures to support environmental friendly goods which even achieve tighter standards then required by EU policy. Industry might complain of competitive distortion as technology to produce such goods is unevenly distributed. Although the additional measure might entail a competitive disadvantage to industries not being able to produce that good they might acquire or develop such technology. Hence, this case does not represent a case of competition distortion.

Example: One MS offers tax reduction for environment friendly goods but does not discriminate regarding the origin of the producer.

Figure 18: Case 4 - Additional Measures on top of EU environmental policies



The different examples show, that harmonisation has the potential to remove market distortions that stem either from historical reasons or from differences in implementation. Harmonisation potentially violates preferences of national actors. National bureaucracies that achieve the European standards at lower costs compared to other countries is part of the countires comparative advantage, but should not be classified as a market distortion. If countries prefer to exceed the European ideal by non-discriminatory measures, this might cause temporary disadvantages for producers, but the situation cannot be perceived as an unfair (dis)advantage for a national industry.

5.2 *Conclusions for the selection of case studies*

In order to establish as to whether the lack of harmonisation leads to competition distortion or not, case studies must meet the following requirements:

- Relate to an environmental policy with differing implementation across EU member states.
- The industries affected through the environmental regulation must be present in various countries and of similar structure as well as competing in similar markets.
- Competition distortion must be perceived and articulated through relevant economic actors.

5.2.1 Design of Scanning studies

The scanning studies should contain concise information as to whether the problem of competition distortion is associated to a certain EU environmental policy. The suggestion is to scan several relatively recent policies (2005 – present) of considerable relevance to industry. Scanning studies should answer the following questions:

- What kind and what level of standard is set by the particular EU policy?
- Are there any complains by industry regarding that particular policy and its implementation in MS?
- What are the reasons for industry complaints (required change in routines, higher internalisation cost, higher regulation cost...)?

5.2.2 Design of case studies

The main overall question the case studies have to answer is:

Are the complaints on market distortions by industry justified or do they reflect merely a (temporarily) change relative competitiveness?

Answering this question will allow to draw conclusions regarding the wider questions whether a more uniform approach in environmental regulation is contributing to the creation of an undistorted Single Market and its implications for environmental standards? In the case studies it is important to differentiate between a description of the policy (the ideal of environmental protection), the different means member states utilise to implement the policy, and the different levels of environmental protection Member States aim to achieve with the policy (MS states ideal of environmental protection).

In order to answer the overall question case studies will include one European policy, one industry operating in at least two Member States, national implementation of the EU policy in Member States where industries are active and public allegations of competition distortion are made.

Each case study will include three levels of analysis.

The European policy

The aim of this part is to establish the ideal level of environmental protection aimed for by the policy and what means member states are given Member Sates to achieve this "ideal".

This part should contain a summary of the policy as well as a description of the principles guiding the policy, its current standards and their future developments.

The section should also contain a description of the instruments mandated / or suggested by the policy to achieve such standards. This description should also contain a description of possible exceptions to the standards and the conditions, which must be met for an exception to be granted.

Part I should also include a description of the targeted industries, changes in technology / processes required to achieve the environmental goals and cost estimations.

Part 1 should also contain information regarding the differences Member States have made in implementing the EU policy (regarding instruments and level of protection). It should also contain information on industry complaints regarding competition distortion. This information will be relatively superficial but should be sufficient to decide which Member States will be investigated in more detail. Member states selected for the case study must show differences in implementation but have a similar structure of the affected industry competing in the same market.

Relevant data sources are EU documents, secondary literature and stakeholder documents. Also, interviews with representatives of the EU commission and business associations should be conducted as they are the most relevant source for information about differentiated implementation as well as allegations of competition distortion.

The implementation within Member States

Level 2 should investigate the implementation of the EU policy in the Member States selected as a result of the previous part. It should summarise for each Member state considered separately the level of environmental protection (standards) and the instruments chosen as well as any additional measures on top of the EU policy. It should then compare the Member State implementation with the EU ideal and with the other Member States considered in the case study.

Industry

This part will in more detail analyse the nature and reasons of cost to industry. This part must contain a summary of the industry complaints. It must also contain a description of the estimated cost resulting from implementations of the EU policy and how they might change relative competitiveness of industry. Cost should be differentiated into internalisation cost and regulation cost. The most important task in this section is to establish the reasons for changes in relative competitiveness and related industry allegations about market distortion.

- Do they arise because historical differences in cost for internalising environmental externalities are reduced or abolished (case 1)?
- Do they arise because differences in cost for internalising environmental externalities are maintained, created or increased (case 2)?
- Do they arise because of differences in cost of the regulation (Case 3)?
- Do they arise because additional measures give additional incentives for internalising cost (Case 4)?

Sources of information are cost estimations for the implementation of the policy, stakeholder documents, news sources as well as representatives of industries.

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6 Scanning Studies

6.1 *Scanning Study on the Environment Liability Directive (2004/35/EC) with a special focus on the Chemical Sector*

By Florian Lux

6.1.1 Executive Summary

The Environmental Liability Directive is a European regulation framework to make operators accountable for environmental harm. Created to harmonise approaches and to prevent competition distortions, it shifts expenditure burdens to the operators and therefore incentivises preventive measures. The chemical sector as a high-risk sector will have to bear a relatively large share of expenditures for prevention, insurance and damage remediation. Based on experience with the liability regime in the United States, the European Commission in its 2002 proposal estimates that the industry will absorb the burden without significant impact on competitiveness. Yet, the difficult and long-lasting policy process has lead to a directive leaving a lot of discretionary power to the Member States allowing for differing implementations in several crucial areas such as exemptions, proportional liability and financial security. According to the research protocol, these three cases represent market distortions and further harmonization is needed in order to achieve an optimal implementation of the set European targets.

6.1.2 The Environmental Liability Directive

6.1.2.1 EU ideal

The Environmental Liability Directive (ELD) aims at increasing liability for producers in relation to environmental damage. It requires that environmental damage is prevented and if occurred remedied. The ELD does not introduce new environmental standards but relies on existing provisions to redefine accountability. It constitutes a public law compensation scheme making producers liable with respect to public environmental goods. It defines a common European ideal of making operators liable for environmental damage they cause, thus implementing the "polluter pays principle". By making businesses, which harm the environment legally and financially accountable, the ELD internalizes environmental costs. This pressures operators to find effective strategies to avoid environmental harm by developing and using environmentally safe technologies and processes and thus spurs innovation.

The ELD covers protected species and natural habitats (protected by the 1979 Wild Birds Directive and 1992 Habitats Directive or equivalent national legislation) at the sites of the Nature 2000 network, Water (covered by the Water Framework Directive) and direct or indirect contamination of land. Member States had time until April 30th 2007 to transpose the Directive into national law. The success of implementation is therefore still difficult to assess.

6.1.2.2 Background

The major oil spill off the French coast caused by the sinking oil tanker Erika in December 1999 and raising concerns about genetically modified organisms fuelled the political debate about environmental liability in Europe. The European Commission therefore reflected on ways to implement the "polluter pays principle" set out in the EC Treaty (Article 174(2) TEC). First approaches to environmental liability and compensation were set out in earlier Commission proposals on environmental liability in the waste sector and in the 1993 Green Paper on the restoration of environmental damage. In 2000 the Commission adopted a White Paper on Environmental Liability, which assesses different options for Community action in the field of environmental liability. In 2002 the Commission issued a proposal for the ELD. In 2004, the ELD was adopted.

6.1.2.3 Transposition and Implementation

Member States are given significant discretionary powers in implementing the ELD. They may, for instance, exempt polluters from liability by defence mechanisms such as permit defence and state of the art defence. As compulsory insurance was not introduced by the ELD, Member States are free to apply own regulatory schemes on financial security. Other important issues are the definition of baseline conditions for the assessment of environmental damage and remediation needs and the definitions of the terms "damage to nature" and "operator". In the directive, the term "operator" is defined very broadly covering any party involved in causing contamination. National legislation will thus decide on the scope of liable parties. Furthermore decisions about details concerning cost allocation in cases of multiparty causation are left to Member States. Article 29 of the ELD explicitly allows Member States to adopt more stringent provisions than those defined by European legislation. That being the case, the success of the ELD largely depends on the transposition by Member States. However, operator's conduct will not only continue to be hugely influenced by national governance but also by self-enforcement and voluntary compliance. In addition, environmental groups can file complaints and in that way exert pressure on policymakers and operators. According to Article 12.1 of the ELD natural or legal persons having sufficient interest in environmental decision-making relating to the damage can request action. This applies to all non-governmental organisations promoting environmental protection and meeting any requirement under national law. Nevertheless, enforcement of the ELD is highly dependent upon direct governmental actions, which makes it interesting to look in detail at the transposition and implementation of some of the issues in Member States.

6.1.2.4 Reporting and Impact Assessment

According to Article 14 (2) the Commission has to report by April 2010 on the effectiveness of the ELD, on the availability of financial security at reasonable costs and on conditions of insurance and other types of financial security for the activities covered by Annex III. This report and an extended impact assessment (IA) then will be used as input for the debate over harmonized mandatory financial security. Furthermore Article 18 obliges Member States to report their experience implementing the provisions of the ELD until April 30th 2013. A first exploratory study preparing further Commission reports was published in 2008. According to this study two thirds of the Member States have fully transposed the ELD up to mid-November 2008.

As the Commission points out in its initial proposal of 2002, the directive is primarily changing the distribution of costs, rather than imposing additional aggregate costs. Therefore the use of the term "costs" is replaced by the term "financial expenditures". In an economic assessment based on the Liability Scheme in the United States and issued in 2000 the annual expenditures are estimated to be at around 1,455 Billion Euros, which is much less than the estimated total societal and environmental benefit. A quantified cost-benefit test has not been performed and therefore no specific information on the repartition of costs is available.

Several Member States have undertaken an Impact Assessment (IA) prior to transposing the ELD into national law (Bulgaria, Czech Republic, Germany, Hungary, Poland, Spain, Ireland and the United Kingdom). The very latest is the United Kingdom (UK), where the transposition will come into force on March 1st 2009. The UK assessment concludes that the annual benefits exceed the annual costs. Implementing the directive will bring benefits of about 27 million British Pounds (BP) over a ten-year period compared to minus 150 million BP if the ELD is not transposed. The annual cost of enforcement is estimated at 1,4 million BP, 4 Million GP in the first year. A detailed cost analysis considering the categories included in the research protocol is not included. The British IA does not expect that minimum transposition will have significant impacts on competition as all countries in the EU are required to transpose at least the minimum requirements.

6.1.3 Differing Implementation in Member States

The European branch of the "Ad-hoc industry Natural Resource Damage Group", an international industry group, which has extensive experience with environmental liability issues due to its activities in the United States, also expressed concerns over the implementation of the directive regarding legal interpretation issues, technical issues and financial security issues. The main areas of concern are in the field of exemptions, financial security, multi-partite cases of liability, and scope of the directive. In what follows, these issues shall be examined.[11]

6.1.3.1 Permit Compliance and State of the Art Knowledge

Aside from exceptions in cases of armed conflict, civil war and a natural phenomenon of exceptional, inevitable and irresistible character, Member States can decide to apply exemptions such as permit compliance and state of the art compliance thereby relieving operators fully or in part or not at all of restoration costs. Permit compliance applies to cases where operators have caused environmental damage by activities approved by competent authorities. State of the art compliance, on the other hand, applies to cases where operators can display that based on the state of scientific knowledge at the time they could not foresee the dangerous outcome of their activities for the environment.

The Netherlands, Hungary, Poland and Lithuania chose not to include any of the possible exemptions in their national legislation. Germany has introduced a federal "Act on Environmental Damage" (USchadG) that leaves the decision whether to accept permit and state of the art defence to the Länder (States), none of which has implemented the defences yet. But as this concerns exceptions from national legislation, the rules will also be applicable if the Länder remain inactive. Bulgaria and France decided not to introduce the permit exemption but included the state of the art exemption in their national legislation. Spain has introduced an "instruction defence", which means that the operator is not liable, when he proves that he complied with an order or instruction by a public authority. Sweden has not implemented the permit and the state of the art exceptions as defences but as mitigating factors.

The chemical industry complains about the discretional authority of Member States concerning defence mechanisms. CEFIC in its 2004 paper claims that companies working in states that do not allow for defence mechanisms will suffer from a relative loss in competitiveness. It also argues that the permit defence mechanism will motivate companies to comply with current regulations. Pointing out to the Commission's initial version, which included permit and state of the art defences, CEFIC argues for full recognition of the two defence mechanisms. Responsible operators acting in compliance with their permits and applying state of the art knowledge might be liable or face legal uncertainties depending on how Member States implement this provision.

The possibility to apply exemptions could be seen as a distortion representing Case 2 as defined in the research protocol (MS staying below European ideal). Member States can stay below the European ideal of resource use and continue subsidisation of environmental resources. A stricter regulation that does not allow for exemptions might make operators more cautious and pressure them to develop cleaner or safer technologies. Applying stricter rules, which do not allow for exemptions might be a further step in making the polluter pay and shift expenditures from the public taxpayer to the operator.

[11] http://www.euractiv.com/en/environment/industry-groups-voice-concerns-environmental-liability-law/article-167749

6.1.3.2 Financial Security

The directive does not provide for mandatory insurance or a fund solution, but according to Article 14 (1) Member States have to take measures to encourage the development of financial security instruments and markets. A compulsory financial security system has only been chosen by six Member States (Bulgaria, Hungary, Czech Republic, Slovakia, Romania, and Spain) Nevertheless, a compulsory financial security is not necessarily restricted to insurance products. In some of the countries operators will have the possibility to choose among different mechanisms to cover their risks. In Spain, for example, financial guarantee options include bank bonds and ad-hoc reserves, which can be set up by the operator investing in public debt. Spain's mandatory scheme was very controversial and will be introduced in 2010. A grace period will be established and the development of the level of maturity of the insurance market will be taken into consideration.

In order to foster the development of insurance products and other financial instruments clear definitions of restoration measures and their assessment are needed. As the development of appropriate financial insurance will take time, CEFIC postulates the permission to self-insurance and financial guarantees in possible mandatory insurance schemes in the near future. The chemical industry as a high-risk sector fears higher costs for prevention, insurance and remediation. High insurance premiums as well as limited coverage of risks are amongst the most pressing problems chemical companies are or will be facing. While experiences from the United States and its liability system show that it is possible to absorb such burden, it is not clear what will happen in Europe. The high costs for insurance might especially be a problem for small and medium enterprises (SME) that are not as capable to use self-insurance and financial guarantees as their bigger competitors.

The case of financial security can also be identified as a market distortion as defined by Case 2 in the research protocol (MS stay below European ideal). Operators in countries applying strict mandatory insurance might suffer from competitive disadvantages but financial insurance assures that environmental damage is remedied and therefore increases the level of internalisation of environmental externalities. Therefore the resources continue to be subsidized in countries that do not apply mandatory insurance. Whether a harmonized approach towards financial security will be included remains to be seen in 2013 after the first implementation phase. However administrative costs that incur in learning about the new set of rules would still be considerable when implementing a common regulation. Therefore the first steps to be taken are in the field of awareness rising and the development of insurance mechanisms. According to the aforementioned 2008 exploratory study businesses are not aware enough of their new liabilities and duties. Sample interviews conducted with operators showed that among the limited number of operators surveyed, none had adapted their insurance policies to cover the extended liability induced by ELD.

6.1.3.3 Proportional liability or joint and several liability

According to Article 9 of the ELD cost allocation in cases of multiple party causation is left to national regulations. Member States are therefore free to apply joint and several or proportional liability. Joint and several liability makes it possible to sue one of the parties for the full amount of the damage and let the operators sort out their respective proportions of liability.

According to CEFIC joint and several liability is unfair, as one party might have to bear liability for the entire damage, even if it is only responsible for a small proportion of the damage. Operators doing business in Member States allowing for joint and several liability, especially SME might suffer from competition distortion. CEFIC criticises the Member States' option to either apply one or the other. It animadverts the system of joint and several liability, proposing instead a common approach implementing proportional liability.

In this regard a European "ideal" has not been fixed but the option requiring joint and several liability is more ambitious and shifts more expenditures to the operators. The implied high regulatory costs and differing information requirements make this case a distortion representing Case 3 as defined in the research protocol (Costly regulation). While proportional liability might seem the better alternative from the operator's perspective, assessing proportional liability implies considerable costs for the administration. One of the key questions therefore is who will have to cover the costs, the administration or the operators?

6.1.3.4 Scope of Protection

The scope of protection covered by the ELD can be extended from areas covered by European legislation to areas protected by national legislation. Seven Member States (Cyprus, Czech Republic, Estonia, Hungary, Poland, Spain, and Sweden) decided to extend the scope of the Directive and apply measures on top of the European requirements. Additional extensions may be applied in Austria, England and France.

According to CEFIC the extended scope in some Member States can lead to significant distortions and to a competitive disadvantage of the chemical companies producing in those countries. However, it does not distort competition from an environmental point of view as tighter standards will give additional support to environmental friendly goods. This possibility to implement additional measures on top of European requirements represents case 4 of the research protocol (Measures on top) and therefore cannot be considered a competition distortion.

6.1.3.5 Complaints by the chemical industry

The European Chemical Industry, notably through the European Chemical Industry Council (CEFIC), has participated in the debate preparing and accompanying the ELD. In December 2002, CEFIC published a comment on the proposed directive and encouraged policymakers to include a system of exemptions in the new liability regime. In May 2004, CEFIC published a paper on the implementation of the ELD expressing deep concern about possible distortion of competition and legal uncertainty if the directive is not implemented by Member States in a "fair and harmonised way".

Moreover, political compromise in the Council and EP Plenary is judged accountable of the discretion of Member States in several crucial areas. One area of discretionary authority is the transposition of the annexes on assessment and remediation of damage. CEFIC appeals to Member States to ensure cost-effectiveness in that process.

CEFIC is aware of possible competition distortion through differential implementation. Stressing the aspect of cost-effectiveness however indicates the aim to lower the level of externalising externalities.

6.1.4 Conclusion

Not all Member States have transposed the ELD yet. Experiences with the implementation will show further variation in implementation. However, some states have already opted for differences in implementations in the field of exemptions, proportional liability and financial security. These cases of differing transposition and implementation might lead to competition distortion, different environmental cost to industry in different Member States. Detailed studies on the cost of the differential implementation are not yet available. The chemical sector is particularly affected by the increased responsibility as it operates with high environmental risk. Providing appropriate financial insurance therefore is a key to effectively implementing the Directive.

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6.2 *Scanning Study on the Deliberate Release of Genetically Modified Organisms (GMO) Directive*

By Florian Raecke

6.2.1 Executive Summary

The EU legislation on the deliberate release of genetically modified organisms (GMOs) into the environment leads to a broad range of implementation differences, which hamper the development of a European market of GMO-products at large. Therefore competition distortions between the Member States (MS) are at present more of a theoretical manner. The currently main problem of the GM-industry seems to be the need of an overall conducive legislation and consistent implementation in the MS in order to establish a real European market of GMO-products.

The main reason for the hesitantly and different implementation are the partly higher, partly lower concerns of consumers, farmers and national governments about the implications of biotechnology. In case GMO crops find wider acceptance in the MS and a real market emerges, competition disadvantages may in the future arise from implementation differences of the co-existence rules for GMO, which could in some MS entail higher costs for GM-using farmers/industry. But firstly, from an environmental economics perspective this would not necessarily cause competition distortions, and secondly, proper regulation could avoid according competition problems.

6.2.2 Introduction

The European legislation on genetically modified organisms (GMOs) deals with a plethora of issues, including rules relating to the release of GMOs into the environment, the traceability, labelling of GMOs and GMOs in food and animal feed, and the co-existence of GM and conventional/organic crops.

The scanning study at hand confines itself to analyzing implementation differences among the Member States (MS) in the deliberate release legislation and the therein co-existence rules.

6.2.3 The EU Legislation

Two different legislative acts are relevant in this context: Directive 2001/18/EC indeed concerns the deliberate release of GMO into the environment. But especially for the aspect "co-existence of GM and conventional/organic crops", which in the scanning study at hand is seen as the most important cause for (future) competition distortion, also regulation EC No 1829/2003 is important as it has crucial impact on the "co-existence rules".

6.2.3.1 Deliberate Release of GMO into the Environment: 2001/18/EC

The original version of the directive "on the deliberate release into the environment of genetically modified organisms" was released in 1990 (90/220/EEC). In 2001 it was superseded by the directive 2001/18/EC "on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC" which entered into force on 17 April 2001 and had to be implemented by the MS by 17 October 2002.

The amendments related primarily to clarification of the scope of Directive 90/220/EEC and of the definitions therein. Furthermore considerable advances in genetic modification during the 1990s and new judicial rulings concerning this subject area required a substitution. The new directive introduced new rules to ensure the strict risk assessments of all GM products before they can be sold, marketed or planted in the EU.

According article 1, the objective of the directive "is to approximate the laws, regulations and administrative provisions of the Member States and to protect human health and the environment" when carrying out the deliberate release into the environment of GMO "for any other purposes than placing on the market within the Community", which means experimental releases (part B of the directive), and when "placing on the market genetically modified organisms as or in products within the Community" (part C of the directive). This objective is to be pursued in accordance with the precautionary principle.

According to article 2, "deliberate release" means "any intentional introduction into the environment of a GMO or a combination of GMOs for which no specific containment measures are used to limit their contact with and to provide a high level of safety for the general population and the environment."

The directive introduced principles for environmental risk assessment, mandatory post-market monitoring requirements (including that of the long-term effects associated with the interaction with other GMOs and the environment), mandatory information to the public, a requirement for MS to ensure labelling and traceability at all stages of the placing on the market (a Community system for which is provided for by Regulation (EC) No 1830/2003 on traceability), and the limitation of first approvals for the release of GMOs to a maximum of ten years.

A discrete authorisation procedure has to be appointed both for the experimental release of GMO into the environment and for placing GMO on the market.

The decision-making process for the experimental release takes place through a national procedure. The competent national authority of the MS where the release is to take place plays a central role, and the eventual authorisation is only valid in that MS where the notification was submitted. However, the other MS and the Commission may make objections to be examined by the competent national authority. The notification should contain a technical dossier including a full environmental risk assessment, a monitoring plan and the appropriate safety measures.

The procedure for a commercial release starts with a notification to the competent national authority as well. In this case, it is the authority of the MS where the GMO is to be placed on the market for the first time. The notification has to include i.a. an environmental risk assessment. In contrast to the authorisation procedure for the experimental release, the further process involves all MS and an authorisation is valid for the whole of the Community territory (initially for a maximum duration of ten years) in order to ensure the free movement of goods: the placing on the market of a GMO implies the free movement of the authorised products throughout the territory of the European Union. If the authority of the MS where the GMO is to be placed on the market for the first time favours the placing on the market and accomplishes the assessment report, it informs the other MS via the European Commission. The other MS and the Commission examine the assessment report and may issue observations and objections. In case of no objections the competent authority that carried out the original assessment authorises the placing on the market of the product, and the product may be placed on the market throughout the European Union. If objections are raised, the procedure provides for a conciliation phase among the MS, the Commission and the notifier. If at the end of the conciliation phase the objections are maintained, a decision must be taken at European level. The Commission first asks for the opinion of the European Food Safety Authority (EFSA). The Commission then presents a draft decision to the Regulatory Committee composed of representatives of the MS for an opinion. If the Committee gives a favourable opinion by qualified majority, the Commission adopts the decision. If not, the draft Decision is submitted to the Council of Ministers for adoption or rejection by qualified majority. If the Council does not act within three months, the Commission shall adopt the decision.

After a GMO has been placed on the market, a monitoring plan has to be implemented in order to identify the effects on human health or the environment.

Article 23 of the directive represents a "safeguard clause": If a MS "has detailed grounds for considering that a GMO as or in a product which has been properly notified and has received written consent under this Directive constitutes a risk to human health or the environment, that Member State may provisionally restrict or prohibit the use and/or sale of that GMO as or in a product on its territory". As basis of such measures there have to be "new or additional information made available since the date of the consent and affecting the environmental risk assessment" or a "reassessment of existing information on the basis of new or additional scientific knowledge".

6.2.3.2 Genetically modified Food and Feed: Regulation (EC) No 1829/2003

Regulation EC No 1829/2003 introduced rules on the traceability and labelling of GMO products. However, conventional, not genetically modified, products may also be accidentally contaminated by GMOs. The limit between GMO products with traceability and labelling requirements and conventional, GMO-contaminated products exempted from such requirements, is 0.9%, provided the presence of GMO is adventitious or technically unavoidable.

This 0.9%-threshold is important for the co-existence of conventional, organic, and GMO-using agriculture. As a fundamental principle of co-existence, farmers should be able to cultivate the types of agricultural crops they choose. None of the three forms of agriculture mentioned should be excluded within the EU. Therefore, with regulation EC No 1829/2003 the new article 26a with the title "Measures to avoid the unintended presence of GMO" was introduced in directive 2001/18/EC. According article 26a, MS "may take appropriate measures to avoid the unintended presence of GMOs in other products". The Commission shall observe the developments regarding coexistence in the Member States and develop guidelines on the coexistence of genetically modified, conventional and organic crops.

The following table gives an overview of the EU legislation governing GMOs and GM products.

Table 18: EU Legislation Governing GMOs and GM Products (Shaffer & Pollack 2004)

Step-by-step Activities in the Production Process	Applicable EU Legislation
GMO research in laboratories*	Contained Use Directive 90/219
All GMO experimental releases (trials)	Directive 2001/18
GMO environmental releases and marketing authorizations for non-food or feed seeds and crops (such as flowers)	
GMO environmental releases and marketing authorizations for seeds and crops for food or feed	Regulation 1829/2003 and Directive 98/95/EC (common seed catalogue)
Authorization for marketing of GM food and feed	Regulation 1829/2003
Labeling of GM food and feed	
Traceability and labeling of GM food and feed products*	

*not relevant for the study at hand

6.2.3.3 Co-existence of GM-Crops with Conventional and Organic Farming: Commission's Guidelines

Based on article 26a of the directive 2001/18/EC, the Commission released with date of 23 July 2003 a recommendation "on guidelines for the development of national strategies and best practices to ensure the co-existence of genetically modified crops with conventional and organic farming".

Therein is mentioned that "co-existence refers to the ability of farmers to make a practical choice between conventional, organic and GM-crop production, in compliance with the legal obligations for labelling and/or purity standards." These standards result from the 0.9%-threshold of regulation (EC) No 1829/2003. The guidelines contain an open-ended catalogue of farm-management and other measures for co-existence that may become part of national co-existence strategies, including isolation distances between GM and non-GM fields of the same species.

The guidelines refer to the possible loss of income for farmers when their non-GMO crop becomes contaminated by GMOs above the tolerance threshold (0.9%). They could suffer from a lower market price of the crop or difficulties in selling it. Furthermore, the need for monitoring systems and measures to minimise the admixture of GM and non-GM crops might cause additional costs for farmers.

In the guidelines is said that the type of instruments adopted may have an impact on the application of national liability rules in the event of economic damage resulting from admixture. The MS are advised to examine their civil liability laws to find out whether the existing national laws offer sufficient and equal possibilities in this regard.

Strictly speaking, the co-existence guidelines concern not only the GM-crop farmers and their organisations, but also conventional and organic farmers and their organisations. Measures to comply with co-existence regulations cause costs – for all three farmer/industry groups, but in different shapes. To simplify matters, in this scanning study only the GM-crop farmers/industry groups are regarded.

6.2.4 Ideal standard and possible variations

The deliberate release directive 2001/18/EC offers a lot of options for differential implementation in the MS, e.g. risk criteria for the release permission, or the monitoring organisation and financing. However, in light of the stakeholder statements the most important aspect seems to be the "measures to avoid the unintended presence of GMOs" according art. 26a. Therefore, the study at hand henceforward deals with these co-existence rules, particularly the aspects "isolation distances" and "liability rules".

The guidelines of the Commission indicate that national measures for co-existence "shall not go beyond what is necessary in order to ensure that adventitious traces of GMO stay below the tolerance thresholds set out in Community legislation". Hence, the "ideal" implementation set by the EU guidelines appears to be making full use of the 0.9%-threshold. But there are no reliable scientific results for the "right" isolation distances between GM and non-GM fields of the same species needed to comply with the 0.9%-threshold available yet. However, cross-fertilisation studies indicate that normally even at distances of 20-50 m the threshold is not exceeded.[12] But it seems doubtful whether distances of this range can give a sufficient guarantee that adventitious traces of GMO stay below the tolerance threshold.

Furthermore, from the Commission's point of view, one single isolation distance per GM-crop would not be in accordance with the differing cultivation conditions in the MS.

Hence, at present there are no crop-specific "ideal" isolation distances and it is unclear which distance e.g. for maize is necessary in order to ensure that adventitious traces of GMO stay below the tolerance threshold.

Also for liability rules for potential economic damage that may result from GMO admixture in non-GM products there is no "ideal" standard in the Commission's guidelines.

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[12] http://www.biosicherheit.de/de/koexistenz/db/ (13.03.2009)

6.2.5 Possible costs to industry through variation in implementation

Potential costs to industry potentially arise through different application procedures and through different rules governing the co-existence of GM-crops and conventional crops. For GMO-farmers wider isolation distances can entail higher organisational, searching and monitoring costs, because potentially they have to deal with a higher number of neighbouring farmers, it could be more difficult to find appropriate fields, and they have to ensure adequate monitoring measures within a greater area.

6.2.6 De facto-Implementation within the MS

6.2.6.1 Directive 2001/18/EC in general

According to article 31(6) of directive 2001/18/EC the Commission shall send to the Parliament and the Council every three years a report on the experience of the MS with GMOs placed on the market. Based on reports of the MS the Commission released a first report in 2004 (COM(2004) 575 final) and a second report in 2007 (COM(2007) 81 final). Both reports refer to the experimental release (part B of the directive) as well as the commercial release (part C of the directive).

According to the first report, until April of 2004 only seven of the EU-15 and eight of the ascending countries had communicated transposition measures. Because deadline for transposition was the 17 October 2002, the Commission took eight of the EU-15 MS to court for non-transposition. Meanwhile all MS have transposed the directive. This slow and hesitant transposition reflects the serious ethical, environmental, health, and socio economic concerns regarding GMO not only of the governments but also of the public within the MS (Garcia 2006). It can be considered as part of a continuing "Member-State Revolt" (Shaffer & Pollack 2004, p. 21) regarding GM, which started in the context of a series of developments in the mid-1990s already and, in particular, the BSE food-safety scandal that struck in 1996.

Also because of such concerns until the second report of the Commission six MS (Austria, Germany, Greece, France, Hungary, Luxembourg) invoked the safeguard clause of the directive and banned five authorized GM-crops. Most recently (February 2009) this happened in Austria and Hungary regarding GM-maize MON 810. The attempt by the Commission to force both MS to allow the cultivation was rejected by the Council of Environment Ministers. Later this spring decisions about MON 810 cultivation in France and Greece are pending.

The second report of the Commission points to the fact that the fees for notifications for placing on the market differ among MS and range from 0-50,000 € per application resp. 0-17,000 € for experimental release. The report expresses the appraisal of the GM-industry that this could influence the selection of the MS to which a company submits an application, especially in the case of small and medium enterprises. Moreover, the report refers to the statement of the GM-industry that many EU farmers are reluctant to grow GM varieties in many MS where large food processors, traders and retailers remain cautious about the use of GM material in the light of increasingly negative public opinion and of the costs associated with traceability. Industry calls furthermore for harmonisation of the experimental release applications and of the environmental risk assessment requirements.

Thus all in all implementation is connected with a lot of questions and tentativeness. Also two aspects of co-existences measures are affected by those uncertainties: Isolation distances and liability rules.

6.2.6.2 Isolation distances

In 2006, the Commission released a "Report on the implementation of national measures on the coexistence of genetically modified crops with conventional and organic farming" (COM (2006) 104 final). It mentions that some MS have adopted measures that aim to reduce the adventitious presence of GMOs below the tolerance threshold, primarily by reducing the established isolation distances. According to the report, these measures appear to entail greater efforts for GM crop owners than what is necessary.

Just like the report of the Commission, current Internet sources[13] show that there is indeed a broad range of isolation distances. Examples of implemented or intended distances for maize: Denmark 200 m, Bulgaria 800 m, Germany 150 m (distance from conventional maize) and 300 m (distance from organic maize), UK 80 m (silage maize) and 110 m (grain maize), Netherlands 25 m (distance to conventional maize) and 250 m (distance to organic maize).

6.2.6.3 Liability rules

According to other measures for co-existence, the most important differences between MS concern the liability rules for potential economic damage that may result from GMO admixture in non-GM products. While some countries maintain traditional tort law rules, other countries like Austria, Germany or Poland have introduced special liability regimes, which are aimed at shifting the economic risks of GM farming onto the causers.

In Germany, for example, GM-crop farmers are liable for all economic losses incurred on neighbouring farms due to unwanted admixture regardless of whether or not a direct link can be ascertained. If the polluter is not detected, all neighbouring farms are jointly and severally liable. An economic loss occurs when a neighbouring farmer's harvest exceeds the 0.9%-threshold for GM content that makes it illegal to sell the harvest without a GMO label.

As the first country, Denmark introduced legislation for a compensation fund for losses arising from GMO admixture. Initially for a period of five years, GM crop growers pay 100 DKK per hectare of GM cultivation into a fund. Non-GM farmers can claim compensation from the fund for the market price difference, as well as for costs incurred for testing and sampling. Organic farmers can ask for further damages due to their special situation.

The report states that until then experience with GM crop cultivation in the MS has been very limited and confined to certain regions of the Community (with the exception of Spain). The impact of differences in the approaches to co-existence on the single market cannot be sufficiently assessed. By the time of the completion of the report, no insurance product to cover economic damages from GMO contamination was on the market. Cost for liability could therefore not be assessed. However, alternative arrangements have been taking place. In Germany for example, a GM feed producer offers to voluntarily buy any contaminated crop at market prices. A new report is expected in 2009. A number of MS have no co-existence regulations yet or just drafts which have to be agreed by the Commission.

6.2.7 The GMO Industry in Europe

The European dedicated biotechnology industry as a whole employs 96,500 people, mostly in small and medium enterprises (Jonsson 2007). With between 10,000 and 20,000 each the number of employees is the highest in Denmark, France, Germany and the UK but considerably lower in the other Member States. Just as employment data the number of biotech companies depend on the definition of a "biotech company" and range between about 2,100 and 3,100 (Jonsson 2007).

[13] e.g. http://www.biosicherheit.de/de/

The only GM crop currently available to EU farmers for cultivation is the so-called Bt maize, which is resistant to insects. In practice, Monsanto's Bt maize MON 810 is the only used event. Although Syngenta's event T 25 is also authorized, there are no varieties on the market.

In 2008, Bt maize was cultivated on an area of 107,717 hectars. This area accounts for 1.2% of total grain maize area in the EU-27.[14] The only country growing significant quantities is Spain, where Bt maize was cultivated on 79,269 hectars (= 74% of total EU Bt maize area). The Czech Republic, Portugal, Germany, Slovakia, Romania, and Poland also grew Bt maize, but only on small areas between 1,900 and 8,380 hectars.[15]

In Spain, GM seed turnover accounted for 11.9 million € in 2004. Since the GM area in other MS can be neglected the Spain figure can be taken to represent total EU GM seed turnover and was about 2.9% EU maize seed turnover. In 2004, GM maize accounted for 85 million € or 1.2% of EU maize production (IPTS 2007).

A research into adoption and performance of Bt maize over the 2002-2004 growing seasons in Spain shows that economic variables, such as higher profit and lower economic risk, are the main reasons for farmers to adopt the technology. Bt maize seed was found to be more expensive than conventional seed, but Bt maize farmers saved corn borer control costs and at large achieved an annual gross margin higher than conventional maize farmers (IPTS 2008). The whole grain maize, which was produced in Spain in that time was used for animal feed production and apparently sold inside of Spain. The largest share of welfare created by the introduction of Bt maize (74.4 % on average) went to Bt maize farmers and the rest went to the seed companies (25.6% on average), taken to include seed developers, seed producers and seed distributors (IPTS 2007). It should be mentioned that there are no labelling or traceability schemes in Spain; all the maize is sold specified as GM and labelled as such. Thus Non-GM farmers cannot receive a price premium for producing non-GM maize as happens in other parts of the world (FoE 2009).

6.2.8 Industry reactions

6.2.8.1 Isolation distances

As the voice of the GM industry, the European Association for Bioindustries, EuropaBio, complains "certain EU Member States have drafted disproportionate and discriminatory rules around coexistence". Coexistence measures had to focus on the feasibility and costs of management practices that aim to minimise the unintended presence of GM in non-GM produce. These measures should aim to respect the 0.9% labelling threshold for food and feed. Furthermore, EuropaBio considers "that growers who have themselves chosen a more stringent labelling standard than that established in EU legislation should not expect their neighbours to bear the special management costs of meeting that self imposed standard; to do so would reverse fundamental freedoms of economic activity and would establish a dangerous precedent. To allow speciality operators to formulate unrealistic standards for GM in their own produce would impose impossibly high standards on neighbours and would effectively impose a ban on the choice of other producers."

Even though reliable scientific results for the "right" distance needed to comply with the 0.9%-threshold are not available yet, the mentioned implemented or intended distances of several MS for

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[14] Eurostat: 8,942,200 hectars grain maize estimated for 2008: http://epp.eurostat.ec.europa.eu/portal/page/portal/SHARED/PER_AGRFIS (12.03.2009)

[15] http://epp.eurostat.ec.europa.eu/portal/page/portal/SHARED/PER_AGRFIS

maize seem to target a lower GM-contamination in conventional and organic maize. Because of higher transaction costs (e.g. searching, organisational, bargaining, handling costs) this situation is lamented by the GMO-farmers/industries of several MS, e.g. the Biotechnology Organisation of Germany, BIO Deutschland.

Because the 0.9%-limit does not apply to seed, some MS have introduced national limits. The European Seed Association (ESA) as well as EuropaBio urge for a uniform EU-threshold. However, because there is no European policy, this aspect is not subject of the study at hand.

6.2.8.2 Liability Rules

EuropaBio considers that "existing national laws on civil liability already provide the necessary mechanisms to determine fault and assess liability and the need for compensation. Additional Community or Member State liability legislation or funds that single out GMOs are not necessary, and would thus be disproportionate and discriminatory." Furthermore, EuropaBio argues that "damages may also be experienced in GM crops – a high-value GM crop might be 'contaminated' by neighbouring conventional or organic fields in which Good Agricultural Practices guidelines were not followed." An "ideal" implementation set by the guidelines cannot be defined, because there is no recommendation for a special liability regime.

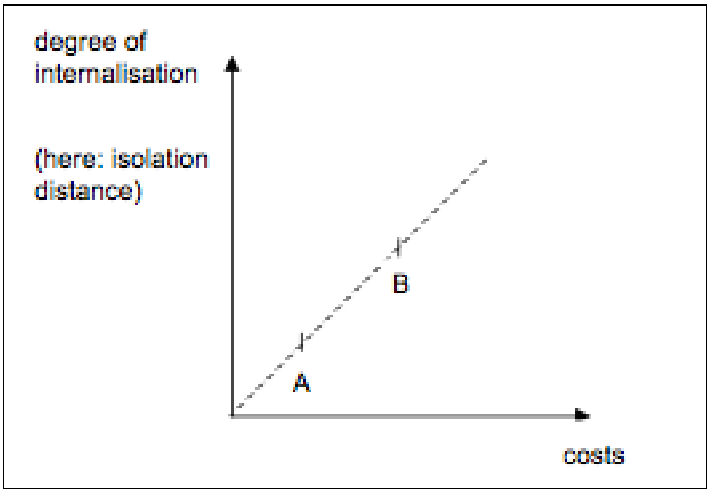
The recent study of Koch et al. 2007 points out that only extreme variations may have a noticeable effect on mobility in the internal market. But in general, it is – according to the study – at least doubtful whether liability differences have any negative influence on the single market, because local market conditions play a much more considerable role. Thus, to simplify matters and because an "ideal" implementation cannot be defined, the classification of the deliberate release policy implementation differences by the four different cases as defined in the research protocol has to be conducted by means of the isolation distances aspect.

National Farmer Associations have made pledges for minimal levels of regulation but have not yet indicated any form of competition distortion through differential implementation within MS (e.g. NFU 2006). Effects on competitiveness are at this point in time felt through the overall slow progress regarding the implementation of GMO regulation and increasing production and demand outside the EU (COPA COGCA 2007).

6.2.9 Discussion

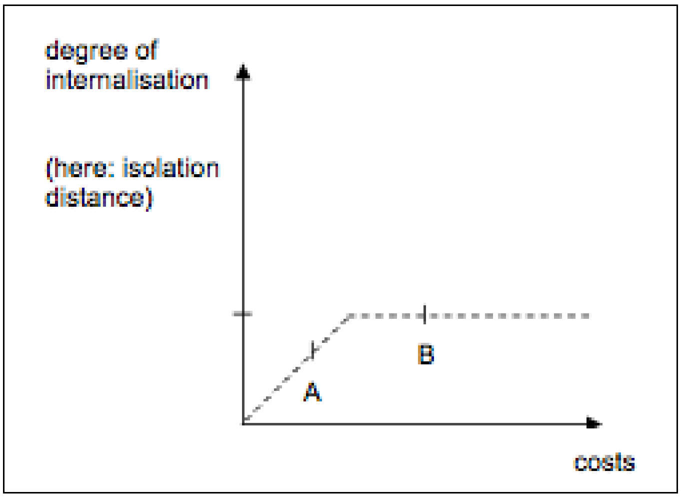
Granted that isolation distances in MS A target a skimpy undershooting of the 0.9%-threshold and in MS B target a considerable further undershooting, this constellation at first glance represents Case 4 of the research paper: MS B undertakes additional measures in terms of isolation distances, which brings the GMO percentage significant below the 0.9%-threshold. The higher the isolation distance, the more consistent is the internalisation of external costs – as measured by the GMO percentage in conventional/organic food plants and aligned monitoring and quality assurance costs:

Figure 19: Isolation distances not causing market distortion



But there seems to be an internalisation limit: the detection limit of GMO, which is 0.1%. Isolation distances, which considerably exceed the distance at which the GMO percentage falls below this detection limit, can cause market distortion:

Figure 20: Isolation distances causing market distortion



However, the distance at which the 0.1% detection limit is reached, cannot be specified precisely and as universally valid. Nevertheless, increasing the isolation distances are additional measures on top the EU ideal. Hence, there is no competition distortion.

6.2.10 Conclusion

Regarding the deliberate release of GMO there is a broad range of implementation differences, culminating in bans of several GM-crops in several MS. Implementation differences and problems are mainly caused by partly higher, partly lower concerns of consumers, farmers and national governments about the implications of biotechnology. These concerns and the hesitant implementation hamper the development of a market at large, and the European GM-industry complains about the in comparison to Non-EU-countries all in all disadvantageous European situation of stringent regulation, high costs and improper implementation. Thus the European GM-industry is still very small, only in Spain GM-crops (Bt maize) is cultivated on a considerable area, and it is a very young industry. The problem of other, long existing industries to be confronted with new and different implemented regulations does not exist in this case. Scientific uncertainty and public opposition to GMO crops currently drive existing differences in MS implementation.

These facts entail that competition distortions are at present more of a theoretical manner. The main problem of the GM-industry seems to be the need of an overall conducive legislation and consistent implementation in the MS in order to be able to grow. Competition distortion in connection with EU-wide trade of GM-crops after commercial release may rather be a prospective problem – which could be avoided if harmonised legislation would be in place and safety concerns over GMO are reduced. Considering that agricultural crops in their non-GMO form are traded strongly within EU MS one can assume that different implementations of GMO regulation are likely to foster competition distortion in case GMO crops find more acceptance in markets.

Whether or not current bans constitute competition distortion depends highly in the perception of the environmental risk of GMOs. High risk-perception would perceive a ban as the highest level of environmental protection and as additional measures to the EU ideal. Lower risk perceptions would conceive a ban as competition distortion since it denies domestic growers to reap opportunities in exporting to other markets. This case is however not defined within the research protocol.

With regard to the 0.9%-threshold and appropriate isolation distances, implementation differences of the co-existence rules for GMO could (theoretically) in some MS entail higher costs for GM-using farmers/industry, which from an environmental economics perspective however do not cause competition distortion. Also, differences in liability schemes and the financial contributions farmers have to make to any form of liability fund might differ and cause differences in compliance cost.

On his meeting on 4 December 2008 the Council pointed out that under directive 2001/18/EC, the Commission is to submit a specific report on the implementation of the Directive, including an assessment, inter alia, of socio-economic implications of deliberate releases and placing on the market of GMO. The Council invited the MS to collect and exchange relevant information on socio-economic implications of the placing on the market of GMO's including socio-economic benefits and risks and agronomic sustainability, by January 2010, and it invited the Commission to submit to the European Parliament and to the Council the report based on information provided by the Member States by June 2010 for due consideration and further discussions (Council 2008).

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6.3 *Scanning Study on Reduction of CO_2 Emissions from Passenger Car Emissions*

By Rüdiger Haum

6.3.1 Executive Summary

A more uniform approach in carbon dioxide emissions standards for passenger cars might lead temporarily to competitive disadvantages, but reduces competition distortion in the long run. A differentiated approach with different regulations in the MS would have the risk of imposing new competition distortions.

6.3.2 Introduction

In early 2007, the European Commission reviewed its strategy on reducing carbon dioxide (CO_2) emissions from passenger cars and proposed new legislation at the end of 2007. In December 2008, the Council of Ministers and the European Parliament agreed informally on new legislation, which has yet to be enacted.

In the following, I will present the original proposal of the European Commission, the final legislation and the complaints of the German association of car manufacturers regarding competition distortion. I will then discus these reactions to establish as to whether the future EU CO_2 regulation represents a case of competition distortion from an environmental perspective.

There are to my knowledge no additional measures in the member state level to directly support the reduction of CO_2 further then the suggested EU target. There are however demand driven measures giving incentives to consumers to purchase low-CO_2 emission cars. One example is the German reform of the German passenger car tax, which increases with CO_2 emissions.

6.3.3 The EU Regulation

6.3.3.1 History and Aims

In February 2007, the European Commission published a review of the existing EU strategy to reduce CO_2 emissions from passenger cars and light-commercial vehicles.

At that time, the reviewed strategy consisted of three parts. Firstly, a voluntary agreement between car manufacturers to decrease the average CO_2 emissions of all new cars admitted to the EU market (average of overall new car fleet) to 140 gram per kilometre (g/km) by 2008/09 and to 120 g/km by 2012. Secondly, a labelling strategy requiring manufacturers to include information on fuel consumption and CO_2 emissions in promotional material. Thirdly, it suggested the application of fiscal incentives for the promotion of fuel-efficient cars.

According to the review, the labelling requirements had been implemented but showed no effects regarding increased sales of low CO_2 emission cars, the Council had not yet made a decision regarding fiscal incentives, and the goals of the voluntary agreement were deemed unlikely to be achieved. Progress by car manufacturers towards the 140 g/km goal was by the time of the review considered insufficient to convincingly indicate its achievement in 2009 (CEC 2007). The review left open which legislative measures should be applied to ensure the achievement of the 120 g/km standard but stated that measures should be “competitively neutral” and “avoid unjustified distortion of competition” (CEC 2007: 8).

In December 2007, the European Commission published a proposal for future legislation on CO_2 emission reduction for passenger cars. The proposal announced regulation containing a mandatory standard of a 120 g/km average for all new cars entering the EU market in 2012. Reductions until 130 g/km should be achieved through improvements in motor technology and a further reduction to 120 g/km through improvements in additional technology (minimum efficiency requirements for air conditions, tyre pressure monitoring systems, etc.) and increased application of biofuels. The standard would apply to all manufacturers selling passenger cars in the European Union.[16]

Individual CO2 reduction targets for each manufacturer should be determined in relation to the mass of the cars in their fleet.[17] Estimated future increases in mass should also be considered and reductions of heavier cars should be relatively larger then reductions of lighter cars. To increase the flexibility, manufacturers should be allowed to average emissions of the different models in their fleet (rather then having to strictly follow the reduction goal of each model) and be allowed to form intra-manufacturer pools.

If manufacturers would fail to meet their target a penalty would become due. The rate of the penalty was suggested to be determined by multiplying the difference between the actual average emissions and the assigned target with the number of newly registered cards and a varying penalty fee. The penalty fee would be 20 Euros in 2012, 35 Euros for 2013, 60 Euros in 2014 and 95 Euros thereafter. Member states should be required to monitor progress and report to the European Commission (CEC 2007a).

On the first of December 2008, the Council of Ministers and the European Parliament agreed informally on future targets of the CO2 emission regulation. These include a reduction of the penalties[18] and a phase in period for the 120 g/km standard. Only 65 per cent of new cars have to achieve 120g/km by 2012, 75 per cent by 2013, 80 per cent by 2014 and 100 per cent by 2015 (Euraktiv 2.12.1008).

6.3.3.2 Impact Assessment

The available impact assessment was carried to assess the European Commission's suggestions on future legislation in the December 2007 proposal.

Distance to Target

According to impact assessment, car manufacturers average fleet CO2 emissions vary considerably and lead to considerable differences to the 120 g/km target (Table 19).

Table 19: Car manufacturers and distance to 120 g/km target

Manufacturer	g/km over 120		Manufacturer	g/km over 120
PSA Peugeot-Citroen	16		Nissan	38
Renault	20		Suzuki	41
Fiat	22		Mitsubishi	41
Honda	25		Mazda	43

16 The strategy also suggested to EU member states to undertake demand oriented measures to support transformation of the EU car manufacturer fleet that will not be considered in this context.

17 „CO2 targets for passenger cars should be defined as a function of the utility of the cars on a linear basis. To describe this utility, mass is the most appropriate parameter because it provides a satisfactory correlation with present emissions and would therefore result in more realistic and competitively neutral targets and because data on mass is readily available" (CEC 2007a: 13).

18 Between 2012 and 2018, the fine will be as follows: €5 for the first gram of CO2, €15 for the second gram, €25 for the third and €95 from the fourth gram of CO2 onwards. From 2019 manufacturers will have to pay €95 for each gram exceeding the target

Manufacturer	g/km over 120		Manufacturer	g/km over 120
Toyota	25		BMW	45
GM	28		DaimlerChrysler	46
Ford	30		Subaru	81
Volkswagen	31		Porsche	138
Hyundai	32			

Source: CEC 2007b

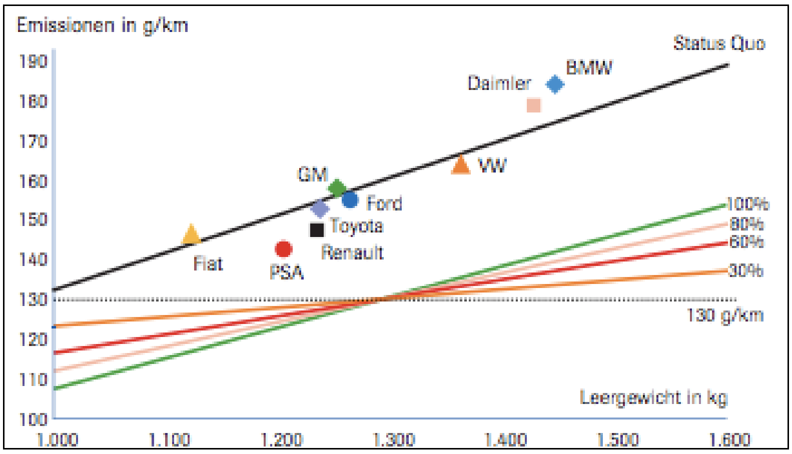
Cost per manufacturer

The cost intensive part of the regulation is achieving the 130 g/km standard through changes in engine technology and therefore the economic impact assessment on manufacturers focussed on this particular part. The impact assessment considered three options for achieving the 130 g/km standard. The first option was the application of a uniform 130 g/km fleet average standard for each manufacturer. The second option, which was eventually suggested by the European Commission, was to reduce CO2 emissions according to the mass of the car. This approach entails different emission reduction goals for different manufacturers, as the average mass (or weight) of their particular fleets differs considerably. This option assumes that mass correlates (more or less) with CO2 emissions and would assign manufacturers with an on average heavier fleet a CO2 emission target above 130 g/km and manufacturers with an on average lighter fleet a target below 130 g/km (leading to an overall average of 130 g/km). The third option would have been assigning reduction goals in form of fixed percentages of reductions for each manufacturers fleet.

The European Commission favoured the second option from the perspective of competition distortion because it was considered to increase cost (expressed in average increase in retail prices) most evenly among manufacturers. Option 1 was considered to favour manufacturers with low-emission fleets as manufacturers with high-emission fleets would have to make larger relative reductions with associated higher cost and retail prices. Option three was considered to favour manufacturers of high-emission fleets as manufacturers of low emission fleets would have to make a bigger effort to reduce emissions further leading to a higher increase of retail prices then for manufacturers with large fleets (CEC 2007b).

Assigning emission reduction goals through a mathematical function of mass of vehicles can be rendered in the following graph.

Figure 21: Projected emission reduction targets



Source: VDA 2008: 22

The black continuous line represents the average status quo of current CO_2 emissions around which the actual average fleet emissions of different manufacturers cluster. The dotted black horizontal line represents the EU emission goal of 130 g/km. The different coloured lines indicate the emission reduction targets individual manufacturers must achieve in order to reach the overall EU goal of 130 g/km.

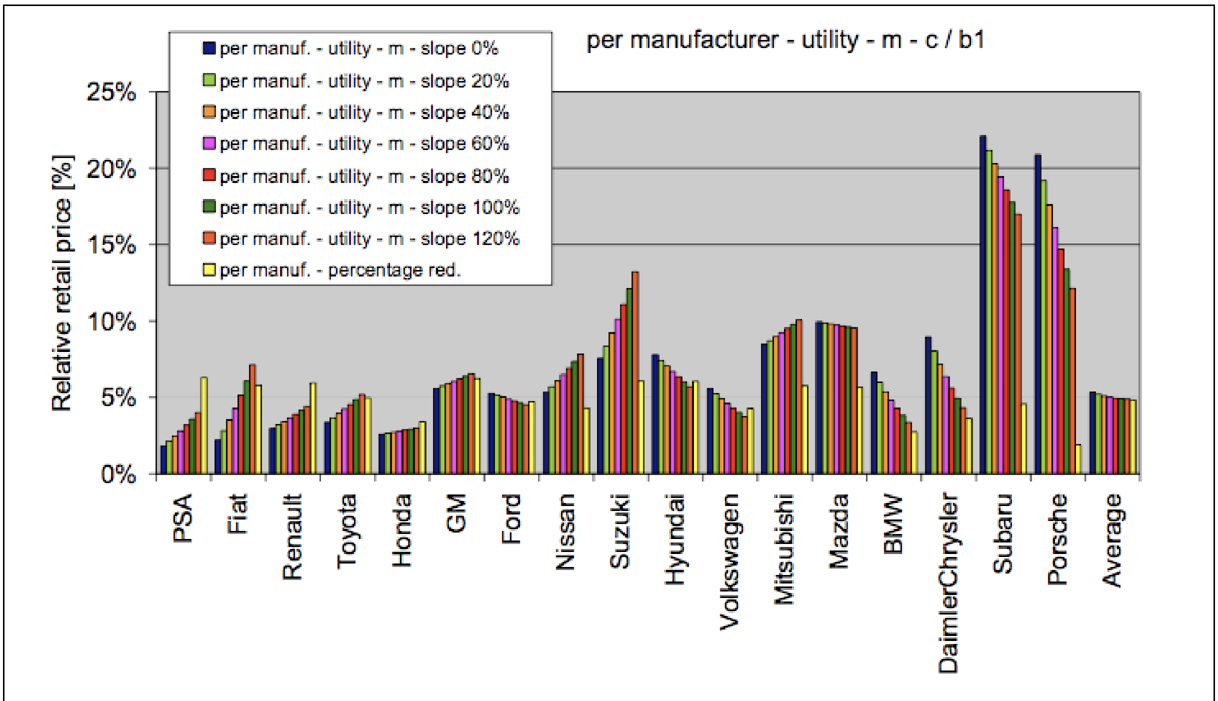
The green line runs parallel to the black status quo line representing mathematically a slope of 100 per cent. The distance from status quo to emission reduction goals as indicated in the green line is therefore (on the statistical average) the same for all manufacturers.

While the mathematical underpinnings can be neglected in this context it is important to realise the consequences of different slopes. If the slope of the function is decreased, the emission targets for individual manufacturers change (see coloured lines). Manufacturers with on average heavier fleets receive larger reduction targets then manufacturers of lighter cars.

As the European policy aims at forcing manufacturers of heavier cars to make larger emission reductions then manufacturers of lighter cars, the European Commission proposal suggested to include in the function calculating the reduction goals of individual manufacturers a slope of 60 per cent (CEC 2007a: 26).

A slope of 60 per cent was considered by the impact assessment to have the most evenly distributed negative economic effects. Economic effects on car manufacturers (and hence consumers) were determined through modelling average increase of retail prices per manufacture in per cent (see Figure 22). A slope of 60 per cent was finally agreed upon in December 2008.

Figure 22: Estimated retail price increase for option 1 (slope 0 %), option 2 (slope 20 to 120) and three (fixed percentage)



Source: CEC 2007.

6.3.3.3 *Industry reactions*

In the following, I will summarise the reactions of the German car manufacturer association (VDA) to the CO_2 emission reduction strategy before the publication of the proposed new strategy by the EU European Commission, after its publication and after the agreement between Council of Ministers and the EU Parliament. The public positioning of the VDA even before the EU announcement of future regulation is included as it is the most extensive comment of the VDA on alleged competition distortion through EU policy.

Germany

The German association of car manufacturers (VDA) protested against future CO_2 emission reduction policy already prior to the publication of the proposal of the EU CO_2 emission reduction strategy in late 2007.[19] The VDA feared that future EU legislation might set a uniform standard of 120 g/km fleet average for all manufacturers which was considered unfair. The argument about the alleged unfairness was based on the assumed different cost effects a uniform standard would have on car manufacturers and especially the specific consequences for German car manufacturers. In the interpretation of the VDA, a uniform standard would allow manufacturer with a relatively low CO_2 emission fleet average (small distance to target) to "get out of their responsibility" as their effort to achieve the policy goal of 120 g/km was smaller then compared to other manufacturers. Likewise, a manufacturer with a high average fleet CO_2 emission level (large distance to target) would be "punished" as their achieved emission reduction might be higher then that of other manufacturers but still not sufficient to meet the required standard.[20] Thirdly, as German car manufacturers showed on average high CO_2 g/ km averages the industry would be "forced" to reduce the emissions of their fleets or to change its composition towards low emission models. A uniform standard would therefore be "disadvantageous" to German industry and "challenge the future of large parts of the German automobile industry" (VDA 2007: 132 – 133).

In reaction to the legislation announced in 2007, the VDA underlined that the chosen slope in determining reduction goals of manufacturers was of "highest relevance" for the competition between manufacturers. A slope of 60 per cent would discriminate against producers of heavy car model in general and German manufacturers in particular. At the same time, the VDA stated that the consequences of a lower then 100 per cent slope would be "justified within limits" (VDA 2008: 23)[21]. The VDA also criticised the extent of the proposed penalty. They would be in the interpretation of the VDA much higher then for industries, which could compensate their CO_2 emissions through the acquisition of emission certificates (VDA 2008: 24).

After the agreement on future legislation in December 2008, the critique of the VDA repeated the argument regarding the penalties, which are still considered too high. No reference was made regarding the slope (VDA 2008 a).

6.3.4 Reasons for industry complaints

The main complaint regarding competition distortion of the German car industry centred on the envisaged 120 g/km overall EU fleet standard. The standard is considered to impose higher cost on

[19] The VDA critique reflects complaints by German car manufacturers e.g. VW in Automobilsport 2007.

[20] A manufacturer with a fleet average of 170 g/km might cut emission of 34 gram till 136 gram and still be over the required 120 gram, while a manufacturer with a fleet average of 140 gram would cut emissions of about 20 gram and would meet the target.

[21] French car manufacturers have on average much lighter passenger car fleets then German manufacturers (see graph). During the political debates of the commission proposal within the council of environmental ministers the French environmental minister argued for a slop of 30 per cent, which would have eased reduction targets for French manufacturers and increased reduction targets for German manufacturers. Achieving the emission reduction targets related to a sixty per cent slope as suggested by the Commission were considered difficult to achieve. Likewise, the French minister stated that it "was difficult to accept that heavier cars are allowed to have higher emissions". The German environmental minister argued for a slope of 80 per cent, which would have alleviated the reduction goals of German manufacturers. Sweden, Czech Republic, Hungary, Austria, Slovakia and Sweden supported the German proposal. Italy, Spain and Romania supported France (Euractiv 2008). The debate may serve as an indicator for industry reaction in other affected EU countries, especially Sweden, which were not accessible online.

German manufacturers then on other (especially French) manufacturers. The severeness of the complaint however decreased with the publication of the exact modalities of the future regulation.

The VDA made the most severe complaints in anticipation of a uniform fleet average standard of 120 g/km for all manufacturers. The uniform standard corresponds to option 1 discussed in the EU impact assessment. From the perspective of natural resource consumption a uniform standard for all manufacturers would have removed distortion of competition, as it would have lead to similar levels of internalising the cost for using the resource clean air (expressed in CO_2 emissions).

The European Commission did not choose option 1 as they applied a different notion of competition distortion in their related impact assessment. The assessment argued that manufacturers with already relatively lower emission averages would be unfairly favoured over manufacturers with higher fleet averages.

Regarding the chosen option (emission reductions according to mass, option 2 of impact assessment) the VDA upheld its critique by applying similar arguments although in a milder form. From the perspective of natural resource consumption, option 2 partly reduces competition distortion, as it requires manufacturers with high CO_2 fleet averages to make bigger efforts in emission reductions than manufacturers with low CO_2 fleet averages. In other words, it approximates the levels of internalisation between manufacturers but does not equalise them and therefore only reduces competition distortion from an environmental perspective.

In summary, manufacturers so far pay different prices as reflected in their differing fleet averages and German manufacturers actually have a competitive advantage through lacking internalisation of environmental cost. The future regulation on CO_2 emissions for passenger cars partly removes historical distortion and therefore represents Case 1 as defined in the research protocol. Industry complaints regarding the policy reflect estimated sales price increases and assumed changes in relative competitiveness but have no relation to an increase in competition distortion from an environmental perspective. In order to completely eliminate competition distortion, a uniform standard is necessary.

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6.4 *Scanning Study on the Limiting Volatile Organic Compound, Solvents Directive (1999) and Product Directive (2004) with special focus on Chemical Sector*

By Florian Lux

6.4.1 Executive Summary

The Solvents Directive introduces limits on emissions from volatile organic compounds (VOC) due to the use of organic solvents at industrial sites. The Product Directive of 2004 adds product standards for paints, varnishes and vehicle refinishing products. Harmonization concerning the scope of the two directives is vital in order to cut administrative burden. The directives have a considerable impact on the chemical industry. One idiosyncrasy of the Product Directive is that a big part of the involved industry favors harmonized regulation, which allows for streamlined production processes, results in higher efficiency and increased opportunities for innovation.

6.4.2 Introduction

Volatile Organic Compound (VOC) emissions contribute significantly to the creation of tropospheric ozone. Although fuel combustion is the major source of VOC, the share of VOC emissions from solvents in lacquer, paint, and glue have increased in proportion since the early 1990s. Emissions from combustion and incineration have been addressed by air pollution policies and have been reduced significantly. This was made possible, for example, by the use of catalysts for internal combustion engines in cars. According to a technical report by the EEA significant decreases of non-methane volatile organic compounds emissions were recorded in the last 10 years.[22] In 1991, 23 countries signed a United Nations European Commission for Europe (ECE) protocol for reduction of VOC. Most states aimed at a 30% reduction in emissions by 2000 but there was no harmonized standard. As the technical limit to reduce VOC emissions from combustion at relatively low cost has been exhausted, it is interesting to look at other sources. According to a study issued in 2002 by DG Environment, the overall annual reduction of VOC in 2010 is estimated to be 279 Kilotonnes (CEC 2002).

[22] Atmospheric methane is the most common VOC generated by ruminants, wetlands and many other sources. It is excluded from the analysis here as the focus is on artificial VOCs.

Figure 23: Emission trends and changes[23]

Table 8 NMVOC emission trends (Gg) and changes (%) for the EU-27 Member States

NMVOC (Gg)	1990	1995	2000	2001	2002	2003	2004	2005	2006	Change 2005–2006 (%)	Change 1990–2006 (%)	Contribution to EU-27 in 2006 (%)
Austria	284	231	177	187	186	179	172	159	168	5	– 41	1.8
Belgium	359	311	245	250	237	231	205	153	150	– 2	– 58	1.6
Bulgaria	NE	NE	NE	NE	NE	NE	NE	147	159	8		1.7
Cyprus	14	15	16	16	16	16	12	11	11	– 7	– 22	0.1
Czech Republic	NE	NE	213	204	197	193	192	176	172	– 2		1.8
Denmark	170	159	127	120	118	113	114	114	108	– 5	– 36	1.2
Estonia	70	46	41	34	38	40	40	36	35	– 5	– 50	0.4
Finland	227	186	160	157	152	145	140	131	132	1	– 42	1.4
France	2 744	2 373	1 935	1 810	1 662	1 606	1 505	1 429	1 345	– 6	– 51	14.4
Germany	3 768	2 094	1 613	1 524	1 451	1 390	1 402	1 385	1 349	– 3	– 64	14.5
Greece	280	305	299	294	289	288	332	289	291	1	4	3.1
Hungary	205	NE	173	NE	NE	155	157	177	179	1	– 13	1.9
Ireland	114	105	76	73	68	64	61	60	59	– 1	– 48	0.6
Italy	2 032	2 023	1 544	1 456	1 346	1 299	1 263	1 207	1 159	– 4	– 43	12.4
Latvia	94	59	56	55	57	60	60	63	65	4	– 31	0.7
Lithuania	NE	NE	NE	NE	72	74	69	84	78	– 7		0.8
Luxembourg	17	17	12	12	12	12	12	11	10	– 5	– 40	0.1
Malta	4.2	6.3	1.8	3.3	3.7	3.6	3.8	3.9	3.8	– 2	– 10	0.0
Netherlands	NE	NE	NE	251	232	224	181	171	166	– 3		1.8
Poland	NE	NE	NE	NE	NE	585	896	885	911	3		9.8
Portugal	307	312	293	295	295	295	297	297	312	5	2	3.4
Romania	NE	NE	362	NE	NE	NE	NE	320	299	– 6		3.2
Slovakia	NE	NE	NE	NE	82	87	88	83	78	– 5		0.8
Slovenia	NE	NE	NE	NE	48	46	46	42	41	– 3		0.4
Spain	1 059	998	1 043	1 015	978	997	985	948	928	– 2	– 10	10.0
Sweden	373	268	220	208	206	207	203	200	195	– 2	– 48	2.1
United Kingdom	NE	NE	1 683	1 237	1 157	1 062	1 001	960	910	– 5		9.8
EU-27	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**9 543**	**9 313**	**– 2**	**NE**	**100**

Note: NE = not estimated/provided.

6.4.3 Set Standard

6.4.3.1 The Solvents Directive

Council Directive (1999/13/EC) on the limitation of VOC due to the use of organic solvents in certain activities and installations has been adopted in 1999. Its main purpose is to prevent or reduce the effects of VOC emissions from several sectors, which use solvent in stationary installations such as the printing industry, the distribution of fuels, the chemical industry, and a number of paint processing sectors. Full implementation of the Solvents Directive (SD) and existing national policies is expected to result in an emission reduction of 49% compared to 1990 levels (Decopaint, 48). Member States have to transpose the directive and assure that all installations comply with the emission limit values in waste gases, the fugitive emission limit values. Installations have to document their compliance to the competent authority, and receive authorization to operate as well as register for activities falling in the scope of the Directive. The SD defines a VOC by its vapor pressure. According to Annex I, the directive covers a broad range of industrial activities.[24] In Annex II A, thresholds and

[23] Source: EEA Technical report No 9/2008.

[24] Those include printing (3 categories), surface cleaning (2 categories), vehicle coating and refinishing, coil coating and other coating (metal, plastic, textile, fabric, film, paper, winding wire, wooden surfaces, leather), dry cleaning, wood impregnation, footwear manufacture, adhesive coating, manufacture of coating preparations, varnishes, inks, adhesives, rubber conversion, vegetable oil and animal fat extraction, vegetable oil refining and manufacture of pharmaceutical products.

emission controls for these activities are defined. The industry can apply standards by installing equipment to reduce emissions or by introducing a reduction scheme to arrive at an equivalent emission level. In particular this may be achieved by replacing conventional products, which are high in solvents, with low-solvent or solvent-free products. Solvents containing substances likely to have a serious effect on human health (carcinogens, mutagens, or toxic to reproduction) must be replaced, as far as possible, by less harmful substances in the shortest possible time.

Member States can apply more stringent requirements concerning authorization and registration than those laid down in the SD. This might be the case for industries also covered by the directive on integrated pollution prevention and control, the IPPC-Directive (96/61/EC recently codified Directive 2008/1/EC), or the National Ceilings Directive (2001/81/EC). Member States are obliged to report to the Commission on the implementation of the SD. The first reporting period covered the years 2003/2004. During this period, Member States made considerable efforts to implement the Directive, but only approximately 6% of installations were registered or authorized.

6.4.3.2 The Product Directive

The contribution of the decorative paints sector to total man-made VOC-emissions in the EU is roughly 4-5%, thinning and cleaning activities included. After implementation of the SD, the relative contribution of the decorative paints sector may rise considerably (Decopaint ii). VOC emissions from paints and lacquers have so far not been reduced significantly due to a high proportion of small-scale installations and the do-it-yourself sector. In 2004, a product standard for paints was introduced in order to tackle this problem. The SD in 2004 was amended by Directive 2004/42/EC, which limited VOC emissions resulting from the use of organic solvents in certain paints, varnishes and vehicle refinishing products. The Product Directive (PD) defines a VOC by its boiling point. It is based on Article 95 of the EC Treaty and seeks to harmonize the EU Internal Market. Annex I specifies a list of products that fall under the Directive. Annex II specifies the maximum VOC content such products can contain. Furthermore, the products must be labelled when placed on the market. Member States have a reporting obligation on implementation measures and a review study is carried out by Ökopol. It will be published in spring 2009, making a review of the PD possible in late 2009.

6.4.4 Implementation

Implementation of the two solvents directives has diverged in the different Member States. An analysis of the reports on implementation of the SD submitted by the EU-15 Member States has been published for the first implementation period (CEC 2006). The new accession states have not been included. However, voluntary reports from the Czech Republic and Slovakia have been submitted and were used as background information. For the second implementation phase, which concluded at the end of October 2007, such data is not available. Concerning the PD, a first Interim Report of the Ökopol study is available since February 2009. It uses the first implementation reports, Member States had to deliver in June 2008 and information stakeholders have provided.

6.4.4.1 Solvents Directive

Progress measured in terms of the numbers of installations registered and authorized has been made by some Member States during the first implementation phase of the SD. Gaps in the reported information make it difficult to draw firm conclusions regarding the status of implementation in a number of cases. Compliance data concerning breaches and penalties, compliance with emission limits, and the implementation of reduction schemes is not provided by all of the Member States. These cases of differing implementation or lack of compliance can create market distortion as illustrated by Case 2 in the research protocol (Member States remain below the European ideal) but further data is needed in order to assess the case more thoroughly.

A detailed analysis of costs for Member States associated with monitoring and overall implementation has not been included, but the topic should be introduced in future queries. If the cost of regulation in certain Member States is higher than in others, this could create lasting competitive disadvantages for some of the industries and would be a case of competition distortion as represented by Case 3 of the research protocol ("costly regulation"). Unfortunately, data, which would help to indentify such distortion is not available yet.

Furthermore, harmonization between Integrated Pollution Prevention and Control (IPPC) and VOC could lead to reduce overall reduction of administrative cost. The interaction of the SD and IPPC Directives is considered within the scope of the 2007 Commission's proposal for a Directive in Industrial Emissions that recasts the SD and six other existing directives related to industrial emissions into a single legislative instrument. It will simplify implementation and reduce unnecessary administrative burden. According to the Commission Communication, "Towards an improved policy on industrial emissions", benefits are estimated to total €105 to €255 million per year (CEC 2007).

6.4.4.2 Product Directive

Member States and stakeholders have reported implementation problems concerning the product category definitions, decorative paints and vehicle refinishing products. Other problems were related to the definition of 'buildings', the fact that protective coatings are not covered and an overlap of the SD and the PD. The Decopaint Study further points to the discrepancy between small enterprises and large ones. While large companies in the sector might be able to bear the losses resulting from the new regulation due to their economies of scale, small enterprises would bear a disproportionate share of the costs. In addition, smaller enterprises lack the resources to conduct the necessary research and Development (R&D) to develop VOC-free products or reduce VOC-Content of its products. Further data regarding implementation will be available in spring 2009, when the Ökopol report is published.

6.4.5 Industry Position

The European market for decorative paint is highly concentrated and has a strong tendency towards further concentration. "On average, the 4 to 5 largest paint manufacturers in any given European country produce over 70% of the total volume. The remaining 30% is shared by a great number of sometimes very small paint manufactures."[25] (Decopaint 216) The paint and coatings industry uses the largest amount of solvents out of all sectors. The average cost of reducing VOC content in paints is estimated to be between €387 and €563 per ton of VOC reduced. But reducing 279 Kilotonnes would bring annually health related benefits of €582 million (non-monetary benefits not included). Reducing VOC in paints could be done by switching from solvent based to water-based paints or by reducing the solvent content of existing water-based paints. Switching to water-based paints would generate an increase in costs due to more expensive inputs and additional R&D costs (Decopaint 217). In the final analysis, reducing the solvent content in existing water-based paints can be done easily in some cases, while in other cases it requires a significant technological shift and is therefore more expensive. Stricter regulation can lead to increased costs for the producers of solvents, paints and pharmaceutical products. However, it also offers a chance for optimizing production processes, especially for paint producers.

Most industry representatives, except most solvent manufacturers and certain resin manufacturers, welcomed the initiation of a product directive limiting the VOC-content of decorative coatings. Major producers of paint pointed to the existing production of low-solvent paint. Low-VOC alternatives for most traditional coatings were available but a lack in consumer demand and a lack of regulation

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[25] The split between large and small companies differs from country to country; in Italy for example small manufacturers have a larger market share than in other countries.

in many countries stopped them from aborting the production of high VOC-products. Therefore, the European Association of Paint Manufacturers (CEPE) was in favor of a unified European regulation in order to facilitate a minimization of the product range, i.e. reducing production of high-VOC paints, which could also increase efficiency and save costs (Decopaint 37).

Producers of highly specialized niche products with VOC-rich contents and the European Solvents Industry Group (ESIG) were skeptical concerning the implementation of the VOC Directive. ESIG is a joint activity of two sector groups of CEFIC (European Chemical Industry Council): OSPA (Oxygenated Solvents Producers Association) and HSPA (Hydrocarbon Solvents Producers Association). ESIG considered the benefits of the regulation in terms of ozone reduction as insufficient to justify the anticipated negative economic effects, which would include losing a huge part of their market once VOC-rich paints are outlawed (Decopaint 70). The European Solvents Volatile Organic Compounds Co-ordination Group (ES VOC CG)[26] points out that over the period 1990-2005 reduced solvents emissions have significantly contributed to a ground level ozone reduction. A small part of that has been done by decorative paints and complete elimination of solvents from decorative paints would therefore only result in a minimal reduction ground-level ozone which according to ES VOC-CG is "impossible to measure and hardly cost effective" (ES VOC-CG 2009).

Concerning a review of the PD, CEPE also argues that further reductions of VOC in decorative coatings and vehicle refinishes will not be possible without compromising on the performance of the products, leading to disproportionate socio-economic costs. CEPE is pressing EU officials to resist lowering VOC limits beyond those prescribed for 2010 under the PD (Coatings Comet 2008).

Further harmonization is needed in order to have a clear separation between the SD and the PD. The PD is most appropriate for painting operations in situ or on site where it is not possible to abate or capture emissions, such as private consumers painting their apartments. The SD doesn't address what is in the paint but aims to control emissions into the general atmosphere. This can be done in a factory setting by abatement or capture techniques and requires special equipment. Industry representatives have argued that it would clearly be unfair if some firms, whose volumes fell outside the solvent emissions directive, were then restricted to paint that complies with the product directive, while others were free to use a broader choice of paints or coatings on similar products (CEPE 2008). "To be covered by the emission Directive means that a manufactory has a higher flexibility in choosing products compared to a manufactory not covered by the emission Directive." (Ökopol 2009)

6.4.6 Conclusion

Common European emission regulations for VOC through the Solvents- and the Paints Directive have been a first step to harmonized EU-wide national regulations. However, a simplified and harmonized approach clarifying the scope of the two directives is vital in order to cut administrative burden and to create a level playing field. Existing provisions have to be implemented evenly and compliance is needed to prevent competition distortion. As paint producers have pointed out, a common European regulation could remove market distortion and create a demand for technically possible low solvent products. As this would lead to increased efficiency and reduced costs, this particular industry has a strong interest in harmonized regulation. The Product Directive aims at harmonizing and stabilizing the European regulatory situation, which notoriously has been characterized by widely diverging regulatory approaches to reducing VOC-emissions. The next review process will focus on providing clarity to industry, facilitating innovation and helping industry keep pace with regulatory requirements.

[26] ES VOG CG has been established by ESIG and incorporates producers and over 25 solvent user groups.

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6.5 *Scanning Study on the Water Framework Directive (2000/60/EC) with an Industry Focus on the Chemical Sector*

By Florian Lux

6.5.1 Executive Summary

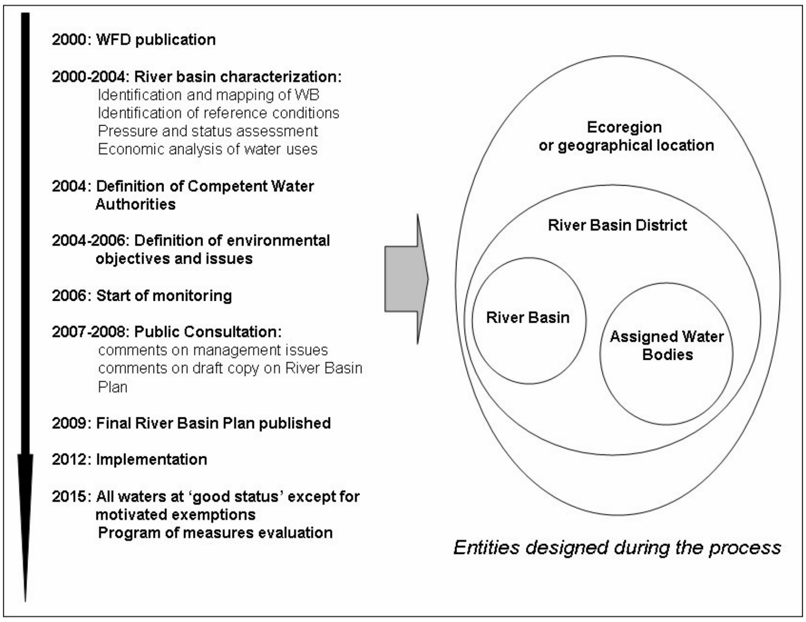
A new European water legislation framework leaving discretionary power to Member States might change competition conditions in the Single Market for the chemical sector and other important industry sectors, such as agriculture, hydropower, and navigation. Focussing on the chemical sector, this study seeks to identify areas in which differing transposition and implementation may impact on competition. Issues as the definition of good status and the application of economic evaluation leave a lot of room for diverging implementation and environmental standards. However, the processes are highly complex and implementation is only at an early stage, making it difficult to draw conclusions on specific outcomes or costs the chemical industry will have to bear.

6.5.2 The Water Framework Directive

6.5.2.1 Rationale and main objectives

The Water Framework Directive (WFD) entered into force in 2000 and is an operational tool to reframe European water policy. Starting from a more fragmented policy field with numerous relevant directives, the WFD introduces a holistic approach to water protection and management. It adopts a strong ecological focus in its definitions and stresses the notion of public participation for policy implementation. Introducing water pricing policies with elements of cost recovery and the cost-effectiveness, the WFD is applying economic instruments for the benefit of the environment. It sets out a plan to create hydrological units called River Basin Districts and to find innovative ways of participation in managing them. This approach takes notice of the internationality of ecosystems and requires transboundary cooperation between administrations. The WFD provides a combination of rules for protection of specific bodies of water and of a general requirement for environmental protection. Reporting from the Member States to the Commission is an essential part of the implementation. Therefore a Water Information System for Europe (WISE) has been established in 2002 to share information about new policy development and implementation.

Figure 24 Main steps and deadlines of the Water Framework Directive (WFD) implementation according to Steyaert/Ollivier (2007).



6.5.2.2 History of water legislation

Early community legislation in the field of water has appeared in the 1970s. A European policy concerning pollution caused by discharge of dangerous or hazardous substances in waters was introduced in 1976 by Directive 76/464/EEC. In 1991 the Urban Waste Water Treatment Directive (91/271/EEC) and the Nitrates Directive (91/676/EEC) concerning the protection of waters against pollution caused by nitrates from agricultural sources were adopted. The Urban Waste Water Directive is designed to reduce the pollution of freshwater, estuarine and coastal waters by domestic sewage and industrial waste water. It sets minimum standards for the collection, treatment and discharge of urban waste water within a certain timeframe. Then the Directive for Integrated Pollution and Prevention Control (96/61/EC)[27] and a new Drinking Water Directive (98/83/EC) with tightened quality standards followed in 1996 and 1998.

6.5.3 Standards set through the WFD

The WFD in its goal setting relies on rather broad definitions that leave a lot of leverage to the transposing member states. The concept of "good status" is rather abstract and has to be explained in more detail. The WFD is approaching water regulation in a holistic way and unites a broad range of protection levels reaching from a general protection of the aquatic ecology to a more specific protection of unique and valuable habitats, drinking water resources and bathing water. To embrace these manifold dimensions the WFD follows a twofold approach.

In relation to all surface waters, "good status" is defined as a case in which the values of the relevant indicators reflect human influence but "deviate only slightly from those normally associated with the surface body water type under undisturbed conditions" (2000/60/EC). For groundwater good status is defined as a state in which the groundwater resource is not exceeded by long-term abstraction and not subject to human alterations which would lead to a failure in achieving the environmental objectives for surface waters, a significant diminution of the water, or damage to the surface eco-system depending on the water (2000/60/EC).

[27] The IPPC Directive has recently been codified (2008/1/EC). It has not been changed in its substance and includes all previous amendments.

According to the WFD groundwater should not be polluted at all. Therefore direct discharge is prohibited and requirements are set for the monitoring of groundwater bodies. Quality standards for groundwater are not redefined but taken from existing legislation (nitrate, pesticide and biocide directives). In 2006, however, the European Parliament and the Council in accordance with Article 17 of the WFD adopted Directive 2006/118/EC, the Groundwater Daughter Directive (GDD). The GDD establishes EU-wide quality standards for nitrates and pesticides that must be met to comply with good groundwater "chemical status".

"Good chemical status" is defined in terms of compliance with Environmental Quality Standards (EQS) established for chemical substances at European level. This more specific approach can then be applied on local, regional or national level. A mechanism for prioritizing hazardous chemicals is also introduced in order to ensure at least minimum chemical quality.

The WFD sets out a strategy against water pollution in Article 16. For the translation of the broad concept of "good status" into standards and limits the WFD relies on current legislation such as the Dangerous Substances Directive (76/464/EEC) during a transitional period until 2013. But newer Directives have to simplify the large amount of existing legislation. In 2006, a new proposal on surface water protection was adopted by the Commission and set limits for 41 dangerous substances in total. In October 2008, Parliament and Council agreed on the proposal and issued a daughter directive on environmental quality standards in the field of water policy (PE-CONS 3644/08) that includes a list of 33 dangerous substances of which 20 have defined maximum concentration levels to be reached by 2018. 13 priority hazardous substances will even have to be phased out within 20 years[28].

Water pricing

The WFD also obliges member states to install a water-pricing policy system. The policy shall serve as an incentive for efficient water usage and as a mechanism to recover the cost for water services, including environmental services and resource uses. Cost recovery has to be based on the polluter pays principle and take social, economic and environmental effects into account (Correlje et al. 2007). The WFD reacts with the integration of water pricing to the lack of such provisions in some member states. The obligation to design measures on full-cost recovery supports the application of economic instruments where they are not yet applied their tightening where they are already part of national water policy.

The water-pricing policy system effectively requires the introduction of market-based instruments to national water policy. The first step to installing water price system requires an economic analysis, an analysis of the financial as well as environmental cost recovery, and an analysis of possible incentives for water pricing of identified river basins (EEB 2006).

Ideal Standard of the WFD

The WFD at the one hand defies an ideal standard by introducing a number of qualitative goals to be determined by the Member States. At the other hand, it sets a number of bottom line measures by drawing on existing legislation that sets limits for a number of discharges.

6.5.4 Implementation and possibilities for distortion

Member States have discretionary powers in many crucial areas concerning transposition and implementation of the WFD, such as economic assessment, water pricing and the setting of standards. These could eventually impede harmonised regulation and therefore distort competition[29]. In the

[28] The new directive in total repeals five existing directives.

[29] On the other hand certain elements of the WFD imply harmonization and concerted action, which counters market distortions. The River Basin approach for example requires international cooperation between Member States on the level of transposition and implementation.

following some areas of possibly diverging implementation and therefore possible market distortions shall be identified and discussed.

6.5.4.1 Assessment of status of groundwater

Criteria for the assessment of the chemical status of a body or a group of bodies of groundwater are defined in Article 3 of the Groundwater Daughter Directive (GDD). Besides the pollutants for which standards are set out in Annex I, Member States have to establish threshold values for the at least the pollutants listed in Part B of Annex II of the GDD. They furthermore should establish threshold values for all pollutants and indicators of pollution, which could endanger "good chemical status" of bodies or groups of bodies of groundwater. The first implementation phase ends on 22 December 2008 and a report based on the information provided by Member States will be published by the Commission by 22 December 2009. Whether the different definitions of groundwater "chemical status" can create competition distortion for the chemical industry has to be found out when implementation is advanced.

6.5.4.2 Disproportionate cost

According to Article 4 setting environmental objectives Member States can extend the deadlines or aim to achieve less stringent environmental objectives under certain conditions. The WFD aims at achieving "good status" in all European waters until 2015, but the deadline may be extended to 2021 or 2027 if the conditions in Article 4 (4) are met. Preconditions are that no further deterioration occurs in the water body and that the deadline extension must be included in the management plan. Members States can in addition to that aim at lower objectives if it is not possible to achieve the parameters for technical, natural reasons or if it is disproportionately expensive. That refers to an assessment of benefits and costs in qualitative and quantitative terms. The practical interpretation of disproportionate cost remains disputed and official procedures have not been fixed yet. A full cost-benefit analysis of groundwater protection is limited by the lack of availability of economic data and by methodological problems. The comparability, transferability and completeness of findings are not assured.

Water Pricing

Another point of contention also in the field of economic assessment is the introduction of economic instruments to internalize the price of pollution through water pricing. According to Article 2 (38) of WFD "water services" are "all services which provide, for households, public institutions or any economic activity: abstraction, impoundment, storage, treatment and distribution of surface water or groundwater, waste-water collection and treatment facilities which subsequently discharge into surface water."

But eleven Member States limited the definition to public drinking water supply and waste water treatment or collection, thus exempting environmentally problematic infrastructures (dams, dykes and weirs for hydropower, navigation, agricultural irrigation and flood defence) from economic assessment. If Member States do not provide comprehensive economic information about the industrial and agricultural use of water the private households have to pay a bigger share of the costs needed to provide the water. This implementation difference might create market distortions giving businesses working in those eleven countries a possible advantage over other firms having to bear the additional cost through internalisation.

It would be a market distortion as defined by case 2 in the research protocol (Member States stay below "ideal" of resource use) as environmental resources remain to be subsidised. If that also applies to the chemical sector and in what way has to be found out. However, availability of water resources is of crucial importance for the chemical industry. Most big units are along rivers and therefore directly touched by water policy. Flood protection is also a major issue for chemical plants.

Other sectors touched by this policy as hydropower and navigation are also closely linked to the chemical industry, which is energy intensive and transports huge amounts of products by water.

6.5.5 Compliance

According to Article 5 of the WFD Member States for each river basin district or their share of an international river basin district have to provide an analysis of its characteristics, a review of the impact of human activity on the status of surface waters and on groundwater and finally an economic analysis of water use.

According to a Commission communication of 2007 on the first stage of implementation of the WFD, transposition of the directive into national law is still inappropriate. Most Member States failed to transpose the WFD “in full conformity”. 19 Member States were identified to have serious shortcomings regarding implementation of Article 4 (Environmental objectives), 9 (Recovery of cost for water services) or 14 (Public Information and consultation) of the WFD. Furthermore Article 4.7 concerning new modifications and developments, which affect the water environment (new hydropower plants or new industry allocations in pristine areas) is often not transposed which creates legal uncertainty for project developers.

The Commission launched eleven infringement cases (against Belgium, Germany, Finland, France, Italy, Luxemburg, the Netherlands, Portugal, Finland, Sweden and the United Kingdom) and the Court of Justice ruled against five Member States for not communicating transposition of the WFD (Belgium (C-33/05), Luxemburg (C-32/05), Germany (C-67/05), Italy (C-85/05) and Portugal (C-118/05)). Three Member States seem to have an overall satisfactory transposition (Austria, Malta and Portugal).

6.5.6 Industry

The European Chemical Industry Council (CEFIC) takes part in the process of developing manageable strategies for implementation of the Water Framework Directive. The chemical industry’s interest is to maintain a scientific, risk-assessment approach to controlling emissions and to minimising the number of substances for which emissions are banned on the basis of their inherent properties. Special focus lies on the phasing out of hazardous substances and the cleaning up of contaminated groundwater. Within the list of priority substances of the WFD there are some high production volume chemicals, including chloroform and dichloromethane, as well as certain by-products. Euro-Chlor and ECSA are promoting the successful voluntary programme run by the chlor-alkali industry, which reduced emissions of chlorinated solvents by more than 80 % over the last 15 years.

6.5.7 Conclusion

As the WFD is in its early stage of implementation it is difficult to assess the possible economic effect differing transposition and implementation could have on the chemical sector. However, by explicitly introducing qualitative goals in relation to river basins to be defined by the MS and subordinating industry emissions to these goals differing standards within and between MS seem to be “built into” the WFD. The process of implementation gives further leverage to the Member States, in relation to the economic assessment of water resources. Diverging implementation of the provisions may lead to competition distortion for some of the chemical industries”. Besides the diverging implementation compliance is far from being achieved and uneven implementation might subjugate some industries to new regulation earlier than others.

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6.6 *Scanning Study on Integrated Pollution Prevention and Control (IPPC) – The Case of Large Combustion Plants*

By Rüdiger Haum

6.6.1 Executive Summary

This case study investigates whether more uniform environmental standards of the Integrated Pollution Prevention and Control (IPPC) would in the future remove competition distortions for the electricity industry. It takes the large combustion plant sector with a focus on electricity generation as an example. The IPPC directive is currently under revision and will replace the Large Combustion Plant Directive in the near future, which currently regulates large combustion plants. The study finds that environmental standards for large combustion plants vary between member states leading to different cost for internalising environmental externalities. From the point of view of the Single Market, a more uniform standard would be clearly preferable to avoid distortions of the growing market for electricity. Introducing unified, binding standards, which is currently suggested by the EU commission, in the future IPPC directive is an attempt to remove historical market distortion leading to an undistorted market.

The case study is a focused analysis of the current discussion on the revision of the IPPC directive and its extension on Large Combustion Plants. Given the current discussion on the policy proposal it is based only on a secondary analysis of public available documents, while new data based on interviews is not gathered. The case study does not offer an overall assessment of the IPPC revision, but instead demonstrate the feasibility of a targeted analysis with a focus on the impacts of the planned regulation on potential or existing market distortions.

The study clearly demonstrates the need for more uniform environmental standards, given the variation of environmental standards in the Member States and the growing European market for electricity.

6.6.2 Introduction

Within the project "The Single Market and the Environment" competition distortion was defined a situation in which different companies are competing in the same market under different conditions. From the perspective of environmental economics competition is distorted if companies show differences in the degree of the internalisation (bearing the cost) of environmental externalities (polluting the environment) caused through differing implementation of EU policy in EU Member States (MS).

Accordingly, European Environmental Policies have the potential to contribute significantly to remove competition distortion by levelling the playing field and removing market distortions. An important cornerstone in this regard is the IPPC directive. Council directive 96/61/EU sets up EU legislation on Integrated Pollution Prevention and Control (IPPC). IPPC aims at minimising pollution from various industrial sources. The annex to the directive lists a number of industries, industrial activities and the main pollutants covert by the directive. Industries include energy, metal production and processing, mineral, chemical and waste management. Additional industrial activities comprise a number of farming activities, tanning, pulp and paper production, as well as surface treatment with organic solvents. The EU estimates that 52.000 industrial production sites are subject to IPPC regulation. Under IPPC regulation, plants must apply for permits to begin (or continue) production. The IPPC directive is currently under revision after a two-year review process and it is planned that it will include large combustion plants thereafter.

The IPPC directive was chosen as a case study because it is a central directive to EU environmental policy and the literature review revealed that EU Member States implement the directive differently with effects on competition (Rave/ Triebsewetter 2007). The large combustion plant sector with a focus on electricity generation was chosen because emission standards are not yet harmonised and intra EU trade in electricity is expected to grow in the future. Considering the IPPC directive from the perspective of competition distortion taking large combustion plants as an example means effectively considering the transition process from an LCP regime towards a future IPPC regime. The case study is carried out by literature and document analysis. The aim of the case study is therefore to contribute to the discussion in how far a future IPPC can avoid competition distortion in light of the historical development of the implementation of IPPC directive and LCP directive.

The following case study is therefore organised accordingly. I will firstly discuss the features of the IPPC directive including goals, ideal standard and MS leverage in implementation. I will secondly discuss in how far member states have implemented the directive differently on a general level, not related to large combustion plants. Thirdly, I will introduce the LCP Directive and briefly discuss how it has been implemented within MS. I will then discuss the cost of the transgression from LCP Directive to IPPC Directive in the electricity sectors taking Germany and Poland as an example. The countries were chosen because they have a considerable variation in the distance to target. This discussion includes a consideration in how far differing cost might affect the trade of electricity. Fifthly, industry reactions to the IPPC Directive on the EU and the Polish level are discussed. The case study ends with conclusions as to whether differing "switching" cost for Poland and Germany represent a case of competition distortion or not.

6.6.3 The IPPC Directive

The IPPC directive aims at preventing or minimising pollution from different industrial production processes. The IPPC Directive came into force on 30 October 1996. It contains a transposition deadline for new and substantially changed installations by 30 October 1999 and for existing installations by 30 October 2007.

IPCC is based on four principles: integrated assessment, best available techniques (BAT), flexibility, and public participation. The integrated approach requires that industrial production sites must consider pollution of different media (air, water, etc.). Industrial installations addressed by the directive are required to obtain authorisation (in form of permit or licence) from the responsible regulating authority in the MS of operation. The BAT approach suggests installations to demonstrate that they work the best available technologies and processes. The IPPC directive is applicable to existing as well as to new industrial installations. The principle of flexibility allows regulators to consider the technical characteristics, as well as local environmental and geographical conditions. It will be discussed in depth in the following. Public participation aims at ensuring that the public may access permit procedures and monitoring results and may participate in the licensing process.

IPPC is a traditional command and control instrument including some flexibility. However, IPPC so far does not allow for other instruments (e.g. market based instruments) with which some MS might have previously regulated a certain sector (Farmer / ten Brink 2004).

The IPPC directive does not contain binding environmental protection standards or emission limits. Article 3 of the directive prescribes a number of basic obligations to which operators of relevant installations have to adhere to in order receive a permit:

take appropriate preventive measures against pollution, especially through BAT

- to cause no significant pollution
- to avoid the production of waste
- to use energy efficiently
- to undertake measures to prevent accidents

- the necessary measures are taken upon definitive cessation of activities to avoid any pollution risk and return the site of operation to a satisfactory state

Whether or not operators of industrial facilities sufficiently do justice to IPPC obligations has to be determined through the authorities of the MS within the permit process. In practice, the application of best available techniques in new and currently operating industrial production sites is the ideal standard favoured the EU commission. This indicated indirectly in the ambition of the EU to introduce measures to a future, revised IPPC directive giving incentives to reduce emissions beyond the standards set by IPPC directive. The standard referred to in this context is BAT (DG Environment 2007).

6.6.3.1 The Permitting Process

Operators of plants apply for permits at designated national authorities. The applications must contain information of the activity, material and energy input as well as output, emission sources, condition of installation, nature and quantity of emissions to all media, technology and techniques applied to prevent and reduce emissions, waste reduction measures, and monitoring measures.

The IPPC directive does not require that permits are based directly on BAT but they contain emission limit values (ELVs) based on BAT. The national authority then decides whether the ELV's suggested by the operator are in accordance with the principles of the directive. Article 9 (8) of the IPPC allows member states to decide whether specific requirements for plants become binding rules for all licence applications or are decided on a case by case basis.

6.6.3.2 The Concept of Best Available Technique

The notion of BAT is central to IPPC as they provide the basis for ELVs. The directive requires that ELVs should be based on BAT, however "without prescribing the use of any technique or technology". When determining BAT, authorities may take into account the technical characteristics of the installation, its geographical location and local environmental conditions effectively granting considerable leverage to MS.

The directive also provides the definitions of the terms "best" and "available". The term "best" is defined as "most effective in achieving a high general level of protection of the environment as a whole". The term available is defined as "developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator" (EC/96/61).

Although the concept of BAT as defined in the directive does not relate to a "universally" optimal set of technologies (at a given time) the IPPC bureau publishes so called BAT reference documents (BREFs) for individual industry sectors containing best available techniques. The BREFs are results from expert working groups co-ordinated by the European Commission. National authorities are obliged to be informed about recent development of BAT (O'Malley 1996).

hence, the IPPC directive does not define an ideal standard. It contains a number of qualitative goals leaving the decisions about quantitative emissions and the underlying technologies to the MS. The directive suggests however an ideal technology standard through the publication of the BREFs.

6.6.3.3 National Leverage in Implementation

There is substantial leverage for the implementation of the IPPC directive. Member States determine emission levels of plants and whether BAT are considered when setting emission levels, they set up the permitting process, and they can decide as to whether to establish generally-binding, industry-wide rules for granting permits or issue permits on a case by case basis.

As Sorrel points out, inclusion of economic considerations in determining BAT leads not only to substantial difficulties in determining BAT on a plant level but also opens the possibilities to substantial national and regional variations as to what constitutes BAT. BAT becomes co-determined through the outcome of negotiation processes over cost-benefit estimations between regulating authority and permit applicant (Sorrel 2002).

6.6.3.4 Implementation in Member States

Differences in implementation fall into two categories. The first category relates to the scope of implementation and includes whether or not the IPPC directive has been transposed in to national regulation and the number of total permits to industry issued.

The deadline for transposition was October 1999 and the final deadline for full compliance with the IPPC directive was October 2007. According to the EU IPPC implementation report the transposition of the IPPC Directive was considerably delayed as all EU 15 Member States had achieved transposition by the end of 2004 only (EC 2005). The EU also reports a strong variation between member states regarding the percentage of expected licences and outstanding licences. While France, the UK and Malta have issued 100 per cent of relevant licences countries like Greece and Slovenia have between 35 and 40 per cent of their licences missing (EC 2008).

Countries like France, Sweden, the UK and Germany had only to undertake minor changes in their existing their permitting system as it was already based on integrative considerations of plants. Portugal, Poland, Greece and Spain had to develop new permitting systems and underlying legislation partly explaining delays in transposition (EC 2005).

The second category of difference relates to the variation in implementation or in how far MS used their leverage in designing national IPPC regulation and processes. A number of studies treat this issue extensively but generic. No specific references to large combustion plants are made. The following aspects are considered the existing IPPC implementation literature:

Generally binding rules: The IPPC directive allows MS states to establish generally binding rules (GBRs) in the assessment of installation permits. The LDK-ECO report on IPPC implementation for the period 2000-2002 in the EU 15 MS concludes "at least 8 Member States had established general binding rules, most commonly in the form of legislative orders, for various industry sectors". These are Austria, Belgium, Denmark, France, Germany, Spain, Sweden, and The Netherlands (LDK-Eco 2004). A subsequent study on the use of GBRs in the EU 27 MS finds that 16 out of 27 MS states use GBRs in relation to the IPPC Directive. They use GBRs in a wide range of sectors covered by the IPPC directive but not necessarily in all sectors to establish ELVs. The IPPC Directive has however not been the driver to establish GBRs. They have been in place before IPPC implementation. Also, only in some of the MS knowledge on BAT either trough BREFs or other sources is used to establish the GBRs. Also, the inclusion of BAT through GBR revisions is a time consuming process delaying the BAT integration process. In practice, many permit issuing authorities use GBRs in a flexible manner and require more stringent as well as less stringent standards in issuing permits (VITO, AEA, and LEIA 2007)

Determination of ELVs in relation to BAT: Rave and Triebswetter state that MS authorities differ regarding the consideration of economic aspects when determining BAT in Germany, the UK, Italy and Luxembourg. German and Luxembourgian authorities generally do not include cost consideration when determining BAT. UK authorities explicitly include cost considerations in their case-by-case approach to determine BAT. Italy follows a mixed approach (Rave and Triebswetter 2007).

Distance of existing regulatory administrative processes to administrative processes required by IPPC integrated permitting approach: Roughly half of the MS had a permitting system installed that included an integrated permitting process. Half of these MS relied on BAT. The remaining MS states had permitting procedure not based on an integrated approach and hence had to make a stronger effort to install the IPPC integrated emission procedure (ENTEC 2007). In France, the UK and Germany the permitting process is well established and competences of different authorities clearly defined. In Spain, Italy and Poland administrative routines are not that well-established and competencies between national and local authorities defined not as clearly leading to delays in the permitting process as well as "frustration" on the side of the applicants. For all countries lack of sufficiently trained administrative staff in the permitting as well as for plant monitoring is reported (Bohne 2006).

Different licensing procedures: Member states have chosen different rules for issuing licences. These differences in rules include e.g whether one permit per installation is issued or permits for parts of installations are issued or whether various installations at one site need various or one permit. Also, differing interpretations of what constitutes a single installation exist (ten Brink/ Farmer 2004).

Duration of permitting procedures: Further differences between Member States exist regarding the duration of permitting procedures, reporting requirements, permitting fees, as well as inspections and enforcement (IEEP and Ecologic 2006; Bohne 2006).

Different levels of permitting fees: According to Rave and Triebswetter, permitting fees vary between MS. The range is from 2.000 € (France) to 22.400 € (UK) (Rave and Triebswetter 2007).

From the perspective of competition distortion the review of the IPPC implementation literature reveals that MS have considerable scope in implementing IPPC directive as the BREFs are rather suggestions than binding. MS have used this scope and implemented the IPPC directive differently regarding environmental goals but also regarding administrative procedures. We can therefore assume that differing implementation cost in MS occur because of differing environmental internalisation cost but also through differing administration cost.

6.6.4 The Current Revision of the IPPC Directive

The IPPC directive is currently under revision following a two-year review process. The review process consisted of numerous review studies as well as a stakeholder consultation and a lead to five main areas of concern for the EU commission (Wenning 2008):

1. Insufficient implementation of BAT
2. Limited compliance enforcement and environmental improvements
3. Unnecessary bureaucratic burden
4. Insufficient scope and unclear provisions
5. Constraints on using flexible instruments

As a reaction, the EU Commission suggests to turn the emission levels contained in BREFs into compulsory minimum emission levels that must be achieved by industrial installations to obtain a permit. Derogations will be allowed, however. Also, the EU commission suggests to introduce minimum provisions on inspections[30], review of permit conditions,[31] annual reporting on compliance by the operator. To reduce the administrative burden the revision shall reduce reporting requirements by MS, simplify the use of GBRs, change the rules regarding unified and single permits. To improve the environmental scope, the EU commission suggests including a further number of industrial activities in IPPC regulation and clarifying the relation of IPPC for some already regulated industries. With regard to flexible instruments, the EU Commission suggests further research on the subject (Wenning 2008). The revision proposal also includes the removal of cost efficiency considerations in the event that new less polluting BAT technology materialises.

[30] At least 1 inspection every 12 months unless programmes are based on a systematic appraisal of the environmental risks.

[31] Permits must be reconsidered every four years and might be updated to reflect changes in BAT as contained in BREFs.

As we will see further down, the issue of considering BAT is the most contested issue between EU Commission and industry. The EU commission considers the diffusion of BAT within the different industrial sectors as unsatisfactory and therefore intends to make the BAT based permits compulsory in licensing processes. The main reason for the unsatisfactory uptake of BAT is in eyes of the Commission is insufficient consideration of the BREFs and a disproportionally high use of flexibility by competent authorities during the permitting process (CEC 2007: 20). It is planned to transpose the revised IPPC directive fully in 2012 and all subjected installations must meet Directive's requirements by 2016.

6.6.5 Large Combustion Plants

A large combustion plants is defined as a technical apparatus in which fuels are oxidised in order to use the heat thus generated (EU 2009).[32] The revised IPPC directive will exclusively regulate large combustion plants of more then 50 MW generation capacity including power plants, petroleum refineries, iron and steelworks and other industrial processes . The LCP BREF was already published in 2006. It includes BAT related emission levels (AELs) that are generally expressed as flue gas pollutant concentrations for air pollutants. Until the end of the IPPC revision and its transposition, large combustion plants are officially regulated by IPPC and LCP directives. The integration of the LCP Directive in the IPPC Directive is meant to set an end to both directives being relevant. How these two directives related to each other could not be clarified as no interviews were carried out.

Considering the belated publication of the BREF and the transposition deadline of the IPPC it is unlikely that permitting processes for large combustion plants have yet considered IPPC BAT standards (EEA 2008). This means that in practice so far the Large Combustion Plant Directive (LCP) has exclusively regulated the emissions for large combustion plants. The directive sets ELVs for SO2, NOx and particulate matter (PM). The LCP directive is a daughter directive to the Air Framework Directive (84/360/EEC).

The proposed revision of the IPPC directive includes the recasting of seven other directives including the LCP directive.[33] Effectively, the recast in relation to the IPPC directive would mean that large combustion plants would be licensed exclusively under the IPPC directive in the future. Integrating LCP Directive into a revised IPPC directive would also mean, in case the currently proposed but still negotiated revision will get adopted, that large combustion plants would have to operate on BAT based emissions limits. The current EU Commission proposal for a revised IPPC directive would make BAT binding and limit exceptions.

Any discussion of competition distortion in relation to large combustion plants must therefore consider the status quo of the LCP directive and the possible effects of a transition to the IPPC regime.

6.6.5.1 EU Ideal Standards

The EU ideal standard would be BAT based ELVs as outlined in the BREF for large combustion plants. A complete overview is given in the appendix. In addition to the general amendments of the IPPC Directive the Commissions plans to clarify the definition of existing plants in the LCP Directive by requiring a "common stack approach" when issuing permits (see section further down).

[32] europa.eu/scadplus/leg/en/lvb/l28028.htm

[33] The EU Commission defines recast as "similar to codification in that it brings together, into a single new act, a legislative act and all the amendments made to it or a legislative act and related acts. Unlike codification, however, recasting involves new substantive changes, as amendments are made to the original act during preparation of the recast text. As for a codification, a recast can be either vertical or horizontal. The new act passes through the full legislative process and repeals all the acts being recast (DG Environment 2008).

6.6.6 The Large Combustion Plant Directive

The directive differentiates between two types of plants: new plants and existing plants. All plants licensed between July 1987 and 2002 must meet the LCP Directive standards. Plants licensed after 2002 have to achieve more stringent ELVs. These to cases are referred to as new plants. Plants licensed before 1987 (referred to as existing plants) have either to achieve the emission limits for pre-2002 plants or become part of a national emission reduction plan (NERP) that contains national, overall emission reduction targets rather then regulating each plant individually.

The decision whether pre-1987 plants have to all achieve LCP standards or become part of a NERP is left to Member States. Nationally specific emission targets are set in the directive. While the setting of ELVs is a classic command and control instrument adopting a NERP gives flexibility to MS as it does not require emission reductions of each plant but leaves the achievement of reductions to each MS (Eames 2000)

The compliance date for existing plants was first of January 2008. Also, existing plants can opt out from achieving LCP standards or inclusion on NERP on the condition that it will operational for no more then 20.000 hours between 2008 and 2015. Member States are allowed to set more stringent standards.

The emission standards from the LCP Directive are summarised in the appendix. There are a number of derogation rights for newly ascending countries, which are also summarised in the appendix. The LCP Directive sets minimum obligations, which are not necessarily sufficient to comply with the IPPC Directive.

6.6.6.1 The Relation Between the IPPC Directive and the LCP Directive

The BREF ELVs for LCP have upper and lower bands that are in all cases more stringent then the ELVs required by the LCP directive. The following table gives on overview of selected ELVs for illustration purposes. The complete list of ELVs can be found in the appendix.

Table 20: Comparison of selected IPPC and LCP Standards

Pollutant	Fuel type	Plant type	Plant Size	LCP	IPPC
SOx	Solid	New	50-100 MW	850	200 - 400
			100 – 300 MW	200	100 - 200
			> 300 MW	200	20 - 150
NOx	Liquid	New	50-100 MW	400	150 – 300
			100 – 300 MW	200	50 - 150
			> 300 MW	200	50 - 100
Dust (PM)	Solid	New	50-100 MW	50	5 -20
			100 – 300 MW	30	5 – 20
			> 300 MW	30	5 – 10

Sources: Entec 2005 and EC 2006

The European Environmental Agencies estimates that applying the stricter ELVs to the 450 largest combustion plants in Europe could reduce NOx emissions by 87 per cent and SOx emissions by 96 per cent (EEA 2008).

6.6.6.2 Differing implementation of LCP in Member States

From a competition distortion perspective it has to be asked how the LCP directive is currently being implemented in MS and whether a transition to the proposed IPPC BAT standards would impose differing cost to industry in different MS.

National ELVs

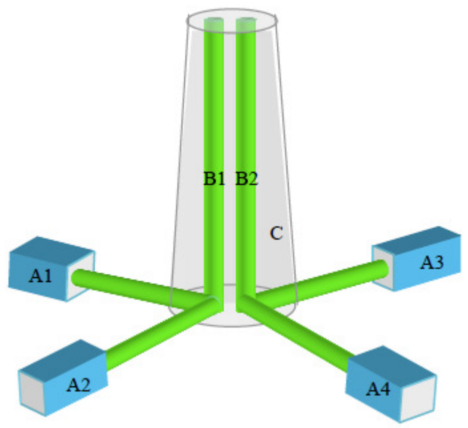
The LCP directive includes a number of derogation allowances for the new ascension states. The countries with the most extensive derogation allowances, as well as the only countries with derogation allowances beyond 2008, include Estonia, Lithuania and Poland. Poland has, by far, the greatest number of plants with derogation allowances (ENTEC 2005).

Further variation in implementation is facilitated through the status of emission limits set by the LCP Directive are minimum standards. MS are free implement more stringent emission limits. Eames reports in 2000 a "significant degree of over compliance" with regards t the LCP Directive (Eames 2000: 5). A comprehensive review of the LCP Directive carried out in 2005 reports similar findings. Some countries that choose to implement ELVs for existing and new plants have imposed more stringent standards then required by the LCP. They are Austria, Finland, France, Germany, Italy, Sweden, and Czech Republic for existing plants. Austria, Finland and Germany have set more stringent ELVs also for new plants (ENTEC 2005). On overview on the differing stringency is given in the appendix. The ENTEC study however excludes countries that chose to implement a NERP for existing plants (Czech Republic, Finland, France, Greece, Ireland, Netherlands and the UK).

Differing interpretation of "existing plants"

One aspect of the LCP Directive that has been implemented within MS with considerable difference is the notion of an "existing plant". MS have interpreted the notion of "existing plant" as boiler, flue or common stack. Interpretations of "existing plants" as boiler subject each boiler with 50 MW or more generation capacity of plants with multiple boilers separately to the directive. ELVs are then determined for each boiler separately. A flue is a "compartment or division of a stack for conveying the combustion gases from the boilers to the outside air" (Entec 2007:i). "Flue" interpretations add the capacity off all boilers under a flue before subjecting it to IPPC regulation and ELVs are determined on aggregate capacity. A stack is an industrial chimney comprising one or more flues. Under the common stack approach all boilers directing their exhausts to one common stack would be aggregated to an overall thermal capacity. The common stack approach is the correct interpretation of "existing plant" according to the EU Commission. The differing interpretations are rendered in Figure 25.

Figure 25: Possible definitions of combustion plant



Where:

A = Boilers with A1 and A2 each having a capacity of 40MWth and A3 and A4 each a capacity of 210MWth.

B = Flue in this example B1 having a capacity of 80MWth and B2 a capacity of 420MWth

C = Common Stack in this example being a capacity of 500MWth

Source: Entec 2007

The differing interpretations lead to differing implementations of the Directive and resulting differences in ELVs and compliance cost. A common stack approach increases the emission reduction requirements as aggregated capacity increases the ELVs (Entec 2007).

For example, an installation consists of four boilers of which three have a capacity of 15 MW and one of 17 MW. According to the boiler approach none of them would be regulated under the LCP and the IPPC directive. Under the common stack approach they would have to achieve emission limits for 50 KW installations, as the aggregated capacity is 62 MW.

Although it was not possible to establish for all MS which approach they had chosen, differences emerge between countries (see Table 21).

Table 21: Approaches to definition of existing plant

Country	Approach
Austria	Common stack
Belgium	Boiler
Cyprus	?
Czech Republic	Common stack
Denmark	Common stack
Estonia	?
Finland	Common stack for new plants, variable for older
France	Boiler
Germany	Flue
Greece	?
Hungary	?
Ireland	Boiler
Italy	?
Latvia	?
Lithuania	Common stack (except old oil refineries)
Luxembourg	?
Malta	N/A
Netherlands	Common stack
Poland	Boiler[34]
Portugal	?
Slovakia	Common stack
Slovenia	Common stack
Spain	Common stack
Sweden	Plant = installation
UK	Boiler (common stack planned)

Source: Entec 2005

Unsurprisingly, adopting an overall common stack in all EU countries for all plants would tighten emission standards and require some plants to upgrade technology or change production processes. 85 per cent plants meet the emission limits for SO2 under a boiler approach but only 63 per cent under a common stack approach. The figures for NOx and PM are 75 vs. 69 per cent and 77 per cent vs. 55 per cent respectively. The differences widen when related to the IPPC BAT standards as listed in the BREF. Only one per cent of installations would currently meet the emission requirements for SO2, 10 per cent for NOx and 19 per cent for PM if the lower end of the BAT based ELVs are considered (Entec 2005: vi). We can assume that countries with a boiler approach will have higher compli-

[34] Accession Treaty emission ceilings for the Polish LCP sector have been calculated on the basis of average emissions forecasts for the Plant=stack definition.

ance cost (ceteris paribus) under a revised IPPC regime then countries that have chosen a common stack approach.

Interpretations of individual boilers and flues as “existing pants” obviously stay below the EU ideal of the common stack approach. Possible lower environmental compliance cost through alternating interpretations and ensuing less strict emission limits are a case environmental subsidy. There are however no studies on how mentioned different interpretations translate into differing cost on a MS level.

6.6.7 Cost for industry for LCP – IPPC transition

The differences in implementation summarised in the previous section suggest that cost to industry differ between MS and competition might be distorted. Rave and Triebswetter assume that seven aspects of differing implementation might produce differing cost to industry (Rave and Triebswetter 2007):

1. Differing efforts to change administrative procedures towards integrated permitting procedures
2. Differing administrative structures and resources
3. Different levels of stringencies and regulatory quality
4. Different frequency and regularity of inspections
5. Differing flexibility regarding BAT
6. Differing considerations of economic aspects in BAT
7. Other administrative differences (fees, reporting requirements, etc.)

However, these points are theoretical. The literature has established that implementation does differ but very few studies have tried to associate differing implementation with costs to the regulated industry. The only exemption being the cost for BAT, which are included in some of the BREF documents. However, the cost defined in BREF documents can merely serve as indicators as actual compliance cost on the plant level depend on a number of variables like plant size, pant age, investment cycle, skills of operating staff etc. (Hitchens et al. 2002).

6.6.7.1 Environmental Compliance Cost

There are however cost estimations for environmental compliance cost. A cost-benefit analysis for the application of overall BREF based BAT lists compliance cost (see Table 22).

Table 22: Additional costs (Euro Million/yr) resulting from the implementation of IPPC BAT AELs at the lower and upper end of the range.

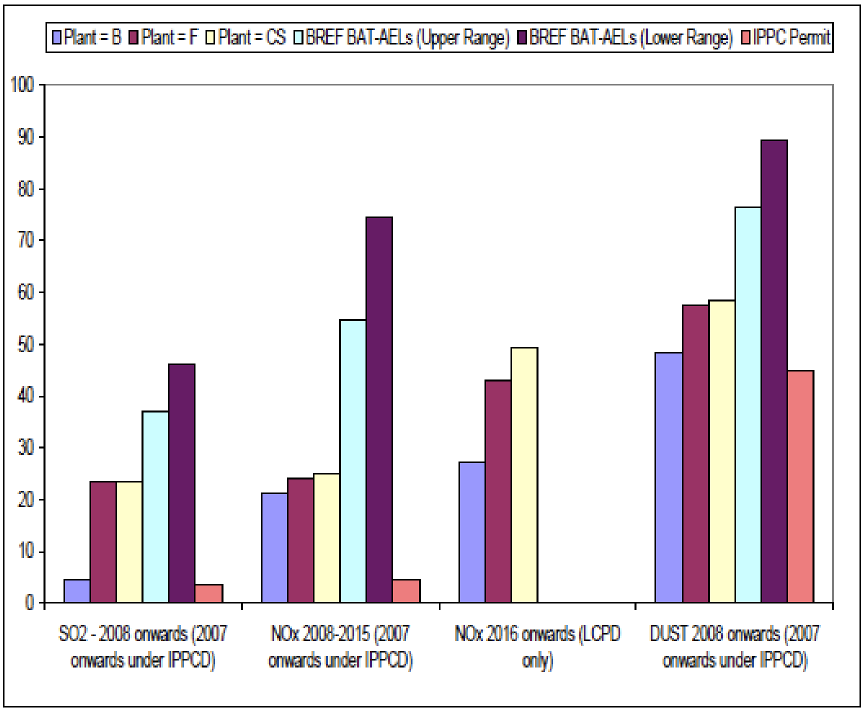
Member State	NEC baseline costs	Annual increase in overall costs	
		Upper BAT AEL range	Lower BAT AEL range
Austria	1720	9	56
Belgium	2102	15	86
Bulgaria	945	30	62
Cyprus	147	5	27
Czech Rep.	1726	155	285
Denmark	1248	74	139
Estonia	356	34	70
Finland	1036	19	105
France	10939	383	682
Germany	14441	444	1708
Greece	2074	-24	156
Hungary	1109	-6	43
Ireland	841	15	85
Italy	9308	19	382
Latvia	368	-1	19
Lithuania	387	22	53
Luxembourg	247	0	5
Malta	97	-3	2
Netherlands	3430	-4	141
Poland	6309	348	676
Portugal	1500	28	84
Romania	2383	53	168
Slovakia	594	44	70
Slovenia	314	22	33
Spain	7916	270	648
Sweden	1624	-145	-40
UK	6622	327	723
EU27	**79,783**	**2132**	**6467**

Source: AEA Energy & Environment 2007

The NEC baseline cost are based on MS own projections of abatements measures without hindsight to the IPPC directive. If cost increases are negative, as e.g. in the case of Sweden, the MS has planned more stringent emission reduction measures then foreseen by the IPPC. The study reveals large differences in compliance cost, however the data presented is of limited use for our purposes for two reasons: figures relate to absolute and not take into account the size of the related industries and they refer to all large combustion plants do not disaggregate to industrial sectors. Germany e.g. has the largest electricity sector in the EU in terms of installed generation capacity and cost per unit of installed capacity are likely to be lower in Germany than in other countries. As figures in table 3 relate to all industries regulated through the LCP Directive and the distribution of overall cost on sectors is not available, a simple division cost/ installed capacity for electricity is not possible.

An overall compliance cost estimation exists for the electricity supply industry (Figure 26).

Figure 26: Projected compliance cost in the electricity supply industry



Source: ENTEC 2005

While these figures show that cost increase with increasing stringency from the LCP to the IPPC directive and between differing LCP interpretations (boiler, flue, common stack) the give no indication about the distribution of cost on a MS state level.

6.6.7.2 The cases of Germany and Poland

The ENTEC 2005 study includes data on projected abatement cost on an individual pant level. In the following, I will compare the compliance expenditure for large combustion plants supplying electricity in Germany and Poland. Germany and Poland were chosen as Germany has more stringent ELVs then required by the LCP Directive and has adapted a flue approach while Poland currently enjoys a number of derogation rights from the LCP directive and has chosen a boiler approach. Also, of all countries included in the ENTEC study on which the following comparison is based Germany and Poland are the most similar samples of large combustion plants considered. Both samples consist of large combustion plants either for electricity supply and combined heat and power production (CHP), the predominant fuel is coal and the Polish and the German sample include the highest overall installed capacity in GW. However, the samples vary in size. The German sample included six plants and the Polish sample 15 plants. Following results might therefore have a sampling error, especially because it is unclear what percentage of the respective statistical population each sample represents. However, although exact average compliance cost for different pollutants, as they will be presented in the following might not be 100 per cent statistically valid, the differences are so striking that one can assume with confidence that the tendency is valid.

Table 23: Average implementation cost for IPPC BAT based ELVs in Germany and Poland (Euro per MW installed capacity per year)

	SO2 Upper	SO2 Lower	NOx Upper	NOx lower	PM upper	PM lower
Germany	654,57	1166,29	3661,29	5402,14	1223,71	1980,14
Poland	4414,67	5071,87	3314,33	4762,87	6866,00	7125,27

Source: Author calculation based on data in ENTEC 2005. See Appendix for details.

As we can see, Poland faces significantly higher environmental compliance costs for all SO2 and particulate matter under the IPPC Directive. Costs for abatement are somewhat lower for Polish plants. Effectively, the replacement of the LCP Directive with the IPPC Directive in its revised form would end the environmental subsidisation of the Polish electricity generation industry related to SO2 and PM.[35]

6.6.7.3 Non-environmental compliance cost

Detailed cost estimations for administrative compliance cost for large combustion plants on ME level do not exist. The EU Impact Assessment gives a number of estimation on average compliance cost for different sectors regulated under the IPPC directive.

The EU Commission has defined administrative compliance cost as cost for reporting and other forms of information on the activities of enterprises. Administrative burden relates to cost, which would not occur in the absence of regulation. This distinction assumes that regulated companies due some form of communication about their activities even without regulation (CEC 2007: 147).

The EU considers permit fees as cost arising to authorities, which are to differing extent passed on to business. Irish authorities pursue an approach of full cost recovery and charge between 5713 and 16506 Euro for a new permit and between 4,444 and 12,697 Euro for a permit review in the energy sector (CEC 2007: 154). Similar breakdowns for other MS are not included in the IA. It is assumed however that average-permitting fees cost range from 4.900 to 21.000 Euro in the energy sector. Costs to review permits are assumed to be 50 per cent of the cost for new permits (CEC 2007: 157). As stated before, nor all of these cost are passed on to business. Costs to business for undertaking the permit process and for reporting are not extensively considered in the IA.

6.6.8 Trade Effects

German and Polish electricity producers offer the same product and theoretically compete in exactly the same market. In fact, electricity is one of the few examples where product differentiation can only take place via price (if we exclude electricity from renewable sources as a possible quality differentiator). A distortion of trade would take place if German electricity companies would ceteris paribus sell less electricity within the EU single market because of lower Polish electricity prices resulting from evaded compliance cost then in case compliance cost would be equal.

To establish a possible distortion of trade and an ensuing discussion of market distortion three conditions must be met: technical and organisational infrastructure for trade, a functioning single market for electricity and price advantages through lower environmental standards.

Contrary to the markets for other products (e.g cars), the existence a trade infrastructure and trade liberalisation between EU MS cannot be taken for granted as national markets for energy have been considered national monopolies until very recently. All three conditions will be discussed separately in the following. It has to be underlined that it is not intended to discuss the impact of the IPPC directive in competitiveness of electricity suppliers. This would require a very different framework and is not the aim of the project.

[35] Cost for individual LCP abatement technologies are listed in ENTEC 2005 pages 100 and 108 as well as in the relevant BREF throughout the text. These are not listed as they are only a very rough indicator for the investment cost of whole sector as every plant will require different sets of technologies. The plant level estimations gathered by ENTEC are more telling in that respect, despite the sampling concerns expressed and although they do not indicate what kind of technology would be required for each site. Which technology constitutes BAT is of no relevance in this context as long as the plant level cost can be estimated.

6.6.8.1 A single market for electricity

Until very recently markets for electricity have been national monopolies or oligopolies with strictly defined market shares. Trade in electricity requires a functioning pan-EU supply and trade infrastructure as well as the liberalisation of national energy markets. Liberalisation of national energy markets must include the opening of the market (facilitation of new market entries and competition) as well as consumer choice.

The EU Commission has been developing legislation to support the liberalisation of MS energy markets since the late 1980s. The steps required for a complete liberalisation are shown in Table 24.

Table 24: Main steps in electricity reform

Restructuring	• Vertical unbundling of generation, transmission, distribution, and supply activities • Horizontal splitting of generation and supply
Competition in Markets	• Wholesale market and retail competition • Allowing new entry into generation and supply
Regulation	• Establishing an independent regulator • Provision of third-party network access • Incentive regulation of transmission and distribution networks
Ownership	• Allowing new private actors • Privatising the existing publicly owned businesses

Source: Jamasb and Pollit 2005

The EU has developed a very comprehensive set of indicators of measure progress in the areas mentioned above. What is relevant is this context is less the status of national markets but rather the question whether electricity is traded between MS.

National energy markets within the EU are connected through physical infrastructure managed under the Union for the Coordination of Transmission of Electricity (UCTE) system that allows for cross-border trade. The technical infrastructure underlying UCTE is considered insufficient to satisfy demand in cross-border because of missing links between systems and insufficient technical capacity leading effectively to “congestion” in the system (Adamec et al. 2008).

Increasing the interconnectedness of national supply infrastructure depends on respective investments within MS. The EU commission expressed concern about the advancement of interconnectedness and launched several projects to support trans-MS transmission. At this point, no estimation on the effectiveness of such programs or the future development of a pan MS transmission system can be made. The EU Commission comments “imports do not yet adequately play their role to counter market concentration in national markets and exert competitive pressure on incumbent operators” (EC 2007: 187).

In 2001, eight per cent of electricity consumption resulted from cross-border flows within the EU. An overview of the trading activities of Germany and Poland is given in the following table:

Table 25: Electricity data for Germany and Poland in 2005 (TWh)

Country	Generation TW	Annual consumption	Import	Export

Country	Generation TW	Annual consumption	Import	Export
Germany	619	614.4	56.8	61.4
Poland	157	145.8	5,00	16.2

Source: OECD 2006.

The large majority of the electricity generated domestically is hence also consumed domestically. Any significant trade distortions due to differing cost will hence occur once trade in electricity increases.

6.6.8.2 Additional cost to Polish Industry

ENTEC estimates the cost to Polish electricity industry for installation and operation of additional abatement technology to be between 6 and 13 per cent of overall generation cost in order to comply with the LCP Directive (see appendix for details). Compliance cost with the revised IPPC directive are likely to be higher. Similar estimations for the German electricity industry could not be obtained, but considering the much lower average IPPC implementation cost it is feasible to assume that the percentage to overall generation cost is smaller. As no interviews with industry experts could be undertaken it could not be established in how far the differing cost affect prices for electricity and electricity exports.

6.6.9 Industry Positions

As the LCP Directive as well as the IPPC Directive targets a wide variety of industrial sectors the following part of the case study will summarize industry positions from various sectors towards the revision of the IPPC directive. A separate section considers the position of the electricity industry.

6.6.9.1 Industry positions on IPPC during Stakeholder Consultation

The EU Commission conducted an online stakeholder consultation during 2003.The stakeholder consultation stimulated a large number of responses. 47 industry associations and eight individual businesses filled out the EU questionnaire. The questionnaire contained one question relevant to this context. Questions six read:

> In which cases do Community-wide emission limit values as minimum requirements help achieve a high level of environmental protection and prevent distortions of the Internal Market?

A summary of the overall industry reactions is contained in the appendix. EURELECTRIC, the EU industry association for the electricity generating industry, replied the LCP Directive already had incurred substantial economic cost and new, binding ELVs were unnecessary as they limited the weighing of environmental and economic considerations (CEC 2004: 134).

Interestingly, the Austrian Association of Electricity Companies states in the same stakeholder consultation that Competition distortion will occur without harmonisation (CEC 2004: 80).

6.6.9.2 Current industry position on the revision of the IPPC directive

On the background of the ongoing negotiations on the revised IPPC directive, it was difficult to receive comments on the current state of affairs from representatives of business associations in Europe or on the national level There are very few public documents from industry available that indicate the actual positions. One of them is however particularly insightful as it is the position paper of the IPPC alliance of energy intensive industries. The IPPC alliance is the association of twelve EU industrial associations.[36] The IPPC alliance opposes uniform standards. Their argument is that

"No two installations are identical, even when producing the same product, since local conditions, e.g. raw materials, are always different. Even the single objective of ensuring a high level of protection for the environment as a whole will often involve making "trade off" judgements between different types of environmental impacts, and these judgements will often be influenced by local considerations. For example, a plant situated at a location with water scarcity issues cannot be treated the same way with regards to e.g. water consumption as a plant located to a big river or a sea with no water scarcity issues – processes need to account for the local environmental conditions in an integrated environmental manner " (IPPC Alliance 2008).

BusinessEurope, the confederation of 41 national industrial association from 33 European countries, states has taken a similar position, also without any other explanation then differing circumstances of installations (BusinessEurope 2007).

The European Chemical Industry Council (CEFIC) is slightly more detailed in their argument against the proposed IPPC revision in a separate position paper. In the CEFIC perspective, production processes for the same good differ and the BREFs cannot make reference to the variety of production processes, have to "average" processes and therefore cannot reflect the situation of all producers. Another reason for the limited applicability of BAT is according to CEFIC that "not all operators are involved". If BAT is applied at all it should used with a "reasonable cost-benefit attitude, using the best available techniques not entailing excessive costs" (CEFIC 2008).[37]

The Industry does acknowledge that the IPPC directive has been implemented differently across the MS and BAT has only partly been taking into account. The reasons for the fragmented implementation are according to industry that "the first round of BREFS was only completed in 2006 and that not enough time and resources have been dedicated at Member State level to assimilate the BREFs. This is of major importance, since the BREFs are only available in English" (IPPC Alliance 2008). Business Europe insufficient "Nevertheless, studies have identified certain shortcomings in implementation of the IPPC directive as well as in its interaction with other sectoral directives. In our opinion, this is due to the very recent implementation of the directive and, consequently, it is still not reliable to draw significant conclusions about its effectiveness" (BusinessEurope 2007).

6.6.9.3 The electricity industry

EURELECTRIC takes a similar view. A position paper on the IPPC directive states "The proposed Industrial Emissions Directive needs to incorporate sufficient flexibility in setting emission conditions to match the large variety of existing plants and operating ranges while preventing and minimising pollution " (EURELECTRIC 2008: 7). EURELECTRIC furthermore asks the existing NERPs to be retained, all existing derogations granted under the LCP Directive to be retained, and to allow existing

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[36] CEFIC, CPIV Standing Committee of the European Glass Industry; Eurofer European Confederation of Iron and Steel Industries, CIAA Confederation of Food and Drink Industries, CEMBUREAU The European Cement Association, EULA European Lime Association, EM European Association of Metals, EUROMINES, CEPI European Confederation of Paper Industries, CERAME-UNIE Liason office of the European Ceramic Industries, EURO ALLIANCES Committee de Liason des Industries de Ferro-Alliages, ECGA European Carbon and Graphite Association.

[37] CEFIC explains: The presence of water or the dry status of soils has a big influence on the capacity of the environments to properly deal with emissions. Same end products can have different raw materials and thus different emissions. The availability of pure oxygen sources may help to have a different way of dealing with wastewater. The absence of water will drive to consider that water treatment is not a good option in some circumstances even if it is the theoretical Best Available Technique… The levels of emissions can vary without worsening the health situation"

plants to operate under the ELVs as determined under the LCP Directive (EURELECTRIC 2008: 10). EURELECTRIC claims no to support the LCD BREFs (despite the contribution of EURELECTRIC to the BREF) as it considers "the examples of plant performance given as totally unrepresentative, since they concentrate on "best ever" levels of emissions, taken from isolated cases, rather than reflecting the spectrum of feasible performance for plant operating under normal commercial conditions and loading patterns" (EURELECTRIC 2008: 11). Furthermore, EURELECTRIC questions the credibility of cost data presented in the BREF. The position paper "views the current paucity of relevant cost data as being damaging to the overall credibility of the document and notes that the BREF itself indicates a deficiency in this area. There is increasing pressure on plant suppliers, effectively driven by EU environmental policy, and this is resulting in increasing costs and lead times. This is means that any existing reference data for plant costs is not representative" (EURELECTRIC 2008: 11). The LCP BREF should therefore not achieve legally binding status. EURELECTRIC furthermore questions the Commission's view that there is a low uptake of BAT in the LCP sectors as communicated in the Impact Assessment.

EURELECTRIC also opposes the binding implementation of the common stack approach because it would rule out "developers splitting plants so that they would be subject to less stringent and costly emission control requirements" (EURELECTRIC 2008).

EURELECTRIC also comments on the on the application of the IPPC Directive to the Polish electricity in Poland. According to EURELECTIC „around 12,000 MW of installed capacities will have to be withdrawn from operation and replaced by the year 2020 (which constitutes over 50% of the Polish system power plants generation capacity –"must-runs")" EURELECTRIC 2008: 22). The reason is that investment cost for NOx emission reduction technology will not be economically viable for respective units, as they cannot recover investment cost.

The Polish Electricity Association (PKEE) takes a similar position. Its 2008 annual report reads that IPPC and other EU directives imposing emission ceilings pose "a threat of a complete paralyse of the electricity sector which will indirectly affect the development possibilities of the entire national economy" (PKEE 2008).

No position on the IPPC review was available from the German electricity industry.

6.6.9.4 Discussion

European business regulated via the IPPC directive strongly opposes uniform emission limit values based on BAT. The electricity generating industry is no exception to this. The proposed revision of the IPPC directive is criticised for lacking flexibility. The main underlying argument in favour of flexible ELVs is that environmental goal should be achieved on the plant level in a cost effective manor. Cost-effective is meant however in lowering cost to the plant and lowering the level of environmental level of protection.

Comparing the German and Polish electricity industries has shown that industries with relatively lax standards under the IPPC directive enjoy a continuing environmental subsidy by not having to undertake significant investments into SO_2, NOx and PM abatement technology this subsidy would effectively terminate in case the current proposal for a revised IPPC gets adopted and implemented. The Polish industry argues that an inflexible implementation of the BAT based ELVs would threaten their existence due to rising abatement cost.

Due to the agreement no to include interviews, it could not be ascertained as to whether Polish electricity can offer their product cheaper then German electricity producers as are result of their derogation rights under the LCP Directive. If that was the case, the application of the revised IPPC Directive might change the relative competitive position of the Polish industry but does not represent a case of competition distortion. Quite contrary, it would historical competition distortion through the application of uniform standards therefore represents Case 1 of the research protocol.

6.6.10 Summary and conclusions

The IPPC directive covers a wide range of industries its implementation differs widely across MS and also within MS as different sectors face differing implementations in the same country. A number of studies aim to determine the effect of the IPPC directive on the competitiveness regulated business[38] but this is the first attempt to relate the concept of market distortion to the IPPC directive on the basis of the existing literature.

In the case of IPPC, the whole regulated industry seems to oppose uniform standards, preferring flexibility to introduce levels of environmental protection below the ideal of the EU policy. The strongly differing implementations of the IPPC directive on the MS level suggest that levels of protection are not only below the EU ideal but also vary considerably between MS. No complaints of competition distortion because of differing implementations or differing levels of environmental protection are established in the academic literature, the available grey literature or through online sources. Industry seems to accept differing levels of environmental protection despite the possibility of trade distortion through differing implementation.

The example of the Polish-German industry comparison however indicates that considerable trade distortion could occur in case the market for electricity would grow within the EU. Assuming greater export and trade potential, Poland could benefit from its laxer standards relative to Germany. Harmonising ELVs for electricity generation under a revised IPPC directive would increase the level environmental protection and remove market distortions from an environmental perspective. Doing so before or at the same time as the single market for energy is gaining more momentum trough increased pan-EU transmission capacity and increased trade would effectively create a level playing field.

In relation to market distortion one can conclude that currently the large combustion plant sector in Poland stays below the European ideal of resource use under the LCP regime and their cost to internalise environmental externalities are comparatively low. Once electricity trade increases, this could have a considerable positive effect on the industries competitiveness in relation to other electricity producers. If the IPPC will get revised as currently suggested, it would be process of removing historical market distortion involving higher cost for adaptation to the Polish industry but leading eventually to an undistorted market.

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[38] See Appendix for a summary of relevant findings of these studies to the topic of this case study.

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Appendix

Appendix A: Emission Limits Values for Large Combustion Plants – LCP Directive

Table 1 Emission limit values for existing plants

<table>
<tr><th rowspan="2">Pollutant</th><th rowspan="2">Fuel type</th><th colspan="4">ELVs (figures in mg/Nm^3) (Note 1)</th></tr>
<tr><th>50 to 100 MWth</th><th>100 to 300 MWth</th><th>300 to 500 MWth</th><th>>500 MWth</th></tr>
<tr><td rowspan="3">SO_2</td><td>Solid
(Notes 2, 3)</td><td>2000</td><td colspan="2">2000 to 400 (sliding scale)</td><td>400</td></tr>
<tr><td>Liquid</td><td colspan="2">1700</td><td>1700 to 400 (sliding scale)</td><td>400</td></tr>
<tr><td>Gaseous</td><td colspan="4">35 – in general
5 – liquefied gas
800 – low calorific gases from gasification of refinery residues, coke oven gas & blast furnace gas</td></tr>
<tr><td rowspan="3">NO_x</td><td>Solid
(Notes 4, 5)</td><td colspan="3">600</td><td>500
From 1 Jan 2016: 200</td></tr>
<tr><td>Liquid</td><td colspan="3">450</td><td>400</td></tr>
<tr><td>Gaseous</td><td colspan="3">300</td><td>200</td></tr>
<tr><td rowspan="3">Dust</td><td>Solid</td><td colspan="3">100</td><td>50 (Note 6)</td></tr>
<tr><td>Liquid</td><td colspan="4">50 (Note 7)</td></tr>
<tr><td>Gaseous</td><td colspan="4">5 – as a rule
10 – blast furnace gas
50 – steel industry gases that can be used elsewhere</td></tr>
<tr><td>SO_2, NO_x and dust</td><td>Multi-firing units using two or more fuels</td><td colspan="4">See Note 8</td></tr>
</table>

Notes

1. The ELVs for existing plants are calendar monthly mean values, see Art 14. The reference oxygen contents are 6% for solid fuels and 3% for liquid and gaseous fuels.
2. Plants greater or equal to 400MWth, which do not operate more than the following number of hours a year (rolling average over a period of 5 years), shall be subject to an ELV for SO_2 of 800mg/m^3:
    - until 31 December 2015, 2000 hours; and
    - from 1 January 2016, 1500 hours.
3. Where the ELVs cannot be met due to the characteristics of the fuel, a rate of desulphurisation of at least 60% shall be achieved in the case of plants with a rated thermal input of <= 100MWth, 75% for plants > 100MWth and <= 300MWth and 90% for plants > 300MWth. For plants > 500MWth, a desulphurisation rate of at least 94% shall

apply or of at least 92% where a contract for the fitting of FGD or lime injection equipment has been entered into, and work on its installation has commenced, before 1 January 2001.

4. Until 31 December 2015 plants >500MWth which from 2008 do not operate more than 2000 hours per year (rolling average over a period of 5 years) shall, in the case of plant subject to a National Plan, have their contribution to the National Plan assessed on the basis of an ELV of 600mg/Nm^3. From 1 January 2016 such plants, which do not operate more than 1500 hours per year (rolling average over a period of 5 years), shall be subject to an ELV for NO_x of 450mg/Nm^3.

5. Until 1 January 2018 in the case of plants that in the 12 month period ending on 1 January 2001 operated on, and continue to operate on, solid fuels whose volatile content is <10%, 1200mg/Nm^3 shall apply.

6. An ELV of 100mg/Nm^3 may be applied to existing plants >= 500MWth burning solid fuel with a heat content of less than 5800kJ/kg, a moisture content > 45% by weight, a combined moisture and ash content > 60% by weight and a calcium oxide content > 10%.

7. An ELV of 100mg/Nm^3 may be applied to plants <500MWth burning liquid fuel with an ash content > 0.06%.

8. Special provisions apply to multi-firing units using two or more fuels as detailed in Art 8. These are briefly summarised as follows:

   i. In the case of plants with a multi-firing unit involving the simultaneous use of two or more fuels (Art 8(1)), ELVs shall be set firstly by taking the ELV of each fuel and pollutant; secondly by determining the fuel-weighted ELVs, obtained by multiplying the individual ELV by the thermal input delivered by each fuel, the product of multiplication being divided by the sum of the thermal inputs delivered by all fuels; and thirdly by aggregating the fuel-weighted ELVs.

   ii. In multi-firing units using the distillation and conversion residues from crude-oil refining for own consumption, alone or with other fuels (Art 8(2)), the provisions for the fuel with the highest ELV (the determinative fuel) shall apply, notwithstanding point (i) above, if during the operation of the combustion plant the proportion contributed by that fuel to the sum of the thermal inputs delivered by all fuels is at least 50%. Where the proportion of the determinative fuel is lower than 50%, the ELV is determined as described in Art 8(2), second paragraph.

   iii. As an alternative to point (ii), an average ELV for SO_2 may be applied (irrespective of the fuel combination used) of 1,000mg/Nm^3, averaged over all existing plants within the refinery (Art 8(3)).

   iv. In the case of plants with a multi-firing unit involving the alternative use of two or more fuels (Art 8(4)), the ELVs corresponding to each fuel used shall be applied.

Table 2 Emission limit values for new plants

Pollutant	Fuel type	ELVs (figures in mg/Nm³) (Note 1)		
		50 to 100 MWth	100 to 300 MWth	>300 MWth
SO_2	Biomass (Note 2)	200	200	200
	General case (Note 2)	850	200	200
	Liquid	850	400 to 200 (linear decrease)	200
	Gaseous	35 – in general 5 – liquefied gas 400 – low calorific gases from coke oven 200 – low calorific gases from blast furnace		
NO_x	Solid – biomass	400	300	200
	Solid – general case	400	200	200
	Liquid	400	200	200
	Gaseous fuels – natural gas	150		100
	Gaseous fuels – other gases	200		200
	Gas turbines – natural gas (Note 3)	50 (Note 4)		
	Gas turbines – liquid fuels (Note 3)	120		
	Gas turbines – gaseous fuels other than natural gas (Note 3)	120		
Dust	Solid	50	30	
	Liquid	50	30	
	Gaseous	5 – as a rule 10 – blast furnace gas 30 – steel industry gases that can be used elsewhere		

Notes

1. The ELVs for new plants are daily mean values, see Art 14. The reference oxygen contents are 6% for solid fuels and 3% for liquid and gaseous fuels.
2. Where the ELVs cannot be met due to the characteristics of the fuel, installations shall achieve 300 mg/m³ SO_2, or a rate of desulphurisation of at least 92% shall be achieved in the case of plants with a rated thermal input of <= 300MWth, and 95% for plants > 300MWth, together with a maximum permissible ELV of 400mg/m³.
3. Gas turbines licensed before 27 November 2002 are excluded from the scope of the LCPD
4. 75mg/Nm³ for gas turbines used in combined heat and power systems having an overall efficiency greater than 75%; gas turbines used in combined cycle plants having an electrical efficiency greater than 55% and gas turbines for mechanical drives. For single gas turbines not falling into any of the above categories, but having an efficiency greater than 35% the ELV shall be 50*(gas turbine efficiency)/35.

Source ENTEC 2005 Appendix

Appendix B: More Strigent Emission Limits

Existing Plants

Table 2.2 Comparison of national ELVs with those in the LCPD (existing plants)

	Country	Are the national LCP ELVs tighter than those in the LCPD?	Details
EU-15	**Austria**	Yes – for dust, SO_2 and NO_x	Dust: the national ELV for all solid fuelled plants (50 mg/Nm^3) is more stringent than the LCPD ELV for solid fuelled plants <500MWth (100 mg/Nm^3). The ELV for all sized plants utilising 'extra-light' fuel oil (30 mg/Nm^3) is more stringent than the corresponding ELV in the LCPD (50 mg/Nm^3). NO_x: the national ELVs for solid (200-600 mg/Nm^3), liquid (150-450 mg/Nm^3) and gaseous fuelled plants (150-300 mg/Nm^3) are more stringent than most of the corresponding ELVs in the LCPD (dependent upon sliding scale). SO_2: the ELVs for lignite (400-1000 mg/Nm^3) and coal (200-1000 mg/Nm^3) fired plants are more stringent than the corresponding ELV for solid fuelled plants in the LCPD (dependent upon sliding scale, 400-2000 mg/Nm^3). No information has been provided by Austria as to how the sliding scale is determined with respect to plant capacity. The ELVs for liquid fuelled plants (200-1100 mg/Nm^3) are also stricter than those in the LCPD (400-1700 mg/Nm^3).
	Belgium		Information supplied from Belgium is a proposal for modification of the Flemish Regulation regarding ELVs for LCP's for the Flanders Region only.
	Denmark		No information received.

		in the LCPD?	
	Finland	Yes – for NO_x and dust No – for SO_2	Dust: the ELV for 50-300 MWth solid fuelled plants (50 mg/Nm^3) is more stringent than the corresponding LCPD ELV (100 mg/Nm^3). NO_x: the national ELV for plants >1000MWth (before and after 31st December 2015) is 200 mg/Nm^3 which is more stringent than the LCPD ELV for plants >500MWth before 31st December 2015 (500 mg/Nm^3).
	France	Yes – for NO_x and dust No – for SO_2	Dust: the ELV for 20-100 MWth plants in agglomerations of more than 250 000 ha (50 mg/Nm^3) is more stringent than the corresponding LCDP ELV (100 mg/Nm^3). NO_x: the ELV for 20-500MWth plants using natural gas or LPG (225 mg/Nm^3) is more stringent than the corresponding ELV in the LCPD (300 mg/Nm^3).
	Germany	Yes – for SO_2, NOx and dust ELV in place for several other pollutants not covered by the LCPD	SO_2: the daily mean ELV for solid fuelled plants >300 MWth (300mg/m^3) is more stringent than the corresponding ELVs in the LCPD (monthly mean value of 400 mg/Nm^3 or greater). In addition these plants have to comply with a sulphur removal rate of at least 85%. NOx: daily (200mg/m^3) and half-hourly (400mg/m^3) ELV for solid fuelled plants is more stringent than those in the LCPD (500-600mg/Nm^3 up until 2016). The ELVs for gaseous fuelled plants (in particular the daily mean values - 135-150 mg/m^3) are also more stringent than those in the LCPD. Dust: the daily mean ELV for solid fuelled plants >300 MWth (20 mg/m^3) is more stringent than the LCPD ELVs for all solid fuelled plants (50-100mg/Nm^3). Plants <100 MWth may emit 30 mg/m3 until the end of 2012. The half hourly mean ELV (60mg/m^3) is stricter than the corresponding ELV in the LCPD for plants <500 MWth (100mg/Nm^3). ELVs are also in place for mercury, carbon monoxide, antimony, arsenic, lead, cobalt, copper, manganese, nickel, vanadium, zinc, benzopyrene, cadmium, chromium and dioxins and furanes.
	Greece		No information received.
	Ireland	No	
	Italy	Yes – for SO_2, NO_x and dust.	Dust: the national ELV for all plants is 50 mg/Nm^3 which is more stringent than the LCPD ELV for plants <500 MWth (100 mg/Nm^3) NO_x: the national ELV for all plants >500 MWth (200 mg/Nm^3) is more stringent than the corresponding LCPD ELV for solid (up until 2016) and liquid fuels. SO_2: the national ELV for all plants <500 MWth (1700 mg/Nm^3) is more stringent than the LCPD ELV for solid fuels for all plants <100MWth (2000 mg/Nm^3) and some smaller plants between 100-500 MWth (dependent upon sliding scale).
	Luxembourg		No information received.
	Netherlands		No information received.
	Portugal	No	
	Spain	No	
	Sweden	Yes	It is understood that existing plants have requirements in their permits which are more in line with the LCPD levels for new plants.
	UK	No	
New Member States	**Cyprus**	No	
	Czech Republic	Yes – for SO_2 and NO_x No-for dust	NO_x: the national ELV for 50-500 MWth gaseous fuelled plants (200 mg/m^3) is more stringent than the corresponding ELV in the LCPD (300 mg/Nm^3) SO_2: the ELV for solid fuelled plants between 50-100MWth (1700 mg/Nm^3) is more stringent than the corresponding LCPD ELV (2000 mg/Nm^3). The ELV for liquid fuelled 300-500 MWth plants (500 mg/Nm^3) will be more stringent than the LCPD ELV for most plants (dependent upon sliding scale 1700-400 mg/Nm^3).

	Estonia	No	
	Hungary	Yes – for dust. ELV in place for arsenic, cadmium, cobalt, chromium, nickel, lead and vanadium. No – for NO_x and SO_2.	Dust: the national ELV for 100-500MWth solid fuelled plants (50 mg/Nm^3) is more stringent than the corresponding LCPD ELV (100 mg/Nm^3). Other pollutants not covered by LCPD: ELV of 3 mg/m^3 in place for total emissions of arsenic, cadmium, cobalt, chromium, nickel, lead and vanadium from liquid fuelled plants. No information provided regarding ELVs for gaseous fuelled plants.
	Latvia	No	
	Lithuania		No information received.
	Malta	No	
	Poland		No information received.
	Slovakia		No information received.
	Slovenia		No information received.

New Plants

Table 2.3 Comparison of national ELVs with those in the LCPD (new plants)

	Country	Are the national LCP ELVs tighter than those in the LCPD?	Details
EU-15	**Austria**	Yes – for dust, SO_2 and NO_x	Dust: the ELVs for light to heavy (35 mg/Nm^3) and extra-light liquid fuels (30 mg/Nm^3) are more stringent than the LCPD ELV for liquid fuelled plants <100MWth (50 mg/Nm^3). NO_x: the national ELV for solid fuelled plants (200 mg/Nm^3) is more stringent than the LCPD ELV for plants <100MWth (400 mg/Nm^3). The national ELV for liquid fuelled plants is more stringent than all of the corresponding ELVs in the LCPD (200-400 mg/Nm^3). The national ELV for gaseous fuelled plants is more stringent than the LCPD ELVs for natural gas fired plants <300MWth (150 mg/Nm^3) and all other gaseous fuelled plants (200 mg/Nm^3). SO_2: the ELVs for coal (200 mg/Nm^3) and lignite (400 mg/Nm^3) fired plants are more stringent than the LCPD ELVs for solid fuelled plants (except biomass) <100MWth (850 mg/Nm^3). The ELV for liquid fuelled plants (200-350 mg/Nm^3) is more stringent than the LCPD ELV for plants <100MWth (850 mg/Nm^3)
	Belgium		Information supplied from Belgium is a proposal for modification of the Flemish Regulation regarding ELVs for LCP's for the Flanders Region only.
	Denmark		No information received.
	Finland	Yes – for NO_x No – for SO_2 and dust	NO_x: the ELV for solid fuelled plants >300 MWth (150 mg/Nm^3) is more stringent than the corresponding ELV in the LCPD (200 mg/Nm^3). The ELV for liquid fuelled plants >300MWth (175 mg/Nm^3) is also more stringent (200 mg/Nm^3).
	France	No	

	Country	Are the national LCP ELVs tighter than those in the LCPD?	Details
	Germany	Yes – for SO_2 and dust ELV in place for several other pollutants not covered by the LCPD No – for NOx	SO_2: The daily (200 and 350mg/m^3) mean ELV for blast furnace and coke oven gas fuelled plants >300 MWth is more stringent than the corresponding ELVs in the LCPD (200 and 400mg/Nm^3, respectively). Solid and liquid fuelled plants (>100 MWth) have to comply with the ELVs as well as a sulphur removal rate of at least 85% (except biomass and light fuel oil). For solid fuels, these requirements refer to use of non-high sulphur content fuels, requirements for high sulphur content fuels are fixed according to the LCPD. Dust: The daily mean ELV for all solid and liquid (except light fuel oil) fuelled plants (20mg/m^3) is more stringent than the corresponding ELV in the LCPD (30mg/Nm^3). ELVs are also in place for mercury, carbon monoxide, antimony, arsenic, lead, cobalt, copper, manganese, nickel, vanadium, zinc, benzopyrene, cadmium, chromium and dioxins and furanes.
	Greece	No for dust	No information received on SO_2 and NOx. ELVs are also in place for lead, arsenic and cadmium.
	Ireland	No	
	Italy	No	
	Luxembourg		No information received.
	Netherlands		No information received.
	Portugal	No	
	Spain	No	
	Sweden	Possibly	No specific comment available.
	UK	No	
New Member States	**Cyprus**	No	
	Czech Republic	No	
	Estonia	No	
	Hungary	No	No information received.
	Latvia	No	
	Lithuania		No information received.
	Malta	No	
	Poland		No information received.
	Slovakia		No information received.
	Slovenia		No information received.

Appendix C: Emission Limit Values for Large Combustion Plants – IPPC Directive

Capacity (MW_{th})	SO_2 emission level (mg/Nm^3)						BAT to reach these levels
	Coal and lignite		Peat		Liquid fuels for boilers		
	New plants	Existing plants	New plants	Existing plants	New plants	Existing plants	
50 – 100	200 – 400* 150 – 400* (FBC)	200 – 400* 150 – 400* (FBC)	200 – 300	200 – 300	100 – 350*	100 – 350*	Low sulphur fuel or/and FGD (dsi) or FGD (sds) or FGD (wet) (depending on the plant size). Seawater scrubbing. Combined techniques for the reduction of NO_x and SO_2. Limestone injection (FBC).
100 – 300	100 – 200	100 – 250*	200 – 300 150 – 250 (FBC)	200 – 300 150 -300 (FBC)	100 – 200*	100 – 250*	
>300	20 – 150* 100 – 200 (CFBC/ PFBC)	20 – 200* 100 – 200* (CFBC/ PFBC)	50 – 150 50 – 200 (FBC)	50 – 200	50 – 150*	50 – 200*	

Notes:
FBC: Fluidised bed combustion
CFBC: Circulating fluidised bed combustion
PFBC: Pressurised fluidised bed combustion
FGD(wet): Wet flue-gas desulphurisation
FGD(sds): Flue-gas desulphurisation by using a spray dryer
FGD(dsi): Flue-gas desulphurisation by dry sorbent injection
* Some split views appeared in these values and are reported in Sections 4.5.8 and 6.5.3.3 of the main document.

Table 6: BAT for the reduction of SO_2 emissions from some combustion plants

Capacity (MW_{th})	Combustion technique	NO_X emission level associated with BAT (mg/Nm^3)			BAT options to reach these levels
		New plants	Existing plants	Fuel	
50 – 100	Grate-firing	200 – 300*	200 – 300*	Coal and lignite	Pm and/or SNCR
	PC	90 – 300*	90 – 300*	Coal	Combination of Pm and SNCR or SCR
	CFBC and PFBC	200 – 300	200 – 300	Coal and lignite	Combination of Pm
	PC	200 – 450	200 – 450*	Lignite	
100 – 300	PC	90* – 200	90 – 200*	Coal	Combination of Pm in combination with SCR or combined techniques
	PC	100 – 200	100 – 200*	Lignite	Combination of Pm
	BFBC, CFBC and PFBC	100 – 200	100 – 200*	Coal and Lignite	Combination of Pm together with SNCR
>300	PC	90 – 150	90 – 200	Coal	Combination of Pm in combination with SCR or combined techniques
	PC	50 – 200*	50 – 200*	Lignite	Combination of Pm
	BFBC,CFBC and PFBC	50 – 150	50 – 200	Coal and Lignite	Combination of Pm

Notes:
PC: Pulverised combustion
BFBC: Bubbling fluidised bed combustion
CFBC: Circulating fluidised bed combustion
PFBC: Pressurised fluidised bed combustion
Pm: Primary measures to reduce NO_x
SCR: Selective catalytic reduction of NO_x
SNCR: Selective non catalytic reduction of NO_x
The use of anthracite hard coal may lead to higher emission levels of NO_X because of the high combustion temperatures
* Some split views appeared in these values and are reported in Section 4.5.9 of the main document.

Table 7: BAT for the reduction of NO_X from coal-and lignite-fired combustion plants

Capacity (MW_{th})	NO_X -emission level (mg/Nm^3)				BAT to reach these levels
	Biomass and Peat		Liquid fuels		
	New plants	Existing plants	New plants	Existing plants	
50 – 100	150 – 250	150 – 300	150 – 300*	150 – 450	Combination of Pm SNCR/ SCR or combined techniques
100 – 300	150 – 200	150 – 250	50 – 150*	50 – 200*	
>300	50 – 150	50 – 200	50 – 100*	50 – 150*	

Notes:
Pm: Primary measures to reduce NO_x **SCR:** Selective catalytic reduction of NO_x
* Some split views appeared in these values and are reported in Section 6.5.3.4 of the main document

Table 8: BAT for the reduction of NO_X from peat, biomass and liquid fuel-fired combustion plants

Appendix D: Granted Derogations for Poland under LCP Directive

Country	Derogation from?	Derogation allowances	Applies until	Conditions	Comments by Policy Makers
Poland	Article 4(3) Annex III: Pt A Annex IV: Pt A	ELVs for SO_2 shall not apply to combustion plants at 36 sites.	31 December 2015 at the latest	During this transitional period, SO_2 emissions from all combustion plants pursuant to Directive 2001/80/EC shall not exceed the following ceilings: - 2008: 454 000 t / year - 2010: 426 000 t / year - 2012: 358 000 t / year In addition, the percentage share of the plants listed above shall not exceed the following: - 2008: 20% of the overall power of the sector as of 2001 - 2013: 19% of the overall power of the sector as of 2001	No response
	Article 4(3) Annex VI: Pt A	ELVs for NO_x emissions applicable as from 1 January 2016 for plants with a rated thermal input >500 MWth shall not apply to the combustion plants at 21 sites.	31 December 2017	During this transitional period, NO_x emissions from all combustion plants pursuant to Directive 2001/80/EC shall not exceed the following ceilings: - 2008: 254 000 t / year - 2010: 251 000 t / year - 2012: 239 000 t / year In addition, the percentage share of the plants listed above shall not exceed the following: - 2016: 24% of the overall power of the sector as of 2001	
	Article 4(3) Annex VII: Pt A	ELVs for dust shall not apply for dust emissions from combustion plants at 29 municipal heat generating sites.	31 December 2017	During the entire period, the percentage share of the plants shall not exceed 2% of the overall power of the sector as of 2001.	
	See above	See above	See above	By 1 January 2008, and again by 1 January 2012, Poland shall present to the Commission an updated plan, including an investment plan, for the gradual alignment of remaining non-compliant plants with clearly defined stages for the application of the *acquis*. Both these plans shall ensure a further reduction of the emissions under the above intermediate targets and aim at sulphur dioxide emissions lower than 400 000 tonnes in 2010 and 300 000 tonnes in 2012. If the Commission, having regard in particular to the environmental effects and to the need to reduce distortions of competition in the internal market due to the transitional arrangements, considers that these plans are not sufficient to meet these objectives, it shall inform Poland. Within the following three months, Poland shall communicate the measures it has taken in order to meet these objectives. If subsequently the Commission, in consultation with the Member States, considers these measures are not sufficient to meet these objectives, it shall commence infringement proceedings under Article 226 of the EC Treaty.	

Source: ENTEC 2005

Appendix E: annual investment cost for implementation of IPPC Directive in Germany and Poland.

Germany	Fuel	Current emissions kt	CC / MW upper range p.a.	CC / MW lower range p.a.
550 MW CHP	Lignite	SO2: 0.648	0,0	1090
		NOx: 2.537	5636	6000
		PM: 0.055	0,0	1273
274 MW ESI	Coal	SO2: 0.339	0,0	0,0
		NOx: 0.169	0,0	0,0
		PM: 0.003	0,0	0,0
502 MW CHP	Coal	SO2: 3.275	4582	5777
		NOx: 3.275	15378	18327
		PM: 0.328	8566	10558
1400 MW ESI	Coal	SO2: 1.812	0,0	286
		NOx: 1.375	0,0	929
		PM: 0.009	0,0	0,0
697 MW ESI	Coal	SO2: 0.697	0,0	287
		NOx: 0.958	0,0	1722
		PM: 0.064	0,0	430
1310 MW ESI	Coal	SO2: 1.434	0,0	229
		NOx: 1710	0,0	1679
		PM: 0.147	0,0	610
404 MW CHP	Lignite	SO2: 1.132	0,0	495
		NOx: 1.034	4455	9158
		PM: 0.024	0,0	990

Poland	Fuel	Current emissions kt	CC / MW upper range p.a.	CC / MW lower range p.a.
1755 MW ESI	Lignite	SO2: 13.064	1766	2393
		NOx: 5.459	969	2336
		PM: 1.002	2621	3761
309 MW ESI	Coal	SO2: 4.710	12945	13916
		NOx: 1.330	10032	11947
		PM: 0.646	34304	35992
1062 MW ESI	Coal	SO2: 17.149	13748	14689
		NOx: 4.790	10640	12721

		PM: 1.73	26271	17778
728 MW CHP	Coal	SO2: 5.966	6593	7418
		NOx: 2027	5632	7418
		PM: 0.326	6044	7280
2056 MW CHP	Coal	SO2: 11.379	1176	1411
		NOx: 3.474	1654	2918
		PM: 0.750	1946	2432
260 MW CHP	HFO[39]	SO2: 0.216	1154	1538
		NOx: 0.036	769	1154
		PM: 0.000	0,0	0,0
696 MW CHP	Coal & HFO	SO2: 4.345	5891	6753
		NOx: 1.386	3448	5029
		PM: 0.129	1580	2730
514 MW CHP	Coal	SO2: 1.082	1556	2335
		NOx: 0.442	584	1750
		PM: 0.049	389	1362
837 MW CHP	Coal	SO2: 4.570	1195	1434
		NOx: 1.834	2628	3934
		PM: 0.797	6093	6691
1171 MW CHP	Coal	SO2: 7.205	1452	1623
		NOx: 2.433	3245	4099
		PM: 1.099	6234	6660
477 MW ESI	Coal	SO2: 2.507	4822	5660
		NOx: 0.667	1258	3145
		PM: 0.067	839	2096
669 MW ESI	Coal	SO2: 5.919	2691	2990
		NOx: 2.113	4933	6278
		PM: 0.285	2392	2840
531 MW CHP	Coal	SO2: 4.112	7156	8475
		NOx: 1.127	2637	4896
		PM: 0.315	8098	9793

[39] Heavy Fuel Oil

700 MW CHP	Coal	SO_2: 3.288	4000	5143
		NOx: 1.026	1286	3143
		PM: 0.291	5429	6714
1334 MW CHP	Coal	SO_2: 1.349	75	300
		NOx: 0.725	0,0	675
		PM: 0.216	750	1049

Source: Author calculation based on ENTEC 2005

Appendix F: Indicators for electricity market liberalisation in EU

Country	Opening	Size of open market (TWh)	Unbundling of transmission system operators/owner	Unbundling of distribution system operators	Biggest 3 generators' share of capacity (%)
Austria	100%	35	Legal	Accounts	33
Belgium	80%	60	Legal	Legal	66
Denmark	100%	33	Legal	Legal	25
Finland	100%	77	Ownership	Accounts	29
France	37%	140	Management	Accounts	86
Germany	100%	490	Legal	Accounts	61
Greece	34%	15	Legal/management	Accounts	87
Ireland	56%	12	Legal/management	Management	90
Italy	66%	182	Own/Legal	Legal	72
Luxembourg	57%	3	Accounts	Accounts	0
Netherlands	63%	64	Ownership	Legal	33
Portugal	45%	18	Ownership	Management	74
Spain	100%	205	Ownership	Legal	79
Sweden	100%	135	Ownership	Legal	50
UK	100%	335	Ownership	Legal	37
Norway	100%	115	Ownership	Accounts	24
Estonia	10%	<1	Accounts	Accounts	21
Latvia	11%	<1	Legal	Legal	0
Lithuania	17%	<1	Legal	Legal	29
Poland	51%	48	Management	Accounts	25
Czech R.	30%	15	Legal	Accounts	53
Slovakia	41%	4	Legal	Legal	40
Hungary	30-35%	9	Accounts	Accounts	41
Slovenia	64%	6	Legal	Accounts	43
Cyprus[22]	33%	1	Management	None	100
Malta	-	-	Derogation	None	100
Romania	33%	11	Legal	Accounts	44
Bulgaria	19%	4	Accounts	Accounts	45
Turkey	23%	24	Legal	Accounts	62

Source: ENTEC 2005

Appendix G: additional cost for Polish Coal Power Plant

Pollutant	Fuel / process	Additional abatement measure	Total cost (€/MWh) (2000 prices)	Cost as a percentage of overall cost of generating electricity (%) (Note 4)	Source of data
SO_2	Coal power station	FGD	5.0 (average, range between 2 and 9)	13% (Note 2)	IEA, 2001 (Note 1)
		FGD	4.5	10% (Note 3)	IEA, 2001
NOx	Coal power station	SCR (in addition to OFA & LNB)	3.2	8% (Note 2)	Table 6.3
		SCR	2.7	6% (Note 3)	IEA, 2001

Notes

1. Average of the cost of FGD installations at 11 power stations in Poland, based on research in 1999. Range is between 2 and 9.

2. Based on a fully depreciated coal power station, with an assumed production cost of €30/MWh (see Table 6.3 for example costs) without FGD or SCR.

3. Based on a generating cost (without FGD and SCR) of approximately €38/MWh

4. Costs expressed as a percentage of total cost of generating electricity (including costs of FGD and SCR)

Appendix H: Summary of industry reactions to IPPC during stakeholder consultations in 2003

In the following table, the reactions of industry are categorised.

Table 26: Industry reactions during IPPC stakeholder consultation in 2003

	Category of answer	No. of answers	
1	No answer given	9	3
2	Supporting community wide emission limits	6	1
3	Supporting flexible emission limit	25	4
4	Supporting both (e.g. uniform standards related to large environmental hazards only)	2	
5	Unclear answer (question answered but no stance taken toward question)	5	
Total		47	8

Source: Author based on CEC 2004

The majority of industry association as well as half of the individual firms that submitted answers are against uniform standards in relation to the IPPC directive. In their answers, they either do not give any justification for their position or argue that flexibility is needed to consider local conditions. Direct references to competition distortion, costs or trade are not made. Very few argue that uniform standards would prevent a level playing field due to the different geographical circumstances of different installations. Very few state that environmental quality standards are to be preferred over uniform emission limit values, as they allow to take into account the geographically "carrying capacity" of local geographical circumstances. Two industry associations (CONCAWE and EUROPIA) suggest that uniform standards would only be reasonable in industries with similar "goals", "products" and "production processes" and cite large combustion plants as an example. Full arguments explaining the preference for flexible standards are never given.

The following table gives an overview of the industry associations in favour of uniform standards and their arguments.

	Industry Association / Company	Argument
1	Austrian Association of Electricity Companies:	Competition distortion will occur without harmonisation
2	British Ceramic Federatiom:	UK Business to suffer tighter standards then other places in Europe
3	CEOE	Only in case of very hazardous substances
4	European Winding Wire Group of Europacable:	Uniform standards increase competitiveness
5	Gesamtverband der deutschen Textilund Modeindustrie e.V.	No reason given
6	Orgalime	Competition distortion would be avoided

		through uniform use if units of measurements in BREF BAT interpretations should be uniform in MS
7	Rexram beverage	case by case is too subjective

Appendix I: Relevant findings of other studies on the question of IPPC and differing cost to industry

Studies on the IPPC - competitiveness relation

There is a small set of literature investigating the IPPC effects on industry competitiveness that indirectly addresses the issues of differing cost through differing MS implementation. I will discuss the results of this set of literature relevant for this context. It has to be underlined that the studies are only of limited value to questions of competition distortion because they investigate the much more complex set of factors related to competitiveness. They are partly useful as they indicate the diffusion of BAT within the considered industries roughly ten years ago. The level of diffusion indicates in the case of IPPC the level of competition distortion from an environmental perspective

Hitchens et al. have conducted an ex-ante study of the effects of the implementation of uniform BAT standards in the cement, the pulp and paper sector as well as the non-ferrous metal sector in 1999. The study assumed that BAT related standards were implemented uniformly across member states and only considered environmental compliance cost .The study concluded that installations that already met high environmental standards were not economically disadvantaged while installations with poor environmental performance were likely to be economically disadvantaged through higher economic burdens (Hitchens et al. 2002). This is nevertheless a very general statement that does not reflect the much more diverse and complex effects within the three sectors considered.

The Cement Industry

The study on the European cement industry compares manufactures of cement in Germany, the UK Italy, Spain and Poland. While the structure of the industry is similar throughout the sample differences existed regarding stringency of national environmental standards, environmental performance and the application of BAT (prior to IPPC implementation) within national industries and between national industries. Germany showed the highest average application of BAT (followed closely by Italy) and lower rates of BAT applications in the remaining countries. As existing national environmental regulation in all sample countries is less stringent then emission levels associated with BAT the application of BAT also differs within national industries[40]. The uniform application of BAT would hence require different levels of investments depending on the existing technology stock. Some of these (e.g. measures to reduce NOx emissions) are costly while some investments are considered to be set off through efficiency gains. However, the costly measures would increase operating cost significantly (0.3-0.5 Euro per tonne of cement plus 0.5 to 1.5 M Euro investment). Interestingly, managers in countries with more stringent environmental regulation, higher BAT and resulting higher environmental expenditures (Germany and Italy) mentioned environmental cost during interviews more often as competitive disadvantage then managers from cement factories in the remaining countries[41] (Wagner/ Triebswetter 2001).

The relevant result from the cement industry study is that a uniform application of BAT as envisioned within the IPPC directive would create a level playing field regarding environmental consumption. Plants already showing a high degree of BAT installation have already made a number of investments which their competitors have not.

Non-Ferrous Metals

A very different situation is revealed for the non-ferrous metals sector. The study compares the implementation of BAT in production sites for five non-ferrous metal products (copper cathodes, copper from scrap-metal, aluminium ingots from secondary raw material, lead ingots from secondary

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[40] E.g. in Germany two plants are considered hight BAT peformers, 5 middle and 1 low.

[41] These plants are however profitable and environmental costs are only one of many factors affecting competitiveness. Also, all managers stated that their overall cost structure did not lead to competitive disadvantages in relation to European cement producers but in relation to Russian and Asian cement producers.

raw material, and waltz oxide production (including the recovery of salt slag). In total, 48 plants are visited for qualitative interviews. The study finds that in 90 per cent of the cases the plants already meet the emission level associated with BAT for air and water emissions. Large differences between plants were only observed for fugitive emissions[42]. According to the BREF fugitive emissions can be reduced through improving material storage and through better handling of the production processed. Investments differ according to extent BAT is already in place, according to the interviews, but are " relatively small" and with no negative effect competitiveness. The companies considering environmental cost was a competitive disadvantage had on average a low level of BAT installed and were less efficient the competitors with a high-level of BAT in place. Companies with a high level of BAT in place were on average more productive regarding the yield of raw-material input. Unfortunately, the study doe not differentiate between environmental and regulatory compliance costs. Also, results are not disaggregated for different EU countries (Farrell 2001).

The paper and pulp industry

The study considers the effects of BAT application kraft pulp mills, white line chipboard production, and paper mills. Kraft pulp mills differ in relation to BAT diffusion und unsurprisingly investment cost to achieve a stronger diffusion of BAT depend on the previous level of BAT although the study underlines that the sample was too small to present reliable data and actual cost are determined by a variety of factors other then the present level of BAT application (e.g. age of plant). Depending on the existing level of BAT investments are expected to range from 10 to 80 million Europe. The study does break down the location of kraft pulp mills with a high level of installed BAT to EU countries, but they seemed to be distributed in a variety of countries rather then concentrated in one of a small number of countries. In the case of white line chipboard production the existing levels of BAT also differ. No information is given regarding the location of the plants. Investment costs were estimated to be between 3 and 12 million Euros depending on the existing level of BAT. In case of the paper mills, different levels of existing BAT installations were found. The study again indicates that no concentration of high-level plants within a single country existed at the time of the study. Investment cost to achieve overall BAT range from 4 to 9 million Euros. Overall, the study concludes that effects on competitiveness might be for some plants severe in case IPPC would get fully implemented, as they would face high investments (Lindblom et al. 2001).

Ten years later, a study by Rave and Triebswetter undertake another study on the competitiveness effects of the IPPC directive. They consider parts of the glass industry part of the steel industry. Opposite to the early studies, they take different implementations of the IPPP directive as a starting point. Regarding the steel industry, the study reports differing compliance cost within member states. Due to limited industry response and method (postal survey backed by selected interviews) the authors underline that any relation between differing cost and differing levels of implementation is at the most weak. Most of the 25 respondents did not answer the question regarding cost of IPPC implementation. The authors assume that steel plants in countries with a history of stringent environmental regulations face minimal compliance cost related to IPPC and have therefore not answered the question. The majority of plants having answered the question of cost came from Spain where the IPPC directive was recently transposed. Costs range from 2,5 to 14 million Euros. Despite the seeming differences, only two Spanish steel plants stated that overall IPPC environmental compliance had a negative impact on their competitiveness (Rave and Triebswetter 2007: 189).

Furthermore, the study reports indicators administrative compliance cost. They are summarised in the following table.

Country	No. Responses	Administrative Cost

[42] Fugitive emissions relate to equipment leaks, emissions from bulk handling , raw material processing, windblown dust, etx

Country	No. Responses	Administrative Cost
Germany		1 complaint about length of admission procedure 2 reports of increased inspections
France		Complaint about length of compliance procedure Complaints about increase of reporting requirements
Poland		1 report of Inflexibility of authorities
Spain		2 reports of lacking guidance and disorganised authorities
Belgium		Complaints about increase of reporting requirements
UK		1 report of increased reporting requirements
Spain		Majority complaints about increased reporting requirements

Source: Rave und Triebswetter 12007: 196

The table shows that administrative burdens might differ for individual companies, unfortunately, the sample is too small to considers whether or not increased administrative cost are systematic for a particular country or represent singular experiences.

Additional to the Rave and Triebswetter Competitiveness study, the EU commissioned a number of further studies assessing the implementation of the IPPC directive[43]. In the following the relevant findings of these studies in relation to competition distortion and the Single Market will be summarised and discussed.

Cost benefit analysis of IPPC directive to 20 to 50 MW industrial combustion plant

The study gathers the status quo of technical installation, emission limits and current emissions of 20 to 50 MW combustion plants for selected EU MS. Cost for emission reduction are calculated by relating status quo emission data to emission cost reduction data from a already existing on model the cost for emission reduction. No further information on the cost for emission reduction data is revealed. Administrative cost are calculated on the basis of UK data for IPPPC for permit applications. The study estimates the overall cost of IPPC application to the 20 to 50 MW combustion plants for a number of scenarios but does not break down the cost on a MS level in the published report (AEA Energy & Environment 2007).

[43] For a full list see Appendix

7 Case Studies

7.1 *Case Study on the European Noise Directive (2002/49/EC) and Its Effects on Major Airports*

By Thomas Sommerer and Aike Müller

7.1.1 Executive Summary

The following case study examines the implementation of the Environmental Noise Directive (END) and its potential consequences for the Single Market. A focus is set on aircraft noise and noise around major airport, and on two Member States Austria and the United Kingdom. Airports play a key role for regional economic growth. The aviation industry alone contributes about 120 billion EUR to the European GDP. Approximately 1.2 million jobs can be directly or indirectly related to the aviation industry. From about 400 European airports only 74 major airports in 19 out of 27 EU member states are directly affected by the END legislation.

The directive has some observable effects on the relative competitiveness in the targeted industry. These effects are related to differences in the national implementation of END as the directive abstains from the prescription of noise emission limits and a completely uniform approach. It is therefore left to the Member States how best to achieve its objectives. Responsible for the differences in the effects of the ENDs' implementation is also the economic situation and geo-strategic position of major airports, the national regime before END and differences in the legal systems of the Member States.

The case study finds no unambiguous evidence for market distortion, but some weak indication of possible effects of the Environmental Noise Directive and differences in national implementation on the relative competitiveness of airport operators. There are also claims for more harmonization and stricter measures. The case of Austria shows that it depends on the geo-strategic position whether some airports can afford higher levels of protection, while others cannot. For a final assessment of the existence of a possible distortion of the common market, it remains to be seen how action plans will affect the situation of the targeted industry.

The current financial and economic crisis also has some effects on the aviation industry and the competitive situation of airport operators. While the overall effects of the crisis are impossible to assess it is likely that the current crisis will at least have some effects on further airport expansion and potential future merges. There is already some evidence that existing plans for airport expansions will be postponed due to its high costs which fall in an insecure investment climate and a world recession that affects nearly all industries.

7.1.2 Introduction

On 25th June 2002 the European Parliament and the Council adopted the European Noise Directive[44] (2002/49/EC) relating to the assessment and management of environmental noise. The aim of the legislation is to define "a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise. The directive also aims to provide a basis for developing Community measures to reduce noise emitted by the

[44] Abbreviated as: END.

major sources, in particular road and rail vehicles and infrastructures, aircraft, outdoor and industrial equipment and mobile machinery" (European Commission 2004: 2).

The Environmental Noise Directive (END) represents a milestone in the European regulation of noise protection. As it abstains from the prescription of noise emission limits and a completely harmonised approach, it is left to the Member States how best to achieve its objectives. In this study that is part of a larger project on the interaction of European environmental policy and the Single Market, we will examine differences in the national implementation measures and its consequences for the competitive situation of affected industries. To highlight the effects of a specific industry in more detail, we focus on the prominent example of aircraft noise and the question if diverging national implementation of noise maps and action plans distorts competition in the field of airport operators and aviation industry. First, in terms of public annoyance, noise exposure around airports is a prominent issue. Second, in contrast to the regulation of noise around highways and railways, the regulation of aircraft noise has potential effects on the single market in terms of competing airport operators in different MS.

The study benefits from a variety of methods and data sources. To understand the national implementation of the END and to assess whether this policy led to real competition distortion, EU and national legislations were studied in detail. This was supported by a comprehensive document analysis of stakeholder process documents, publications from the airport and aviation industry as well as press releases and scientific literature. Most prominently the authors conducted 15 semi-structured face-to-face and telephone interviews with government officials, airport officials and independent policy experts in Austria and the UK.

In section 2, the European policy and the underlying problem of exposure to noise are briefly sketched. Section 3 illustrates the situation of airports and airport operators in Europe. Based on an overview of main features in the process of END implementation, two cases are selected for an in depth study (section 4). Section 5 and 6 present two case studies on Austria and the United Kingdom. Austria is a small country with only one single major airport, while it is in close proximity to competing airports in other Member States. By contrast, a large number of airports in the United Kingdom fell under END legislation. Whereas in Austria, the government has been responsible for the development of noise maps and action plans, the UK government has chosen a different approach to the implementation, designating airport operators as the competent authority. Finally, section 7 sums up the conclusions regarding the effects of END on the Single Market in the field of aircraft noise.

7.1.3 The Environmental Noise Directive 2002/49

7.1.3.1 Noise Exposure: Negative Health Effects and Quality of Life

The rationale for the development of the Environmental Noise Directive END was justified with a lack of consistent and comparable data for EU member states and inconsistent policy measures that so far dealt with the problem. Until the 1990s environmental noise abatement received little political attention compared to other environmental problems such as water or air pollution. This contradicted the public perception of the problem as it became one of the most important environmental pressures and was publicly rated as a problem of similar relevance to global warming recently (CALM 2007: 4).

This perception is supported by an increasing academic consensus about the adverse health effects of environmental noise (Boer/Schroten 2007, Miedema 2007, Bröer 2007, Evans et al. 1998). Especially the negative effects of aircraft and airport noise, which are a subcategory of environmental noise, have been the subject of several separate studies (Hume et al. 2003, Pepper et al. 2003, Bronzaft et al. 1998, Meecham/Shaw 1980). A special focus of research has been on the effects of aircraft noise on sleep disturbance (Miedema and Voss 2004, Ollerhead et al. 1992, van Wiechen et al. 2002).

The Noise Expert Working Groups' „Position Paper on Dose Response relationships between Transportation Noise and Annoyance“ from 2002 revealed that the level of annoyance from aircraft noise is much higher than for road or railway noise. As Table 27 shows, the number of persons annoyed by aircraft noise at a level of 60 dB is about 38%. It is significantly lower for road traffic (26%) and for railroads (15%) (see also Miedema and Voss 1998).

The recent EU-funded HYENA-Project (Hypertension and Exposure to Noise near Airports) investigated adverse health effects over a time period of 4 years. It included studies near six major airports in Germany (Berlin Tegel), Greece (Athens), Italy (Milano Malpensa), the Netherlands (Amsterdam Schiphol), Sweden (Stockholm Arlanda) and the UK (London Heathrow). Altogether 5000 participants between 45-70 years near any of these airports were included in the study (Jarup et al. 2005). The project confirms negative health effects and found out that living near airports increases the risk of hypertension (Jarup et al. 2008, Haralabidis et al. 2008). Other studies show that the specific adverse effects reach from medical related problems such as insomnia, high blood pressure, ischemic heart disease and hearing damages to psychological stress or negative effects on the learning capabilities of children (CALM 2007: 8, Berglund et al. 1999). Unsurprisingly, these studies are sometimes questioned by the affected industry on general or methodological grounds (IATA 2004: 5).

It is estimated that around 20 percent of Western Europe's inhabitants suffer from noise levels that scientists consider to be unacceptable (European Commission 1996). In the year 2000 about 44% of the population of the EU25 (~ 210 million people) were exposed to road traffic noise levels above 55 dB(A) which is the guideline value for outdoor noise levels and the threshold for „serious annoyance“ (Boer/Schroten 2007: 12, Berglund et al. 1999). As Table 27 shows, more than 50 million people in selected OECD countries were exposed to road traffic noise levels over 65 dB(A), which is ten times louder than the WHO guideline value. Nearly 30 million people in OECD countries are exposed to severe Aircraft noise between 65-70 dB(A). Estimations of the economic and social costs of noise exposure are difficult to assess but some studies estimate them up to 30-46 billion EUR per year for road traffic noise in the EU22, which is approximately 0.4% of total GDP in the EU22 (Boer/Schroten 2007: 21).

Table 27: Population Exposed to Transport Noise (Million People)

Country	Road dB(A)					Air dB(A)					Rail dB(A)				
	55-60	60-65	65-70	70-75	>75	55-60	60-65	65-70	70-75	>75	55-60	60-65	65-70	70-75	>75
Austria	0.62	0.47	0.76	0.29	0.11	0.04	0.03	0.05	0.02	0.01	0.04	0.02	0.04	0.01	0.01
Belgium	3.00	2.72	1.08	0.09	0.01	0.12	0.09	0.04	0.02	0.01	0.37	0.22	0.10	0.04	0.02
Denmark	0.56	0.41	0.41	0.06	0.04	0.06	0.03	0.01	0.01	0.00	0.08	0.05	0.02	0.01	0.00
Finland	0.35	0.24	0.21	0.04	0.00	0.06	0.04	0.02	0.01	0.01	0.19	0.11	0.05	0.02	0.01
France	12.0	9.30	6.20	2.76	0.34	0.69	0.49	0.20	0.09	0.06	0.22	0.23	0.11	0.06	0.05
Germany	11.8	10.1	5.94	3.10	0.70	0.47	0.39	0.30	0.20	0.13	6.01	3.73	1.51	0.44	0.06
Greece	1.39	0.89	0.58	0.12	0.04	0.05	0.05	0.02	0.01	0.01	0.15	0.08	0.04	0.01	0.01
Ireland	0.69	0.45	0.26	0.08	0.02	0.04	0.03	0.01	0.01	0.00	0.13	0.08	0.04	0.01	0.01
Italy	11.3	7.43	4.30	1.29	0.37	0.71	0.51	0.21	0.10	0.06	3.50	2.50	1.30	0.40	0.10
Luxembourg	0.08	0.05	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00
Netherlands	5.10	2.40	0.40	0.15	0.05	3.15	1.80	0.30	0.10	0.05	0.68	0.14	0.05	0.03	0.02
Norway	0.60	0.40	0.25	0.08	0.03	0.01	0.07	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Portugal	1.94	1.28	0.74	0.22	0.06	0.12	0.09	0.04	0.02	0.01	0.37	0.23	0.10	0.04	0.02
Spain	7.35	4.83	2.80	0.84	0.24	0.46	0.33	0.14	0.06	0.04	1.42	0.86	0.39	0.14	0.06
Sweden	0.84	0.41	0.27	0.06	0.01	0.07	0.03	0.00	0.00	0.00	0.24	0.13	0.05	0.01	0.00
Switzerland	180	0.95	0.49	0.22	0.04	0.07	0.03	0.04	0.01	0.01	0.68	0.47	0.22	0.10	0.06
UK	17.2	9.20	4.60	0.50	0.60	2.25	1.21	0.16	0.03	0.01	0.66	0.50	0.17	0.04	0.02
Total	**76.7**	**51.6**	**29.3**	**9.91**	**2.66**	**8.37**	**5.22**	**1.56**	**0.70**	**0.42**	**14.7**	**9.37**	**4.19**	**1.36**	**0.44**

Source: ATAG 2002: 45

7.1.3.2 European Noise Regulation and Directive 2002/49/EC

European Community measures to address the problem of environmental noise exist since the 1970s. Successive EU Directives have laid down noise emission limits for road vehicles and for many types of outdoor equipment in order to control noise pollution. For example, noise emissions from motor vehicles have been regulated by directive 70/157/EC, noise from subsonic aeroplanes in directive 80/51/EC.[45] Parallel to the END the EU adopted the Directive 2002/30 in 2002, which concerns noise-related operating restrictions at Community airports.[46] An agreement on this issue had been reached in ICAO for the banning of the older and noisier Chapter 2 which took effect in April of that year. More recently, an agreement had been reached in ICAO on Chapter 4 setting noise standards for new aircraft entering service, but no timetable was set for the phasing out of Chapter 3 aircraft. The EU Directive 2002/30 envisaged operating restrictions on aircraft that were marginally compliant with Chapter 3 being adopted at individual airports within the framework of the 'Balanced Approach' set out by ICAO, and set out rules for the establishment of those restrictions. The Directive mandated the Commission to carry out a review after five years.[47]

Despite the increasingly stringent legislation on noise sources and the progress made in noise control by the industry, there has been little improvement in the noise exposure levels endured by citizens across Europe (European Commission 2007). While an individual aircraft can be made quieter, the rate of innovation and uptake of new technology are likely to be much slower than the rate of growth of air travel. Therefore it is likely that following a period of relative improvement over the next decade, local environmental impacts from aviation could worsen (POST 2003a).

In 1996 the EU Commission undertook a first major step in the direction of a common noise policy with the publication of a Green Paper of the Future Noise Policy of the Community. The Green Paper has a special emphasis on assessing and managing the exposure to environmental noise.[48] It reviews the state of the art in noise policy including existing community measures and policies to reduce noise exposure and their application, the negative effects of noise including its external costs as well as different sources of noise.

One major conclusion that was drawn from the Green Paper is the poor state of available data on noise exposure. In addition, available data and noise contours are difficult to compare as member countries use different methods to obtain relevant data. This is a purely historical reason as some member states have independently developed their own system of noise indicators. Research shows possible differences in the outcome of noise calculations using different national methodologies of up to 15 dB(A). National noise indices and noise standards also differ considerably, making it even more difficult to compare data on noise exposure (Schipper et al. 2003: 591f). An international comparison of zone limits for aircraft noise by Bruell and Kjaer (2001) illustrates this diversity for several Member States and other OECD countries (Table 28).

Table 28: Zone Limits for Aircraft Noise

Country	No Restriction	Insulation Measures	No Dwellings
Australia	< 53	53-56	>55
Canada	< 57	60-62	>68
China		< 54	
Denmark	< 51	>61	>51
France		< 62	62-71
Germany	< 62	67-75	>75
Japan		< 54	>69
Netherlands	< 50	53-56	>50

45 Council Directive of 6 February 1970 on the approximation of the laws of the Member States relating to the permissible sound level and the exhaust system of motor vehicles, Official Journal L 42, 23.2.1970, p. 16–20, recently amended by Directive 2007/34/EC ; Council Directive 80/51/EEC of 20 December 1979 on the limitation of noise emissions from subsonic aircraft, Official Journal L 018 , 24.1.1980 P. 26-28.

46 http://eur-lex.europa.eu/pri/en/oj/dat/2002/l_085/l_08520020328en00400046.pdf (18.01.2009).

47 For an in depth-stucy on this issue see M P D Group Limited 2007.

48 'Future Noise Policy': European Commission Green Paper. Brussels: European Commission, 1996

Country	No Restriction	Insulation Measures	No Dwellings
New Zealand	< 52	52-62	>62
Norway	< 55	55-65	>55
Sweden	< 51		
Switzerland		62-72	>62
United Kingdom	< 55	55-64	>70

Source: Bruell and Kjaer 2001, All limits are shown as LAeq, 24 h values

The need for comparable data and a common approach in European noise policy finally lead to the directive 2002/49/EC relating to the assessment and management of environmental noise. On 26 July 2000 the Commission submitted a proposal for a directive relating to the assessment and management of environmental noise following the Green Paper.[49] With 10 amendments, this proposal has been transposed to the Noise Framework Directive at the second reading of the European Parliament on 3 October 2001. It has finally been adopted by the EP and the council on 25 June 2002.[50]

The main action that needs to be implemented progressively includes the following steps:

1. the determination of exposure to environmental noise, through ***noise mapping***, by methods of assessment common to the Member States;
2. the information of the public on environmental noise and its effects;
3. the adoption of ***action plans*** by the Member States, based upon noise-mapping results, with a view to preventing and reducing environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health and to preserving environmental noise quality where it is good.
4. the adoption of ***action plans*** by the Member States, based upon noise-mapping results, with a view to preventing and reducing environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health and to preserving environmental noise quality where it is good.
5. to provide a basis for developing community measures to reduce noise emitted by its major sources.

The two central pillars of the END are the creation of strategic noise maps and action plans which have to be available to the public. Member States have to develop strategic noise maps (Article 7) and action plans (Article 8) designed to manage, within their territories, noise issues and effects, including noise reduction if necessary for major roads (more than six million vehicles p.a.), major railways (more than 60,000 train passages p.a.), major airports (more than 50,000 movements p.a.) and agglomerations with more than 250,000 inhabitants. The plans must also aim at protecting quite areas against increasing noise pollution.

First versions of strategic noise maps were due to 30th June 2007. The action plans had to be prepared by the relevant authorities until 18th July 2008 and have to be submitted to the Commission no later than January 18th 2009, which so far has not happened for every member state and affected industries.[51] The directive consists of a main body and six supporting technical annexes on noise indicators, assessment methods for indicators and harmful effects, requirements for strategic noise

[49] OJ C 337 E, 28.11.2000, p. 251.

[50] OJ L 189, 18.7.2002, p. 12–25.

[51] http://ec.europa.eu/environment/noise/pdf/deadlines_d2002_49.pdf (12.12.2008).

mappings and action plans. The data has to be sent to the commission. In most parts, the directive aims at harmonizing indices and calculation methods.[52]

If full implementation is assumed, this harmonization will eventually make noise situations in different Member States comparable. The noise directive does not set any EU-wide limit or binding target values on environmental noise abatement. The setting of such values to protect EU citizens against the adverse effects of noise overloads is regarded as a matter of subsidiary and are therefore left to the individual Member States (Schipper et al. 2003: 59, CALM 2007: 15).). Therefore, existing national noise standards will probably still remain valid for many years. Furthermore, without the background of comparable data on the exposure to noise, it would have been difficult - in terms of technical details and political as well as economic interests - to fix uniform standards at that time.

The END also sketches the next steps in the European regulation. According to Article 11, the Commission is expected to submit a report on the implementation of the END to the European Parliament and the Council no later than 18 June 2009. The review of noise maps and action plans at the level of member states in 2012 and every five years after is laid down in Article 7 and 8.

7.1.4 Industry

7.1.4.1 Major Airports in Europe

According to information provided by the Commission, END measures against noise from transportation affect 162 agglomerations, 82.575 km of major roads, 12.315 km of major railways and 74 major airports in EU Member States.[53] This information shows that the legislation of the END has several implications not only for member states but also for relevant industries responsible for traffic and industry noise. In order to assess potential market distortions as a result of a lock of standardisation of the Environmental Noise Directive, it is necessary to narrow the focus to a single industry, which is affected by the END. After consultation with the Commission and the project partners, the airport/air-traffic industry was selected as an important case.

Table 29: Number of Major Airports in the EU-Area[54]

	Member State	No. of Major Airports
1	United Kingdom	20
2	Spain	10
3	Germany	9
4	France	9
5	Italy	9
6	Denmark	3
7	Sweden	2
8	Belgium	1
9	Czech Republic	1
10	Ireland	1
11	Greece	1
12	Luxembourg	1
13	Hungary	1
14	Netherlands	1
15	Austria	1
16	Poland	1
17	Portugal	1

52 See also the "Harmonise Project" for harmonized accurate and reliable methods for the EU directive on the assessment and management of environmental noise, http://www.harmonoise.org.

53 http://circa.europa.eu/Public/irc/env/d_2002_49/home (12.12.2008).

54 For Source see Appendix 1.

	Member State	No. of Major Airports
18	Romania	1
19	Finland	1
	Σ	74

According to article 3(p) of END, a major airport „shall mean a civil airport, designated by the Member State, which has more than 50 000 movements per year (a movement being a take-off or a landing), excluding those purely for training purposes on light aircraft." From overall 400 aerodromes in the EU, the END definition of major airports aims at 74 airfields in 19 Member States (DG Transport 2008). Eight smaller MS - Estonia, Bulgaria, Cyprus, Latvia, Lithuania, Malta, Slovenia, Slovakia - do not have a major airport with more than 50,000 movements per year. Thus, they are not a direct target of the environmental noise directive in the area of airport noise. Only Member States with at least one affected major airport are discussed in more detail for this case study.

The number of affected airports is unevenly located (see Table 29). In general larger and more populated countries have more major airports. Only five countries (UK, Spain, Germany, France, Italy) have more than 3 major airports. These countries together count 57 major airports, which is more than 3/4 of all affected airports. Among these countries, the United Kingdom plays a special role. The high number of 20 major airports is mainly due to its island position. A detailed overview on all 74 airports, their names, location and the number of aircraft movements can be found in Annex A.

European airports cover 12% of worldwide commercial aircraft movements, which sum up to 6.3 million in 2007. Appendix 2 displays the busiest 20 airports in Europe in terms of commercial aircraft movements for 2007 (DG Energy and Transport 2007). The top-5 include Paris Charles de Gaulle (544 000 movements / 60 million passengers), Frankfurt/Main (486 000 / 54 million), Madrid Barajas (482 000 / 52 million), London Heathrow (476 000 / 67 million) and Amsterdam Schiphol (436 000 / 48 million). The total number of European commercial aircraft movements in 2007 was 16.6 million, of which Europe's top 20 airports covered 38 %.

Appendix 3 classifies all European airports according to their number of passengers (DG Energy and Transport 2008, Key facts). In sum, 31 airports exceed the threshold of 10 million passengers per year, which is roughly comparable to 100,000 flight movements – two times more than the END definition of a "major airport". The second category between 1.5 and 10 million passengers comprises 101 airports. Given the number of 74 'major' airports, less than half of these 101 aerodromes is affected by END obligations. Finally, 254 European airports had less than 1.5 mio. passengers in 2007, almost 50% of them are small airfields with less than 150 passengers.

7.1.4.2 Airport Operators and the Economic Impact of the Aviation Industry

Key figures on aviation industry in Europe

With more than 130 scheduled airlines and a network of over 400 airports, the sector of air transport makes a key contribution to the European economy. Airports are commonly considered as important contributor to economic development (Bel and Fageda 2006). A prospering air transport sector increases the competitiveness of national economies (AOA and York Aviation 2005, OEF 2006). The comparison of the growth in GDP and growth rates in air transport shows a strong correlation (ATAG 2002). In the urban areas around airports, air transport stimulates to regional growth with direct employment and multiplier effects.

Aviation industry, covering airline and airport operations for business travellers, tourists, freight, airport maintenance, air traffic control and activities such as baggage-handling and catering employs more than 3 million people in the EU. It contributes more than EUR 120 billion to European GDP (DG Energy and Transport 2008). Approximately 1.2 million jobs are directly related to on-airport employment, including 170,000 employments at airport operators (AOA and York Aviation 2005).

Over the last decades, air-transport became one of the most important and fastest growing industries. Since the 1960s, passenger traffic has grown at nearly 9 % per annum, which is 2.4 times more than the growth of the gross domestic product over the same time. It is projected to grow further at least to the year 2015 (IPCC 1999, Watson 1999:9). In 1990 the total revenue of all airlines was 199.5 billion $US which increased to 328.8 billion $US in 2000. This was accompanied by an increase in annual air-transport kilometres from 14.37 Million (1990) to 26.67 Million kilometres in 1999 and an increase in the number of passengers from 1.16 billion (1990) to 1.64 billion by the year 2000 (ICAO 2001). Even 9/11 only lead to an interim decline in the overall growth of the sector.

Airport operators

Appendix 4 gives an overview of 18 European airport operators and their ownership structure. These enterprises control 45 major airports as well as further 140 small and regional airfields, around 40% of all European airports. Some airport authorities such as Flughafen Düsseldorf are responsible for managing one airport exclusively, while there are several examples of airport authorities managing networks of airports such as Sweden's LFV or the Spanish-owned British Airports Authority (BAA).

Until the mid 1990s, airport operators have been overly state-owned. Driven by ongoing liberalization of air transport in the European Union, airport privatization emerged during the last decade: airfields are more and more operated as commercial business and not as public service organizations. However still 11 of the 18 largest airport operators are completely publicly owned today, with federal, regional or local government involved (Appendix 4). For some privatised airports, such as Rome and Athens, shares are held by either a single or group of strategic airport investors (e.g. Hochtief). Five airport operators have their shares listed on national stock exchanges (DG Energy and Transport 2006).

Most recently, the French government partially privatised Aéroports de Paris (from 0% to 32.50% of shares), and the Belgian government sold 70% of its stake in Brussels Airport. In addition, FRAPORT (Germany) increased the share of private ownership from 29.40 % to 41.42 % in 2005. Although privatization has so far involved only few European airports, far-reaching transactions are expected in the coming years (ICAO Annual Report 2007).

The authors of the York Aviation Study (AOA and York Aviation 2005) identify the major reason for this trend: operating an airport above a certain threshold of typically 500,000 passengers can be a profitable business. Bel and Fageda (2006) give an alternative explanation. They claim that airline liberalization has brought competitive forces to the whole chain of the aviation industry and thus to privately as well as publicly operated airports. In addition, the need of undertaking capacity expansions along with constrained public budgets has promoted the involvement of private firms and a profit-maximizing behaviour.

Airport operation actually is a profitable business, as figures of aggregated results and operating margins suggest (Appendix 5). The financial performance of European airport operators is high, with an average operating margin increasing from 19.3% in 2001 to 22.2% in 2006 Appendix 5). Growing cost pressures of passenger security requirements after 9/11 causes the modest increase in operating margin after 2002. In the same period however, the net margin increased from 8.3%up to 14.6%. In addition, a survey of 50 European airports found out that the average return on capital was 4.6 percent (SH&E 2006).

Economic outlook

Before the financial crisis emerged in mid-2008, analysts expected the airport business and aviation industry to grow significantly in the near future. A 2008 survey of Eurocontrol noted a planned 41% increase in airport capacity between 2007 and 2030, including new airports, 29 new runways and new air- and ground-side infrastructures (Eurocontrol 2008). Within the available capacity in 2007, the forecast is that by 2030 there will be between 1.7 and 2.2 times the number of flights in Europe. Total world airline scheduled passenger traffic in terms of passenger-kilometres is expected to grow at an average annual rate of 4.6 % up to the year 2025. The total number of departures and distance flown on domestic and international services of scheduled airlines are expected to more than double over the 2005-2025 period (ICAO 2007). Nonetheless these figures have to be related to a recent growth warning from December 2008 as the International Air Transport Association (IATA) forecasts an industry loss of US$2.5 billion for the year 2009 (IATA 2008).

The growth of the air transport sector is threatened even without considering effects of the global financial crisis. The capacities of airports are limited, and the enlargement of major airports and regional airfield seems inevitable and cannot be completely substituted by better flight logistics and increasing aircraft capacity (Eurocontrol 2008). As it can be seen from the prominent examples of Frankfurt or Heathrow, the expansion of airports in urban areas faces many difficulties.

7.1.4.3 The Competitive Situation of Major Airports in Europe

The operation of an airport has long be seen as a classic exemplary of a natural monopoly, as the passengers' point of departure and his destination are fixed. As Nobel laureate Joseph Stiglitz pointed it out, „airports are a monopoly and there is no competition to force it to change.“ (Interview with Financial Times, 22 August 2006). However, airline deregulation and airport privatisation have brought opportunities for airport competition (Bel and Fageda 2006). The rise of low-cost carrier and their willingness to open new bases throughout Europe lead to an increase in the bargaining power of airlines regarding the contracts with airports (Starkie 2008). Airport services mainly depend on airlines offering flights from their facilities, so airport competition involves rivalry to attract airline activities (Bel and Fageda 2006). In general, airports can either compete to attract low-cost carriers or strive to be the transfer ‘hub’ of international alliances.

First, competition between airport operators can occur between neighbouring airports that share the same hinterlands, e.g. in London, Berlin or Paris. In many cases, such competition is restricted through the common ownership of airports within the same urban area (OEF 2002, BDF 2007). If ownership is divided, a traditional division of task may exist between an airport for low cost carriers and charter flights (Cologne or London Gatwick) and business airports (Düsseldorf or London City), so that competition does not matter (BDF 2007). However, there is a number of neighbouring airports separated by national borders, so that the ownership structure and the regulatory environment differ. This is the case for the Amsterdam Schiphol (with Brussels National 150 km away) or Vienna, with Slovakian airport of Bratislava only 48km away.

Second, airport competition can no longer simply be seen as a matter of competition between spatially adjacent airports. In the new regime of low-cost carriers and contracts between airlines and airports, competition takes place over a very wide geographic market (Starkie 2008). Airports can compete with other so-called ‘hubs’ for international or intercontinental flights – transit passengers normally do not care about the location of the hub (BDF 2007). For example, London Heathrow competes with European mainland hubs for intercontinental flights (e.g. Amsterdam Schiphol or Paris de Gaulle, Starkie 2008). The willingness of logistic enterprises and private customers of low cost carriers to accept a longer transfer to the airfield increases competition between distant airports. One prominent example can be found in the decision of Deutsche Posts' division DHL to move its central logistics hub from Brussels Airport to Leipzig/Halle in eastern Germany in 2004 – about 540 km away from Brussels; a third competitor has been a regional airport in Vatry/France – 230 km away.[55] Even if the change from one airport to another can be seen as a costly endeavour, the lack of capacity forces airlines to do so (BDF 2007). Thus, if the implementation of European noise policy affects the expansion of airports differently, changes in the relative competitiveness could be the consequence.

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[55] Sueddeutsche Zeitung, 10 November 2004

Third, small and regional airfields compete with major airports (Starkie 2008). This kind of competition evokes ambiguous reactions. On the one hand, competing larger airports and airlines have claimed the existence of state aid for small airfields to distort market conditions, since many of these regional airports are still in public hands (Bel and Fageda 2006). On the other hand, airports face high fixed costs, so that strong competition can be expected to generate financial losses in airports with small traffic volumes (Starkie 2008, Pels et al. 2003). This aspect of airport competition is also relevant for the analysis of the financial effects of noise regulation and planning. Large airports with high traffic volume commonly face greater difficulties for expansion than small ones. In addition, only major airports are subjected to the development of noise maps and action plans by END, with partially costly consequences. Regional airports situated outside an agglomeration could experience a competitive advantage by growing to a threshold of 50,000 movements per annum without any costly obligation for noise mapping and action planning.

7.1.5 Member States Implementation of the European Noise Directive

The European Noise Directive 2002/49/EC was adopted on 25th June 2002 by the Council and the European Parliament with the aim to define a common framework to avoid, prevent or reduce the harmful effects of environmental noise. As already mentioned above, the directive abstains from the prescription of noise emission limits and a completely harmonised approach. Therefore it is left to the Member States to decide on national implementation measures designed to achieve the objectives of the directive. The following section will examine the key differences in the national implementation measures and related legislation of the END. As a result of this brief overview two cases are selected for a more detailed and in-depth study of the implementation and its potential consequences for the competitive situation of airport operators and the aviation industry.

7.1.5.1 National Implementation of the END

Member states' implementation of the European Noise Directive 2002/49 varies in time, strictness and ambition of the member countries. Although the overall transposition deadline of the directive was July, 18th 2004 for all EU member states[56], from 19 member states with a major airport, only four countries (Denmark, Netherlands, Spain, Sweden) implemented the END before. Most countries lag behind for one or two years, the last implementation took place in late 2006. Frequently, differences in implementation can be related to the different state structures and legal systems of the member states (e.g. federal vs. central states).

Table 30 shows the main developments and responsible authorities for the national implementation of the END 2002/49. Generally, the overall responsibility of the implementation of the END into national law falls into the competency of the Environmental Ministries (EnvMin). In the United Kingdom, the Netherlands and Finland, the Ministry of Transport is in charge whereas in the Czech Republic the Ministry of Health has the overall responsibility for the national implementation.

The concrete competencies for noise mapping and action plans differ more considerably among the national authorities. Some variation could have been expected, given the fact that the definition of 'responsible authority' (Art. 4 (1)) is not further specified in the directive. In some cases ministries like the Ministry of Public Works in Spain (Ministerio de Fomento) or the Ministry of Transport, Innovation and Technology (Bundesministerium für Verkehr, Innovation und Technologie) in Austria (together with local authorities) or the Civil Aviation Authority (France) are responsible for noise mapping and action plans. In other cases, the environmental administration takes charge of the development of these instruments (Belgium, Denmark, Greece, Hungary, Luxemburg). For federal states, the implementation of END regarding major airports falls in the competency of federal authorities (Austria), of local authorities (Belgium) or is a mixture of both (Germany).

[56] Bulgaria and Romania had extended deadlines (01.07.2007).

Table 30: National Implementation of END 2002/49

MS	National Legislation*	Overall Responsibility	Noise Mapping	Action Plans	Legal Action	ECJ Ruling
Austria	04.07.2005	EnvMin	Min. Transport, Min. of Economy and local authorities	Min. Transport, Min. of Economy and local authorities	yes	yes
Belgium	22.07.2005	EnvMin	EnvMin (with obligatory consultation of airport operator)	EnvMin (with obligatory consultation of airport operator)	yes	no
Czech Republic	30.11.2006	Min. of Health	Min. of Health	Min. of Health	yes	yes
Denmark	07.07.2004	EnvMin	EnvMin	EnvMin	no	no
Finland	19.08.2004	EnvMin	Finavia (Airport)	Finavia (Airport)	yes	no
France	12.11.2004	EnvMin	Civil Aviation Authority, EnvMin	Civil Aviation Authority, EnvMin	yes	no
Germany	24.06.2005	EnvMin	Local and Federal Authorities	Local and Federal Authorities	no	no
Greece	28.03.2006	EnvMin	EnvMin	EnvMin	yes	no
Hungary	20.10.2004	EnvMin	EnvMin	EnvMin	no	no
Ireland	03.04.2006	Environment Protection Agency	City and County Councils, Airport Authority	City and County Councils, Airport Authority	yes	yes
Italy	23.09.2005	EnvMin	Airports and local authorities	Airports and local authorities	yes	no
Luxembourg	02.08.2006	Environment Administration	Environment Administration	Environment Administration	yes	yes
Netherlands	30.06.2004	Min. Transport	Min. Transport	Min.Transport	no	no
Poland	27.06.2005	EnvMin	Airport operator	Airport operator	no	no
Portugal	31.07.2006	EnvMin	ANA-Aeroportos de Portugal	ANA-Aeroportos de Portugal	yes	no
Romania	27.04.2005	EnvMin	Min. of Transport	Min. of Transport	no	no
Spain	17.11.2003	EnvMin	Min. of Public Works	Min. of Public Works	no	no
Sweden	01.07.2004	Min. Enterprise, Energy and Communications	LFV group (Airport)	LFV group (Airport)	no	no
United Kingdom	08.08.2006	EnvMin (DEFRA), Transport Min (DFT) /	Transport Min. / Airport operators (Heathrow, Gatwick, Stansted)	Airport Operators, guidance from Transport Min.	yes	yes

*Transpositions deadline for all member states: was 18.07.2004, except Bulgaria, Romania: 01.07.2007

In a number of countries, noise maps and action plans have to be developed by airport operators themselves. This is the case for Finland, Italy, Poland, Portugal, Sweden and the United Kingdom. The consultation of the Brussels airport operator is obligatory in Belgium. It has to be assessed whether this kind of delegation leads to substantial differences in the implementation of END between member states, in particular for the United Kingdom and Italy where at least some airports have already been privatized.[57]

Differences in national regulations may also be linked to differences in the speed of implementation. While nearly all member states did not meet the EU deadline for the national implementation only some had to face legal action as the last two columns of Table 30 suggest. On July, the 11th 2005, one year after the passing of the overall transposition deadline, the European Commission took legal action against eleven Member States as they were lagging behind the proposed deadline to transpose the END into national law. The concerned Member States were Austria, Belgium, the Czech

[57] In Denmark and Sweden, the environmental permit scheme caused problems for the development of action plans and noise maps. In these countries, the operation of an airport is conditional on the existence of an environmental permit, specifying environmental requirements and orders. In return, the state guarantees that no addition requirements (like action plans) will be imposed for a given period of time. See Nordic Working Group For Environmental Issues In Aviation (N-ALM), Subgroup on Noise, 20.11.2006, COPENHAGEN, records. www.slv.dk/Dokumenter/dscgi/ds.py/View/Collection-1450 (15.01.2009).

Republic, Finland, France, Greece, Ireland, Italy, Luxembourg, Portugal and the United Kingdom (EC Press Release 2005: IP/05/894). The standard procedure for a legal process follows article 226 of the Treaty establishing the European Community. This article empowers the Commission to take legal action against Member States that are not respecting its obligations resulting from specific directives.

In case of a potential infringement of EU law the Commission addresses a first written warning (Letter of Formal Notice) to the Member State concerned, requesting it to submit its position on the issue by a specified date. It depends on this reply and the reasons for the delay whether the Commission decides to address a final written warning (Reasoned Opinion) to the Member State concerned. This clearly and definitively sets out the reasons why it considers there to have been an infringement of EU law and calls upon the Member State to comply within a specified period (EC Press Release 2005: IP/05/894). If the Member State fails to comply with the Reasoned Opinion, the Commission can decide to bring the case before the European Court of Justice, which has happened in five out of eleven potential cases for late implementation of the END (see last two columns of Table 30). Austria (Case C-94/06), the Czech Republic (C-140/06), the United Kingdom (C-138/06), Luxembourg (C-78/06) and Ireland (C-137/06)[58] had to face action before the European Court of Justice. In the cases of Austria, Luxembourg and the United Kingdom the Court declared that these countries failed to adopt all laws necessary to comply with the Directive 2002/49/EC within the period prescribed and ordered them to pay the costs.

Before the implementation of the END, various national regulations existed in the MS, sometimes for a longer period, for example in France (Loi relative à la lutte contre le bruit, 1992), Italy (Legge quadro sull'inquinamento acustico, 1995) or Germany (Gesetz zum Schutz gegen Fluglärm, 1971). Governments had chosen various instruments, standards and methods of calculation. As it has been outlined above, the END did not introduce binding standards, so that its implementation did not level the playing field. However, the comparability of data generated by the harmonised approach to noise mapping, could be interpreted as a first step in this direction.

7.1.5.2 Identification of Cases

The preceding chapter gave a short impression on differences in targets of the national implementation of the Environmental Noise Directive. Against the background of this information Austria and the United Kingdom are selected for deeper analysis of the implementation of the END. As shown in Table 30, the overall responsibility for the national implementation of the directive differs. In most members states the overall responsibility for the national implementation of the directive falls into the competency of the Environmental Ministries. This is also true for the case of Austria where the environmental ministry shared the responsibilities for noise mapping and action planning with Austrian Ministry for Transport, Innovation and Technology (BMVIT) and with the Austrian Ministry of Economy. [59] In Austria the 'classic' implementation of the END through different state authorities in a complex federal system led to some inconsistencies and a delay in the national implementation of the END.

The implementation of the END in the UK is strikingly different but the implementation was also delayed. While the overall responsibility remains with two state authorities (Department for Transport, DFT and the Department for Environment, Food and Rural Affairs, DEFRA) the establishment of noise maps and action plans are delegated to airport operators. This turns out as a very important selection criterion: As airport operators in the UK are dominated by private enterprises this ideally contrasts with the case of Austria where state authorities are responsible for this task.

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[58] For details on the the cases follow http://curia.europa.eu/jurisp/cgi-bin/form.pl?lang=en (27.01.2009).

[59] For partial noise maps and action plans for industries operating under annex 4 of the Austrian trade law (GewO 1994).

The UK also hosts some of Europe's most important and biggest airports. With 20 airports, the UK is by far the member state that has the most airports with annual movements beyond the END threshold of 50,000 movements per year. The area of South-West England with its major airports Heathrow, Gatwick, London City, Stansted and Luton together represent the largest air transport system in Europe, handling nearly 100 million passengers every year and which face strong competition from its European rivals in France (Paris Charles de Gaulle), the Netherlands (Amsterdam-Schiphol) and Germany (Frankfurt). London Heathrow is the most important airport in the UK and one of the leading airports in Europe. With 68 million passengers in 2007 Heathrow covers about 28 % of all UK airport passengers. Due to high number of big or medium sized airports, the aviation industry is of crucial importance as it directly contributes to the UK economy through the turnover and profits of airports and airlines.

Austria's main airport Wien-Schwechat (Vienna) is also of crucial importance for the economic prosperity of the country and faces an extraordinary competition situation on the regional and international level. The airport of Vienna is an international "hub" for destinations in Eastern Europe, but regional competition is also of great interest as one of its competitors is the Airport of Bratislava which is only 48 km away from Vienna and located in another EU Member State (Slovak Republic). With only 32,000 movements in 2007 the airport of Bratislava does not fall under the END.
In contrast to the UK the Republic of Austria only has one major airport, which is directly affected by the END. One could argue that this could turn out as an advantage for small MS like Austria because they face fewer obligations. As a consequence small MS have to prepare less noise maps and action plans and thus have to spend less money on the associated costs.

7.1.6 Case 1: Austria

7.1.6.1 The Implementation of END 2002/49/EC in Austria

National legislation before END

Austria is a very interesting but also complex case regarding the national implementation of the Environmental Noise Directive, because of the ambiguous situation of noise protection in Austria before. The national legislation that followed the European Directive filled the blank of legal measures on aircraft noise protection in Austria. While in Germany, a law on aircraft noise has been in place since 1971, Austria passed no overall and consistent noise regulation until 2005 (Feilmayer et al.2007: 26). So far, noise protection was a 'by-product' of other legal acts on the federal and the central state level, while aircraft and airport noise was under the competence of the central state (Dieberger et al. 1994: 68). Most relevant was the Austrian aviation law (Österreichisches Luftfahrtgesetz, LFG) from 1957 and the ICAO guidelines for noise certification (ibid.: 70, 72).

Although Austria had no overall noise protection regulation before the implementation of the END it had some strict measures in the areas of railway or road traffic or industrial noise (Interview Lechner). Austria has a longer tradition regarding technical approaches to noise protection in general. This is represented in the success of the silent lorries-programme back from 1989 and other activities of the Austrian Working Group on Noise Abatement (Österreichischer Arbeitsring für Lärmbekämpfung ÖAL) since it its foundation in 1958. Thus, Austrian noise experts see their country as one of the leading European nations regarding noise protection (Interview Gartner, Interview Ortner, Interview Rosenbaum).

The result from Airport Vienna Mediation process from 2001-2005 can be seen as an exemplary case in this regard (Interview Gartner, Interview Jöchlinger). After a period of five years of negotiations, in 2005 a mediation contract had been signed between Vienna Airport (FWAG), local government and citizens' initiatives. It contains provisions regarding night flights, flight paths, technical noise protection and environmental impact assessment. In addition, an Environmental Fund was established to finance noise protection measures. e.g. the installation of noise proof windows, starting at a noise level of 45 dB (night zones) and 54 dB (night zones), or the acquisitions of real estate inside conflict zones at market prices. The latter applies to a noise level of >57 dB in night noise zones, and to >65 dB in day noise zones, calculated in accordance with the Sydney model (Vienna Mediation 2005). These results reflect a broadening consensus in the Austrian population and were praised by the majority of the participants and observers as a landmark achievement and role model for mediation processes at other airports. Although the costs of positive public relations and environmental friendly reputation are not easy to quantify they nonetheless constitute an advantage that should not be underestimated. A positive reputation could have positive effects for a spread of investments to other airports or potential merges (Interview Brezansky).

However, it has to be noted that the result of the mediation process has not been transposed to binding legislation. This has been explained by opposition from the Federal Ministry of Transport (BMVIT) and from the operator of small airports in Austria. It has been argued that a transposition would represent a enormous burden on airports in a situation geo-strategically less favourable than Vienna, whereas a preferential treatment of citizens close to Vienna Airports could for political reasons not be justified to the Austrian public.

Implementation process

The Republic of Austria and its federal states altogether passed 31 legal acts, which are directly or indirectly related to the European Noise Directive 2002/49 and reported by Austria as its national execution measures[60]. The complexity of the implementation procedure partly results from its federal state structure, as the Republic of Austria comprises nine federal states (Burgenland, Kärnten, Niederösterreich, Oberösterreich, Salzburg, Steiermark, Tirol, Vorarlberg, Wien).

Most important and central to all other legal acts on the federal level is the Bundes-Umgebungslärmschutzgesetz, which officially entered into force on 5. July 2005.[61] The federal law is the relevant regulation for noise protection around major airports. Before the final version has been passed by the Austrian parliament, the Austrian Ministry for the Environment (Lebensministerium) circulated a draft version of the legal act to an interested public, stakeholders and other ministries on 22 November 2004. The draft legislation was highly debated which is evident from the altogether 82 comments that have been received within only six weeks[62]. Most of them came from citizens that are affected by aircraft noise and most of them requested consistent noise levels in line with WHO guidelines (L_{night} 45 dB; L_{den} 55 dB). The final version has been passed with the majority of votes from the conservative Austrian People's Party (ÖVP) and the Freedom Party of Austria (FPÖ) on 9 June 2005.

The federal law has been followed by a federal ordinance from 5th April 2006 (Bundes-Umgebungslärmschutzverordnung BGBl. II Nr. 144/2006) that clarified technical details of the federal law, regarding the noise indices, noise mapping, action planning and the definition of agglomerations.[63]

60 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:72002L0049:EN:NOT#FIELD_AT (27.01.2009).

61 Bundesgesetz 60/2005; Official Journal: Bundesgesetzblatt für die Republik Österreich (BGBl.), Nr. 60/2005, Publication date: 04.07.2005 , Entry into force: 05.07.2005; Reference: (MNE(2005)52738).

62 The draft version of the legislation an all public comments can be assessed through the parliament of the Federal Republic of Austria http://www.parlament.gv.at/PG/DE/XXII/ME/ME_00239/pmh.shtml (27.01.2009).

63 Verordnung des Bundesministers für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft über die Methoden und technischen Spezifikationen für die Erhebung des Umgebungslärms (Bundes-Umgebungslärmschutzverordnung – Bundes-LärmV), 144. Verordnung, ausgegeben am 5. April 2006, BGBl. II - Nr. 144.

The Austrian government missed the European deadline for the implementation of directive 2002/49/EC. The complex web of competencies in Austria and the federal state structure have been named as reasons for the late and cumbersome implementation of the END (Interview Gartner). Widespread responsibilities and competencies slowed down the implementation process (Glawischnig-Piesczek 2005).

These were the main reasons why the Republic of Austria faced legal action from the European Commission and the European Court of justice. On the 26 October 2006 the fourth chamber of the Court declared that 'by failing to adopt all the laws, regulations and administrative provisions necessary to transpose into national law Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise as regards the Provinces of Burgenland, Carinthia, Upper Austria, Salzburg, Styria and Tyrol, the Republic of Austria has failed to fulfil its obligations under Article 14(1) of that directive (Case C-94/06, OJ C 326 of 30 December 2006: 19). The explanatory statement of the Court confirmed that the main reasons for the legal action of the Commission and the Court decision have to be related to Austria's complex federal structure and unclear responsibilities for national implementation of the Environmental noise directive.

Competent authorities

The complex web of competencies for noise regulation in Austria has complicated the implementation process. The main problem is that the central state has no formal competencies for noise protection, with the effect that eleven federal states need to prepare own legislation: "Noise is a complex matter in Austria as different authorities have at least some say in the matter" (Thaler 2005). The Länder made their action depended on further legislation at the federal level and a clarification of competencies, e.g. regarding noise mapping for major roads as these fall under the competence of the federal states and the central states as well (Interview Brezansky).

Overall, three national ministries and the state governors (Landeshauptleute) and other local authorities are involved in the national implementation. Like in many other EU member countries, the overall responsibility for the national implementation of the END is on the Federal Ministry of Agriculture, Forestry, Environment and Water Management (Lebensministerium). This competency follows § 14 of the Bundes-Umgebungslärmschutzgesetz (see also Table 30).

The most important parts of the Bundes-Umgebungslärmschutzgesetz and the Environmental Noise Directive so far are the establishments of strategic noise maps and action plans. The competent authority for noise mapping and action planning for major airports is the Austrian Ministry for Transport, Innovation, Technology (BMVIT), which is also the Supreme Civil Aviation Authority[64]. The BMVIT is supported by authorities at the federal and local level, in the case of airport noise, by the Magistrate of the city of Vienna. The operator of Austria's only major airport in Wien-Schwechat, the Flughafen Wien (FWAG) supported all relevant actors with the provision of relevant data. However, it had no formal competencies and has not been involved in the in the development of noise mapping and action plans until now, and there has not been an interest to do so (Interview Jöchlinger).

A conflict of competencies was confirmed by interview partners who stated that the cooperation and the need to consent between the Ministry for the Environment and the Ministry for Transport, Innovation, Technology had been far from ideal (Interview Gartner). The conflict mainly referred to the definition of major airports and the development of action plans.

Definition of major airports

In the process of implementation, the definition of major airports has been an important issue. The END labelled all civil airports with more than 50,000 movements per year as major airports, but in

[64] See § 6 and 7 of the Bundes-Umgebungslärmschutzgesetz.

the draft version, the Environmental Ministry intended to include all civilian airports in Austria, based on §64 of the Federal Aviation Act. This intention has been highly criticised by the commercial chambers and the BMVIT. In a formal response to the draft, the Ministry of Transport requested a differentiate treatment between airports and major airports (BMVIT 2005).

The Austrian Federal Economic Chamber (WKO) also commented the definition of major airports in § 3(7) of the draft legislation as this was more ambitious than the requirements of the Environmental Noise Directive (WKO 2005) The inclusion of all Austrian Airports would have had some cost- and capacity implications for the airports and relevant authorities responsible for Noise Mapping and Action plans. On the other hand, there has been public pressure to include the second and third largest airports of Salzburg and Innsbruck in the definition of major airports.[65]

As a result of the consultation process, the final national legislation used the 50,000 movement threshold of the END for the first round of action planning and noise contour mapping. However, the airports of Graz, Innsbruck, Klagenfurt, Linz and Salzburg will fall under the influence of the END in the second round although they are not affected by the present threshold (Pröll 2005, Interview Gartner). Noise mapping for these airports will be due on 31. May 2012, and action plans for these smaller airports have to be submitted to governmental authorities until 31 May 2013.

Thus, Austria goes beyond European obligations. However, it has to be reminded that END foresees an extension of the definition regarding other noise source (road and railway noise), where the threshold is adjusted for the second stage of noise mapping and action planning (Article 7 (2)) for major roads (from 6 million to 3 million vehicle passages per year) and railroad noise (60,000 to 30,000 train passages per year). As a representative of the Environmental Ministry stated, the threshold for road traffic and railroads is seen as reasonable, while it would be desirable if the definition of airports is adjusted in the revision of the directive (Interview Gartner).

Limit Values and Measurement

In the consultation on the draft legislation, the setting of limit values was also highly debated. Citizens' initiatives requested aircraft noise levels that would be in line with WHO guidelines (L_{night} von 45 dB und L_{den} von 55 dB). The Vienna Environmental Lawyers criticised that thresholds for action planning differ among noise sources with a 5dB lower threshold for aircraft noise (Wiener Umweltanwaltschaft 2005, Interview Brezansky). [66] Thus, aircraft noise is seen as a privileged noise source. This criticism was supported by other experts such as Susanne Rynesch from Österreich Plattform Fluglärm in an expert meeting of the Austrian Parliament (Rynesch 2005). In this context, a representative of the UBA pointed at the relation of aircraft noise and public annoyance (see Appendix 10, Interview Ortner). In the parliamentary debate, the divergence between the END prescriptions - of action planning in areas >65 dB L_{den} - and the mediation agreement for Vienna airport - where the acquisition of real estate is guaranteed from 57 dB onwards - have been highlighted, combined with a request for stricter and binding standards (Krainer 2005). In the end, there has not been any feedback on these requests.

Austria has a tradition of noise regulating standards, and so the implementation of technical prescriptions did not cause major difficulties. As it can be seen from documents on the Vienna airport mediation, L_{den} standards have already been in use (VIE Mediation 2005). The Austrian method for the calculation of noise contours is regulated in ÖAL-Richtlinie 24, which in its original version dates

[65] According to the Environmental Ministry, the BMVIT did not deliver data on changes in the number of flight movements in recent year that would have lead to a revision of the defintion of airports (Interview Gartner).

[66] This could be the result of successful lobbying of the affected aircraft industries as a personal communication with the Wiener Umweltanwaltschaft suggest (Brezansky 2009).

back to 1984.[67] The European Commission in a recommendation of 6 August 2003 concerning the guidelines on the revised interim computation methods for industrial noise, aircraft noise, road traffic noise and railway noise, and related emission data has recommended this regulation.[68]

Prescriptions from ÖAL-24 differ in one important aspect from other European approaches. As in Germany, the calculation of L_{den} is based on the average of the six most congested months (Arbeiterkammer 2006: 52). By contrast, Belgium, Denmark, France or Sweden follow a less ambitious goal with the calculation of an annual average (Arbeiterkammer 2006: 95ff). On the other hand, Finland chooses the average of three most congested months; in Italy, 21 days are under considerations, from which one week has to include the annual peak; in the United Kingdom, measurement on L_{eq16} only refers to the period between June and September (Arbeiterkammer 95ff).

In general, Austria faces several problems regarding the measurement of aircraft noise, due to its mountainous topography, e.g. around the airports of Salzburg or Innsbruck (Interview Ortner, Interview Gartner). Therefore, there is a concern that the interim method, practised by many countries without tradition in noise regulation, becomes the future "harmonised method", while the continuation of the Austrian approach would be preferred.

Strategic Noise Maps and Action Plans for Major Airports

By the time of writing this case study, the Republic of Austria fulfilled a major step into the direction of a full implementation of the Environmental Noise Directive. On Monday 26 January 2009 the Environmental Ministry was able to make the noise maps and action plans for Austria available to the public. They can be accessed via two Internet platforms. [69] Noise maps are available for all relevant major roads, railways and airports. The LM has announced in different national media their availability to the public.

However, the implementation of the END in Austria reveals considerable differences between federal and local authorities (Interview Ortner). In addition, the action plans that had to be submitted to the Commission on 18 January 2009 are still missing for major roads for Kärnten, Oberösterreich, Salzburg, Tirol and Vorarlberg. as well as for major railways and, most important for this case study, for the major airport (as of 12 March 2009).[70] The responsibility for the action plans for airports is located in the Ministry for Transport, Innovation, Technology (BMVIT). As a result of the missing action plan for the airport in Vienna, the final consequences of the directive and the action plans for the airport Wien-Schwechat are hard to assess. Interviews with airports officials and noise experts nonetheless suggest that the consequences of the action plan for the major airport Wien-Schwechat are limited.

Table 31: Aircraft Noise in Austria, L_{den} and L_{night}

<table>
<tr><th>Noise Zone
(dB)</th><th>Inhabitants</th><th>Residences</th><th>L_{den}
Hospitals</th><th>Schools</th><th>Kindergarten</th><th>L_{night}
Inhabitants</th></tr>
<tr><td>45-49</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>5885</td></tr>
<tr><td>50-54</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>328</td></tr>
<tr><td>55-59</td><td>8337</td><td rowspan="2">4320</td><td rowspan="2">0</td><td rowspan="2">7</td><td rowspan="2">12</td><td>187</td></tr>
<tr><td>60-64</td><td>477</td><td>0</td></tr>
<tr><td>65-69</td><td>7</td><td>4</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>

[67] ÖAL-Richtlinie 24-1 Lärmschutzzonen in der Umgebung von Flughäfen Planungs- und Berechnungsgrundlagen. Österreichischer Arbeitsring für Lärmbekämpfung Wien 2001. See also Arbeiterkammer Wien 2006.

[68] 22.8.2003 EN Official Journal of the European Union L 212/49.

[69] http://www.laerminfo.at/article/archive/17904 (03.02.2009); http://gis.lebensministerium.at/eLISA/frames/index.php?&gui_id=eLISA (03.02.2009).

[70] http://www.laerminfo.at/article/articleview/59908/1/17978/ (04.02.2009).

Noise Zone (dB)	Inhabitants	Residences	L_{den} Hospitals	Schools	Kindergarten	L_{night} Inhabitants
70-74	0	0	0	0	0	0
>75	0	0	0	0	0	-

Source: Lebensministerium 2009, Aktionsplan Österreich / Teil A2 – Section 1.3

What is available to date are the results of the analysis of noise contours in a general document on action plans, published by the Environmental Ministry (Lebensministerium 2009). It demonstrates that the relevance of aircraft noise in Austria is low, according to END criteria. As the overview in Table 31 reveals, less than 500 people are affected by L_{den} > 60 dB, and no one for L_{night} > 60. For L_{den} > 55 dB, 8821 people in 4324 apartments are affected, compared to 6400 inhabitants for L_{night}.

Distance to Target

Attempting to assess the distance to target of END obligations regarding aircraft noise in Austria gives an ambivalent impression. It could be stated that the distance to target has been considerable, so that European harmonisation imposes a significant burden on targeted industry. First, there has not been any national legislation, even if Austria in general has some experience in technical approaches to noise protection.

Second, many actors involved have viewed the implementation of END as a success story, so that it can be concluded that it changed the existing situation. Some MP praised the law as a central milestone for noise protection policies (Kopf 2005). Representatives from the Environmental Ministry also acknowledged that the directive and its implementation represent a significant advancement in noise protection policy in Austria, e.g. for the transparency and the future designation of areas (Interview Gartner). The collection of information and the publication of reliable data on the exposition to noise is widely seen as an important contribution to the perception of aircraft noise by the pubic (Interview Jöchlinger, Interview Gartner).

Third, the existence of a significant distance to the European policy ideal is also manifested in the lagged implementation, both for the federal law and the action plans, which are still missing for the Vienna airport. If one would come to the conclusion that the END caused a change in the political and legal environment, negative effects on targeted industries could be expected.

However, it could as well be argued that the distance to target is limited. First and foremost, only one major airport is affect by the definition of the European directive. It is not only the low number of affected airports, but also the advantageous geo-strategic position of Vienna airport, which is situated mainly outside densely populated areas.

From the technical point of view, Austria's distance to target to the intended results of the European Directive was short, too. With regard to the calculation of aircraft noise, the „Guidelines on the revised interim computation methods for industrial noise, aircraft noise, road traffic noise and railway noise and related emission data" published by the European Commission mention the data contained in the Austrian computation provision as a standard recommendation (Umweltbundesamt 2008: 15, European Commission 2003: L 212/63). The Austrian method was set out in the guideline No 24-1, published by Österreichischer Arbeitsring für Lärmbekämpfung (ÖAL 24-1 2001). The fact that the European Commission recommended the national ÖAL guideline and excepted it as a valid interim computation method turned out to be an advantage for Austria although this method is still far from perfect in establishing a physical model for aircraft noise (Interview Lechner).

Second, the mediation agreement for Vienna airport that has been adopted two weeks before the federal law has been passed in 2005, goes far beyond the demands of the European directive. Thus, the airport operator FWAG does not expect an additional burden from the END's action plans in addition to the existing regime (Interview Jöchlinger).[71]

Third, even the federal law is more demanding than the European model, with the inclusion of the airports of Graz, Innsbruck, Klagenfurt, Linz and Salzburg in the second round of noise mapping and action planning from 2012 onwards, although they are not affected by the END 50,000 movements threshold (Pröll 2005, Auer 2005).

Fourth, the federal law implementing END on aircraft noise - and thus the European ideal have been strongly criticized for being too vague and lax. Eva Glawischnig-Piesczek (2005)f rom the Green Party labelled the law as a bureaucratic monster with too many responsibilities. The difference of the national law and the existing regime for Vienna airport has also been criticised (Krainer 2005, MP SPÖ). In the parliamentary hearing, noise expert Martin Blum (2005) criticised that an ideal opportunity was missed to correct the deficits in Austrian noise policy, which result from unclear and too many competencies.

To conclude, the political debates, readings and expert hearings in the Austrian Parliament reflect diverging opinions on the implementation of the END and its potential success.[72] The arguments against the existence of a long distance to target seem to prevail at the moment, and existing regulations clearly go beyond END goals. However, this is not clear for future developments at the European level. This mainly refers to the introduction of more stringent limit values – and more ambitious definitions of targeted airports. Although representatives of the environmental administration welcome this, it is obvious that this might increase the burden for airport operators in other than Vienna. Finally, there are also concerns about a change in the method of measurement and calculation. The introduction of the interim method or an approach from countries with a less mountainous topography as the community standard could seriously increase the distance to target.

7.1.6.2 The Airport Sector in Austria: END and Competition

The economic situation of airport operators

Similar to other small countries in Europe, the Austrian air transport sector is highly monadic. The only major airport according to the END definition is the airport of Wien Schwechat. Vienna Airport is Europe's 12th largest aerodrome by flight movements (224.809 movements in 2008). In Austria, it covers 77 % of all flights and 95 % of the total freight volume (Statistik Österreich 2008).

In contrast to the majority of airport operators in Europe, Vienna Airport is a private corporation. As one of the pioneers in Europe, the Flughafen Wien AG is listed on the stock exchange since 1992. Today, private actors own 60 % of shares – from which 50 % are free float – the remaining 40 % are equally held by the city of Vienna and the state of Lower-Austria. Airport Vienna has been quite successful in recent years but because of the financial crises and the possible takeover of Austrian Airlines, its major client, the corporation lost 2/3 of its value between April and November 2008 (Börsenzeitung, 7 August 2008, Wirtschaftsblatt, 27 October 2008).

The economic importance of Vienna airport is considerable. The corporation has about 4,000 direct employees (2007), another 14,000 are employed at the airport (FWAG 2008). There are approximately 230 firms operating in the environment of the airport Vienna, with a business volume of approximately three billion Euros in 2006. The airport plays a key role for the economic development of the metropolitan region of Vienna – and for the Austrian economy in general. The airport operator

71 This impression was supported by independent experts from outside the airport industry as a personal statement from the Wiener Umweltanwaltschaft suggests (Interview Brezansky).

72 http://www.parlament.gv.at/PG/DE/XXII/I/I_00857/pmh.shtml (05.06.2009).
http://www.parlament.gv.at/PG/PR/JAHR_2005/PK0448/PK0448.shtml (05.02.2009).

claims that it affects about 1,200 firms with overall 600,000 employees (Dorsch Consult 2008: 20). As 40 percent of all tourists enter and leave Austria by the airport of Vienna, it is also a key driving factor for tourism in the metropolitan area of Vienna – a sector with volume of about 3.7 billion Euro - including congress tourism and business travellers (FWAG 2008). Accessibility is also a crucial criterion for the decision to settle headquarters of international companies and organisations. The geographical situation in the centre of Europe is favourable not only for passengers from Austria. A theoretical catchment area sketched by FWAG includes an area of 14 million people in Austria, Czech Republic, Slovak Republic, Hungary, Croatia and Slovenia (Appendix 9).

The competitive situation of airport operators in Austria

Flughafen Wien AG, the operator of the only major airport in Austria as well as Vienna as a location for industry and business compete with other airports and cities in several ways. First, the airport is a regional gateway linking a large metropolitan area with destinations all over the world. According to the catchment area (Appendix 9), it competes with smaller airports in Austria, for example with Linz (177km), Graz (150km), Klagenfurt (243km) and even Salzburg (267 km). These airports, which are not addressed by END are strongholds for low-cost carriers. Whereas their share of flight movements in Austria is rather limited (< 20%) today, they constantly increased their marked share over the last decade. FWAG officially does not view other airports in Austria as competitors and rather points at a situation of coexistence (Interview Jöchlinger). This is manifested in the non-transposition of the mediation agreement to national law, which would have possible discriminate these airports. In a certain sense, FWAG is interested in the success of these airports, seeing them as a stronghold against foreign competitors, like the airport of Munich (see below).

Second, competition between regional airports (see chapter 3) has a transboundary connotation in the case of Vienna. Its closest competitor as regional gateway is an airport in another EU member state. The Slovak airport of Bratislava is situated only 48km away from Wien-Schwechat. This is an extraordinary situation compared to other European metropolitan areas like Paris, Frankfurt or Copenhagen, where we also find more than one airport in close proximity, but with the same operating company. With 32,000 movements in 2007, Bratislava airport is not obliged to implement noise measures for major airports. But again, the role of competition is rather unclear. On the one hand, FWAG officials underline the quality of Vienna airport, attracting many passengers from neighbouring countries in the east and southeast. In addition, the lack of a Slovak home carrier is also seen as a weak point of this potential competitor. On the other hand, there has been a serious attempt of FWAG to overtake the airport of Bratislava with the three party consortium 'Two One' in 2006. Although it offered the best bid, the endeavour was stopped by the newly elected Slovak Government, for reasons of competition distortion, explicitly justified by the proximity of the Vienna airport (Air-Guide Magazine & AirGuideOnline.com, 23 October 2006, VWD Wirtschaftsnachrichten 7 August 2006).

Third, the operator of Wien-Schwechat competes with major European airports in neighbouring countries for international transit passengers. Relevant international hubs can be found in Budapest (200km away), Prague (278 km) and Munich (355km), but also in Frankfurt, Zurich and Milan. All of them are easily accessible from large parts of Austria and neighbouring countries. All of them (except for Zurich) are obliged to European legislation for major airports. From the perspective of FWAG, this competition mainly relates to flight destinations in Eastern Europe (Table 32).

Table 32: Number of Flight Destinations in Central and Eastern Europe

	2004	2005	2006	2007
Vienna	37	38	41	45
Frankfurt	38	41	37	37
Prague	24	28	29	30
Munich	25	34	29	30
Budapest	19	20	21	19

	2004	2005	2006	2007
Zurich	19	17	16	17

Source: FWAG 2007: 65

By its geographical position, Vienna has a strong advantage in this regard. However, this position is threatened by a positive growth perspective for Prague and Budapest airport as international hubs in the heart of Europe is highly promising, so that it is possible that they will grow larger than Vienna in the near future. Whereas Budapest had about 8 million passengers in 2005, (Vienna: 16 mio.), these figures are expected to grow up to 20 million passengers in 2020 (Wieninternational.at 2006). An Interest of FWAG in the takeover of airports of Prague and Budapest is also documented, yet with little prospect of success (Wirtschaftsblatt 7 February 2008). As Table 32 shows, FWAG could strengthen its competitive position over the last years. It replaced Frankfurt as the European Hub with the largest number of connected destinations to Eastern European. Only Prague and Munich could keep pace, yet at a significantly lower level.

Even if the airport operator claims that competition is limited or less relevant, it is not for the economy in the metropolitan region around airports. It is by no means a coincidence that the competitive situation of the airport of Vienna has often been referred to by various economic and political actors and interest groups like the Industriellenverband (Industrial Association) or the Wirtschaftskammer Wien (Commercial Chamber). A possible threat of the airport by competitors from abroad (in particular from CEE countries) is frequently linked to possible consequences for the competitiveness of Vienna as a location for business and industry.

In particular since the fall of the Iron Curtain, the competitive advantage of Vienna with its geographical situation in Central Europe, its infrastructure and security attracted headquarters of numerous enterprises, international organisation and research centres (Der Standard, 10 July 2008.) The hub function between east and west has been a major argument for enterprises to settle in Vienna (Hauska & Partner International Communications 2008, Dorsch Consult 2008:19). In recent years however, with a growing number of negative news for Vienna as a location of business- e.g. the dislocation of IBM headquarter for Orient and North Africa - the competitive advantage regarding its neighbours seems to decrease (Wirtschaftsblatt 9 June 2008). Therefore, lobbyists plead for a strong emphasis on infrastructural investments, e.g. in the capacity of the airport.

For the near future, there are three crucial factors that will influence the competitiveness of the FWAG – and of Vienna: the future of Austrian Airlines, the expansion plans of Wien-Schwechat and those of competing airports. Beyond the direct link of increasing costs of noise protection and a competitive disadvantage regarding those airports without such an obligation, the issue of airport expansion reveals how the competitive situation of airports is affected by noise regulation.

Airport expansion in Vienna

The expansion of capacity is a major issue for Vienna airport. Since the end of the 1990s, the claim for the construction of an additional third lane has occurred (TU Wien 1999). Since 1996, several attempts to expand the capacity- e.g. the prolongation of lanes - have been undertaken ("Masterplan 2015", Wiener Zeitung, 8 November 2006). The claims of airport operators directly refer to the competitive situation regarding neighbour countries (Dorsch Consult 2008: 19). They have been supported by various airline operators and industrial associations, who linked the successful expansion with the fate of the overall economic development of Vienna and Austria (APA, 12 August 2005, Kurier, 26 August 2006).

Several lobbyists pointed at development plans of competing airports that already started. For example, Vienna Commercial Chamber (WKW) president Brigitte Jankl claimed that Vienna has to keep pace with its competitors Munich, where a third lane is already in planning, and Budapest and Prague, where airports are also expanded (Der Standard, 10 July 2008). In recent years, competition with other hubs already showed some effects. There has been a decrease in transit passengers in 2007 (compared to 2003: 58.923 to 35.328, Statistik Österreich 2008). Without a third lane, so the argument goes, the number of passengers is expected to stagnate until 2010. By contrast, a third lane is predicted to lead to a passenger capacity beyond 30 million, compared to 23 million with the existing lanes. According to a rule of thumb, 1,000 employments are linked every million passenger, so that this projection means a surplus of 14,000 additional employments until 2020 (Dorsch Consult 2008: 20).

From 2001 to 2005, a voluntary mediation has been carried out to reconcile neighbouring communities with the consequences of airport expansion. In the final document, measures on different environmental issues have been laid down – amongst them a chapter on noise protection. In 2008, a formal process of environmental impact assessment started that is expected to produce an environmental impact declaration in May 2009, accompanied by massive protests from diverse groups. In the mediation and the ongoing EIA, noise effects of the airport expansion have been debated controversially. On the one hand, a simulation financed by airport operators suggests that the expansion and the construction of a third lane will lead to less noise (FWAG 2008). On the other hand, anti-noise activists claim an immense increase in the amount of air traffic noise (Krone, 18 December 2006).[73]

According to FWAG representatives, the expansion and the construction of a third lane would clearly lead to a competitive advantage, as other airports face bigger obstacles than Vienna (Interview Jöchlinger). The other way round, if the expansion of capacity would be delayed or hindered by more demanding noise regulations, this would constitute a competitive disadvantage. However, thanks to the geo-strategic situation of Vienna and the success of the mediation process, this is not expected to happen in Vienna.

By contrast, the airport operator pointed at a completely different aspect regarding the interaction of noise regulation and competition. A high level of protection and a transparent illustration of noise exposure could be seen as an economic advantage, because resistance against the expansion by the public can be limited (Interview Jöchlinger, Interview Gartner). For example, with a Lufthansa overtake of the AUA and low public resistance to the expansion plans in Vienna, Lufthansa might have an incentive to relocate flights from German Airports, where expansion of capacity is much more difficult.

7.1.6.3 The Direct and Indirect Cost Effects of Noise Regulation in Austria

Cost of noise regulation

At the level of direct cost occuring from the implementation of END, a possible advantage for the affected operator of Vienna airport could be assumed – compared to countries where airport operators have been responsible (see chapter 4, chapter 6). In the case of Austria, the Government is solely responsible for the financing of noise mapping and action planning. This was strongly demanded from the Austrian Commercial Chamber (WKO 2005: 11f) that made clear that a shift of any costs to private enterprises in the affected traffic industries could lead to competitive disadvantages for some enterprises. The Environmental Ministry also expects that apart from the governmental expenditures only minimal costs for affected enterprises in the transport sector (Lebensministerium 2004: 21f, Interview Gartner).

The airport operator as well as the Austrian government stated that they did not expect any competitive disadvantage for the business location of Austria or any negative employment effects as a result of the implementation of the Environmental Noise Directive, because the END has to be implemented in all Member States. On the contrary it is expected that in the long term the implementa-

[73] Beyond the protest of anti noise-activists, the expansion of the airport could possibly be delayed by “external factors”, i.e. the effects of the financial crisis and the decrease of passengers, as FWAG chairman Coreth stated in an interview (Kurier, 8 January 2009).

tion will create meaningful consequences as a result of necessary investments in planning- and decision making processes (Austrian Parliament 2005: 7ff).

The costs were nonetheless expected to be up to three times higher than originally calculated. The final costs calculation varies between 12-36 Million EUR for the years 2005-2012 (ibid.) which would lead to an annual average of 1.5-4.5 Million EUR – compared to an estimate of about 11 Million EUR in the draft version (Lebensministerium 2004: 14). Additional operation costs from the year 2013 onwards are estimated within an interval of 0.8 – 2 Million EUR. The estimated implementation costs for major airports were calculated with 500,000 EUR once (Austrian Parliament 2005: 9, Lebensministerium 2004: 21f). On the other hand, representatives from the environmental authorities made clear that the costs of noise mapping have even lower than expected, e.g. due to increasing computing power and technological progress (Interview Gartner, Interview Ortner). In addition, a recent study showed that noise mapping can also lead to an increase in tax income for the state, as the designation of quiet areas influences prices in the housing sector (Feilmayer et al. 2007).

Thus at present, the END-related financial burden on the Flughafen Wien AG is limited, i.e. when compared to the consequences of the mediation process which reaches far beyond the requirements of the END (Interview Jöchlinger, Interview Brezansky). The general costs for noise protection measures around Vienna Airport amount to 40 million Euros. From this sum, 35 million Euros relate to noise protection measures in the context of the mediation agreement, additional 5 million Euro are foreseen for the existing two-lane-situation (because of the delay in the 3rd lane-project, Interview Jöchlinger). This overall sum is relevant for the operational result of the FWAG – it is about 50 % of annual earnings. However, it is still supposed to be limited compared to other European Airports, where noise protection plans amount up to 200 million Euros (Interview Jöchlinger). To conclude, costs from protection measures against noise from aircrafts are high, but they do not relate to national measures on the implementation of the END. According to FWAG officials, noise protection measures at Vienna airport or the airports of competitors in general are not of decisive relevance for the operation of the airport (Interview Jöchlinger).

Considering the resistance to extend the END obligation to smaller airports (e.g. Salzburg and Innsbruck), this does not seem to be the case for all airports in general. The economic performance of smaller airports could be sensitive even to rather lax obligations from END regarding contour mapping and action plans. In the case of Austria, this might be due to the mountainous topography and the proximity to densely populated areas, keeping in mind that the operation of airports implies relatively high fix costs, so that is is profitable only above a certain threshold (see chapter 3). The same applies to the transposition of stricter noise regulation – like the mediation agreement - on all airports, as i.e. the "Vienna-solution is too expensive for Innsbruck and Salzburg" (Interview Gartner).

Finally, the perception of low cost at present state is challenged by the expectation that the END as a framework directive will build the baseline for further, possibly more costly harmonisation of noise standards (Bergthaler 2007: 18). The Commercial Chamber also warned against a cost explosion as a result of further activities that go beyond the END (WKO 2005).

Indirect effects of END on the competitive situation

Even if it could be concluded that noise regulation does not directly affect the competitive situation of the airport operators, an indirect effect could be expected. If noise protection measures are demanding and delay or inhibit the construction of additional lanes, airport operators could suffer from significant disadvantages. The example of the Vienna Airport and the mediation demonstrates how noise regulation could positively affect the competitiveness. If public concerns are mirrored in participation, information and financial engagement in state-of-the-art noise protection measures, expansion plans of airports are easier to realize. Faced to the overall problem of capacity in the near future, (see chapter 3 of this study), reliable plans for the future are decisive for the economic success in this field.

7.1.7 Case 2: United Kingdom

7.1.7.1 The Implementation of END 2002/49/EC in the United Kingdom

National Legislation before END

Contrary to Austria, a number of legal acts and regulations have already been in place in the United Kingdom before the European Directive 2002/49 has been transposed to national law. Since the late 1950s, specific obligations existed for selected airports. At London Heathrow Airport, noise monitoring and noise limits for departing aircraft have been regulated since 1959, and night flight restrictions have been in place since 1962 (BAA 2001: 3).

A more general approach to aircraft noise legislation started in 1982 with the Civil Aviation Act (CAA). The 1982 Civil Aviation Acts as well as its amendments grant the UK government and airport operators powers to introduce noise control measures, including mitigation. Under the CAA the government can designate airports for closer supervision by the Secretary of State (POST 2003: 11). Currently London airports Heathrow, Gatwick and Stansted are classified as designated airports for noise purposes. The legal responsibility for aircraft noise is set out in sections 78, 79 and 80 of the Civil Aviation Act 1982. These sections designate enabling powers to the Secretary of State for Environment, Transport and the Regions to set rules and requirements for the purpose of limiting or mitigating noise and vibration from aircraft landing or taking off (AOA 2006). On the other hand, CAA gives airports some immunity against far-reaching regulation by the state (AOA 2006: 78).

Since then, UK government passed further legislation on the impacts of aircraft noise. Other legislative measures of more general relevance can be found in the Environmental Protection Act from 1990 (part III) and in the Noise Act from 1996. From the perspective of aircraft noise regulation, both include rather general prescriptions. Since the late 1990s, growing regulatory activity can be observed, with the Aeroplane Noise Regulation (1999) and the Aerodromes Regulation (2003). The latter manages the implementation of 2002/30 on technical prescription for aeroplanes. It includes some preliminary comments to the END, without a direct implementation.

A milestone in the political debate on noise pollution around airports was the Government White Paper on "The Future of Air Transport" in 2003. This White Paper set out a strategic framework for the development of airport capacity in the United Kingdom over a period of 30 years against the wider context of the air transport sector. It demands the development of contour maps and states that noise from aviation and airports should be limited and, if possible reduced over time (AOA 2006: 78). It outlined several new policies for airports which control, mitigate and compensate for aircraft noise (BAA Glasgow 2008). The White Paper established a framework for future planning applications against which the relevant public bodies, airport operators and airlines can plan ahead. It takes account of all relevant factors, including views expressed in an extensive consultation exercise which attracted over 500,000 responses (White Paper executive summary). The White Paper aims at the reduction and minimisation of the impacts of airports on those who live nearby, and on the natural environment, while it balances this view with the recognition that for many areas of the UK the availability of air services is crucial to their economic prosperity.

In addition to formal legislation and national initiatives, a number of other policy instruments are in use to reduce noise from aircraft around airports. This refers to voluntary agreements between airport and local community regarding the number of night flights, airport/airline agreements on procedures to minimise noise or economic instruments like landing charges varying according to the noise performance of aircraft (POST 2003: 26).

Implementation process

In the United Kingdom, the Environmental Noise Directive has been transposed separately in England, Scotland, Wales and Northern Ireland. The first regulation came into force in England on 1st October 2006, with the Statutory Instrument 2006 No. 2238 "The Environmental Noise (England)

Regulations from 8th August 2006", see ENDS Report Sep 2006: 41). In Scotland, the respective regulation "Scottish Statutory Instrument 2006 No. 465, The Environmental Noise (Scotland) Regulations" came into force 5th October 2006, shortly after the Welch Statutory Instrument 2006 No. 2629 (W.225). They have been followed by the Statutory Rule 2006 No. 387 (The Environmental Noise Regulations Northern Ireland 2006) on 20th October 2006. The English regulation has been amended with the Statutory Instruments 2008 No. 375 "The Environmental Noise (England) (Amendment) Regulations" from 13th February 2008.

The END has been transposed by secondary legislation in each Devolved Administration. These regulations have been drawn up in consultation with various government departments including the Department of Health, Department for Transport, Ministry of Defence, Department for Trade and Industry. The DEFRA coordinated the implementation and organizes the reporting to the European Commission. For noise around major airports, the Department for Transport has been the implementing administration (Interview Wentworth). The duty of cooperation between Devolved Administrations has been laid down in the mentioned regulations. As in other Member States, a conflict between DEFRA and DfT has been stated by observers (Interview Stevens). However, this has been denied by representatives from both ministries (Personal Communication Turner and Evans).

A public consultation on the transposition of the END was carried out in February 2005, with 136 written responses from industry, regulators, local authorities, and environmental groups. The transposition procedure and the consultation are exemplary regarding other member states (Mayer 2006).

Legal action

The UK legislators missed the European deadline (18th July 2004; see table Table 30 for the transposition of the END by more than two years. The Environmental Minister Alun Michael explained the delay with the "practical complexities of the Directive" (Commons Hansard, 9. Nov 2004,). As a result of the late implementation the UK faced legal action from the European Commission and the European Court of Justice (Case C-138/06). The UK had to face the standard procedure of legal action for delayed implementation of EU law. A letter of formal notice was sent to the UK on 15.12.2004. On 13.07.2005 the Commission issued a Reasoned Opinion in which it concluded that, by omitting to adopt the laws, regulations and administrative provisions necessary for the transposition of the Directive into its national law, that Member State had infringed its obligations under that directive. The Commission also requested the United Kingdom to adopt the measures necessary to comply with that reasoned opinion within a period of two months from its notification. The UK authorities replied to that opinion by a letter of 13.09.2005 and indicated the state of progress of the transposition of the Directive in England, Scotland, Wales and Gibraltar. As no further information was received on this issue the Commission brought this action before the Court. On the 14.12.2006 the fifth chamber of the Court declared that by failing to adopt, within the prescribed period, the laws, regulations and administrative provisions necessary to comply with Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise, the United Kingdom of Great Britain and Northern Ireland has failed to fulfil its obligations under that directive and ordered the United Kingdom of Great Britain and Northern Ireland to pay the costs (Case C-138/06, OJ C 131, 3.6.2006: 20). [74]

One reason why the UK missed the deadline for implementation of the END could result from the fact that the country is exceptionally affected by the implementation for major airports due to its large number of relevant airports. The table in Appendix 1 shows that in 2007, for 20 airports the threshold of 50,000 flight movements was exceeded. This is significantly more than for any other

[74] http://curia.europa.eu/ (06.03.2009).

Member State.[75] As interview partners from DEFRA and DfT stated, it would have obviously "made life easier had we had fewer airports to map, so it was a disadvantage because we had more to do in the same timescale as other countries with fewer airports" (Personal Communication Turner and Evans 2009).16 major airports fall under English legislation, among them three major airports designated by CAA 1982: London airports Heathrow, Gatwick and Stansted, unifying almost 40% of all flight moves from British airports. Further 3 airports fall under the legislation of the Scottish Statutory Instrument (Aberdeen, Edinburgh, Glasgow), and Belfast is the only major airport in Northern Ireland.

In Scotland and Northern Ireland, the noise mapping has been stretched to all airports. The Scottish Executive has interpreted the END Annex VI requirement to mean that it will be necessary to prepare noise maps for any airport where aircraft noise levels outside the airport boundary were found to be greater than L_{den} 55dB or L_{night} 50dB. Similar, England extended noise mapping to Biggin Hill, Gloucestershire, Shoreham and Southend airports, because flights to and from them had impact on large agglomerations (AEF response to DEFRA 2008). Belfast City Airport also had fewer than 50,000 movements in 2005, but has been designated as a competent authority by virtue of its location within the agglomeration of Belfast. Thus, implementation in the UK slightly goes further than EU obligations. The definition of major airports has been a difficult task, and the UK government had to pass a second regulation one year after the original SI to include three additional airports (Interview Havelock).

Competent authorities

One important issue in the UK transposition of END refers to the competent authority as defined by Article 4 (1) of the Directive. In general, English SI 2238 states that the competent authority for the implementation is the Secretary of State – the Department for Transport (DfT) (regulation 6). For airports however, the designation differs from this rule. For the development of noise maps for (CAA 1982) non-designated airports, that is for all major airports except the London Big-3, the airport operators themselves are the competent authority (regulation 10). For the development of action plans, the airport operators are responsible for all major airports (Regulation 18).[76] This is an important feature. Out of 19 EU member countries affected by the END only six (Finland, Italy, Poland, Portugal, Sweden and the United Kingdom) countries delegated the task of noise mapping and actions planning to the airport operators.

The airport operators in the UK are not completely left alone accomplishing this task. The Environmental Ministry developed a guideline for action plans. A first draft of this guideline was published by DEFRA in September 2008 (DEFRA 2008). The guidance is aimed at facilitating the process for airport operators who as the competent authority are responsible for producing their own action plans. Among the actions the airport operators should take into account when drafting their plans:

- consider what further measures should be taken in residential areas that are exposed to more than 69 dB $L_{eq16;}$
- examine the day, evening and night results produced from the noise mapping and consider whether there are any features of the noise impact that might be measured further;
- ensure there is an effective complaint handling system in place;

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75 Since the time of the implementation, several airports have seen an increase of the number of flight movements and subsequently fell under the legislation of END. The number of major airports (being defined as a airport with total movements of greater than 50,000 per annum) was determined from Aircraft Movements 'UK Airport and Statistics 2004' published by the Civil Aviation Authority (CAA).

76 Similar in Scotland and Northern Ireland.

- consider the information from any noise complaint data that is held and whether there are any measures that might be taken to manage further the aircraft noise impact.[77]

So far the guidance document is preliminary. Responses and general enquiries on the document were expected on Friday 28 November 2008. By the time of writing this study DEFRA was still re-drafting the final guidance document with the aim of including the responses. The final guiding document is expected to be published by the end of March 2009. Several interview partners made clear that airport operators would not start to prepare action plans until the final document will be released (Personal Communication Walmsley, Interview Inn, Interview Dawes).

Once compiled the action plans of the airport operators have to be submitted to governmental authorities. They will be revised by the Secretary of State – in this case, the Department for Transport.[78] After this revision, they will be reported to the European Commission- by the Environmental Ministry- the official reporting entity (DEFRA airport technical guidance 2006: 3).

The decision to delegate the establishment of noise maps and the publication of action plans to airport operators provoked wide protest from many noise activists. Relevant campaigning groups argue that requiring an airport-to-airport approach based on local circumstances may not be as effective in stimulating rigorous noise management as establishing noise limits for EU airports, for both the day and night periods (Interview Wentworth). In the process of consultation, the Aviation Environment Federation (AEF) strongly opposed this designation as draft DEFRA guidance gives operators too much flexibility to determine measures and thresholds of high noise exposure. While most airport operators are responsible to their shareholders and fearful of competition, AEF sees no incentive to undertake measures to reduce noise that are costly or constrain capacity (Interview Johnson). In an official statement the AEF states that "airport operators are unlikely to develop plans that are either too costly or inhibit their ability to grow in any way, however justifiable in terms of the impact on noise, unless they are directed to do so." (AEF response 2008: 2). Their interest will be lead by the economic interest in minimising costs and facilitating airport growth: „They have a vested interest in more planes using their airports. Almost certainly their action plans will only consist of the measures they were going to take anyway." (AEF response 2008).

Anti noise activists from the campaign group HACAN also criticised the responsibility of airport operators and formulated strong demands for the takeover by local government: "The government is trying to skew the consultation. Operators will offer double glazing and call that an action plan." (Planning (UK), September 12th 2008). HACAN first voiced its criticism when DEFRA issued its noise maps (Planning, 4 January 2008: 2). The AEF also argues against the DFT as a possible substitute of airport operators as competent authority. From their point of view, this seems not adequate because of its obvious closeness to aviation industry. As local governments are also not seen suitable both by DEFRA and AEF (they partially own airports), AEF sees a strong case for the Environmental Agency to be the competent authority (AEF 2008).

According to EPUK, the designation of airport operators has lead to a "low trust in the process of noise mapping and action planning" (Interview Stevens). They fear that this will lead to "business as usual". In the process of consultation, the CAA that has been charged with noise mapping of designated airports argued for an involvement of the local government which would be more adequate to balance the interest of residents and local industry (Interview Havelock). However, what is critical both for the designation of airport operators and local communities would be the definition of quiet areas (Interview Havelock).

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[77] http://www.defra.gov.uk/corporate/consult/aviation-actionplans (27.02.2008).

[78] Department for Transport, Aviation Environment Division. See DEFRA, Airport technical guidance; and DEFRA news, release, Ref: 290/08 Date: 4 September 2008.

For noise mapping at designated London airports, this argument is less strong, as in these cases, the Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority estimates the noise exposure on behalf of the Department for Transport. The ERCD produces annual reports on noise exposure contours depicted noise index (L_{eq}) values at Heathrow, Gatwick and Stansted since 1997 (Interview Havelock). For the non-designated airports and for action planning however, the UK government defends its decision with the argument that they already did noise mapping under the old national regime. The Government favours the airport operators, as in practice they already "act as the day-to-day regulators of operational noise from aircraft, by monitoring and enforcing adherence to their noise control procedures and the Government believes that those with the powers to implement measures to control noise are best placed to draw up the action plans." (DEFRA Explanatory Memorandum 2006: 27) Regarding the delegation of action plans, it has been argued that "if others had the responsibility for developing action plans, there would be a risk of proposals being made that would raise expectations but would be completely impractical and undeliverable." (Personal Communication Turner and Evans).

This argumentation is partially contradicted by the same DEFRA document a few pages up. It gives a list of advantages for the involvement of the secretary of state in cases other than noise mapping around airports. For example, governmental control ensures consistency in the quality and form of the data collected; (DEFRA Explanatory Memorandum 2006: 18). Although the actual financial benefit for airport operator is unclear – the real cost and consequences of action plans are still open - it has to be stated that this difference in implementation might create a competitive advantage for British aviation industry – Table 30 shows that only few Member States delegate the authority to produce noise maps and action plans to airport operators.

The inconsistent line of argumentation supports this interpretation. For example, it can be questioned why action planning is delegated to designated airports in London and noise mapping not. As action plans are not completely available to date, the role of the guidance by the secretary of state is not easy to assess. In any case, the secretary of state has the last word and has to sign the action plans before they will be released and made public (Interview Dawes). In addition, airport operators partially opposed to the delegation of responsibility regarding noise mapping during the consultation process (BAA Scotland 2005) – while they welcomed to be the competent authority for action plans.

Limit values and measurement

Regarding the noise measurement procedure, the UK Government considered two options: measurement and calculation (Explanatory Memorandum, DEFRA 2006) Measurement would necessitate less technical expertise than deriving maps from computer-based predictions, but it would go beyond the requirements of the END and costs significantly more due to the labour intensive method for collecting data. Thus, calculation has been preferred to meet the mapping requirements under the END. The index as defined in the annex of END (L_{den} and L_{night}) faced national standards. Since 1979 the DfT estimates current and future impacts of aircraft noise by determining the area exposed to average sound levels of 57dB(A) or more during the 16 hours on a average summer day between 7am and 11pm with the L_{eq16} index (POST 2003, Interview Havelock).[79] This contour was chosen as an indicator of the onset of what is known as *community annoyance* in the daytime, following a study in 1985 which showed a good correlation of this figure with annoyance (Brooker et al. 1985). The UK regulations and the DEFRA guidance solved the conflict between both approaches by keeping old L_{eq} and adding the European indices. The former will be used to assure continuity (many British airports only recently introduced L_{eq16} for contours), the latter should be used for strategic planning (Interview Havelock).

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[79] Before, the NNI (Noise and Numbering index) based on the perceived noise level has been used from 1963 on (Interview Havelock).

First, noise maps refer to L_{den}, which is based on the L_{eq16} indicator previously used in the UK (Defra Guidance 2006: 5). However, noise contour maps will also be produced in supplementary indicators that are currently used in the UK for existing regulatory functions. So, mapping is expected to be useful for national as well as EU purposes. (Stone 2005).

This practice has not been without opposition. This refers to the possible confusion with two parallel standards, and to possible differences. While the L_{eq16} is measured for the average summer day, the L_{den} requires annual averages. END regulations also require the adaptation in the heights of measurement, from 1.2.m over ground to 4m (DEFRA Guidance 2006: 12). Thus, the distance to target is not clear: The UK government claims a short distance to target with both methods. Calculation models in ANCON2, operated solely by the UK Civil Aviation Authority (CAA), and INM (produced by the American Federal Aviation Administration) produce results in terms of the L_{eq35} indicator. As long as input data are available relating to the day, evening and night period required by the END, it will be possible to generate the noise levels in the L_{den} and L_{night} indicators as required by the END. On the other hand, government representatives clearly argue for the prevalence of the British method. First, scientific evidence for the L_{den} is contested (CAA 2005). Second, an economic incentive argument is given for the parallel use. For those that have produced contours, there is usually an understandable desire to continue to use the same model as far as possible when it comes to mapping" (Scottish Government Consultations, 2005: 7.8).

Environmental interest groups claim that the British standard is not adequate. The AEF holds that the draft guidance refers to the 69 L_{eq} contour threshold from the Air Transport White Paper (ATWP), but does not provide limit values in L_{den}. This would be a considerable deviation, as the 69 L_{eq16} hour reference has no applicability to noise at night (AEF response 2008). It cannot be stated clearly if the process of measurement and the continuation of old L_{eq} leads to differentiate effects on targeted industries, when compared to other MS. In this respect, the END might not be precise enough. The argument with sunk costs reveals possible competitive argumentation against European measurement procedures, although the END prescriptions offer some leeway.

As a consequence, airport operators are more and more forced to use L_{den} and L_{night} for any planning project, in order to satisfy resident's requirements (Interview Havelock). It turned out that there are significant differences between L_{eq16} and L_{den}. For the example of Heathrow, 250,000 people are included in L_{eq16} (57 dB), while three time more people are affected when the L_{den} (55 dB) is considered, mainly caused by the weighting of evening hours (Interview Havelock). The public interprets this difference obviously as an 'underestimation' with of the old instrument, although the noise exposure is the same (Interview Havelock).

Table 33: Number of People Exposed to Noise Around UK Airports

	Numbers of people Exposed to L_{den} 55-59	Numbers of people Exposed to L_{den} 60-64	Numbers of people Exposed to L_{den} 65-69	Numbers of people Exposed to L_{den} 70-74	Numbers of people Exposed to L_{den} >75
Birmingham International Airport (EGBB)	600	200	0	0	0
Blackpool Squire's Gate (EGNH)	0	0	0	0	0
Bournemouth Airport (EGHH)	500	100	0	0	0
Bristol Lulsgate Airport (EGGD)	3200	800	0	0	0
Leeds Bradford Airport (EGNM)	100	0	0	0	0
Liverpool John Lennon Airport (EGGP)	1600	1300	100	0	0
London City Airport (EGLC)	0	0	0	0	0
London Gatwick Airport (EGKK)	8700	2600	500	100	0
London Heathrow Airport (EGLL)	81100	21200	4100	600	0

	Numbers of people Exposed to L_{den} 55-59	Numbers of people Exposed to L_{den} 60-64	Numbers of people Exposed to L_{den} 65-69	Numbers of people Exposed to L_{den} 70-74	Numbers of people Exposed to L_{den} >75
London Luton Airport (EGGW)	6500	2000	100	0	0
London Stansted Airport (EGSS)	7300	1700	300	0	0
Manchester International Airport (EGCC)	9500	2000	100	0	0
Newcastle International Airport (EGNT)	4400	1400	0	0	0
Nottingham East Midlands Airport (EGNX)	8000	1700	700	0	0
Southampton Eastleigh Airport (EGHI)	100	0	0	0	0
Belfast International (EGAA)	500	100			
Aberdeen Dyce (EGPD)	11200	3200	200	0	0
Edinburgh Airport (EGPH)	7700	400	400	0	0
Glasgow International (EGPF)	0	0	0	0	0
Prestwick (EGPK)	2300	1700	100	0	0

DEFRA 2007: Data Reporting under the 2002/49/EC,http://circa.europa.eu/Public/irc/env/d_2002_49/library

The production of noise maps for major airports in the UK - by CAA and other consultants - has been finished in December 2007, and all maps have been transmitted to the European Commission[80]. Guidance for airport operators of major non-designated airports has been given by Defra (The Environmental Noise (England) Regulations 2006 Technical Guidance).

UK government representatives see the completion as a success, as Environment Minister Jonathan Shaw said: "These maps are part of that process and will enable us to better understand noise and deal with it.“ (DEFRA 2007). The ERCD approved all noise contours regarding accuracy and validity of data, and problems have occurred only for one noise map (Interview Havelock). Thus, airports are well prepared though late in the schedule.

However, English noise maps have been published with a delay of one year regarding official EU deadline. (ENDS report 2007: 43). By contrast, the Scottish Government led the rest of the UK on work under the environmental noise Directive. As a reason for the delay in England, NGO representative policy officer Mary Stevens said the long wait for the English maps was due to resource problems at DEFRA resulting from the 'low political profile' given to noise issues. People working in the field have grown 'more and more irritated' about the delays (ENDS report 2008). Differences appear not only in the timing, but also in several features of the maps. Visible map area for England is smaller and fewer degrees of noise intensity are displayed than in the Scottish maps (ENDS report 2008). In addition, the limited number of Scottish airports might have facilitated the process (Interview Stevens).

The results of noise mapping for major airports are illustrated in Table 33 from the EU database: It shows the number of people exposed to noise around airports (L_{den}). For example, around Heathrow 81,000 people live inside the 55-59 dB L_{den} contour, and more than 4,000 are affected from noise exposure higher than 65 dB, L_{den}. This is the top value for the United Kingdom, but maps for smaller airports like Nottingham, Edinburgh and Aberdeen also include a large number of people inside the defined contours. On the other hand, from 20 airports displayed in Table 33, seven airports do seemingly not affect more than 500 people according to 55 dB L_{den}. Compared to figures from Austria, the

80 http://circa.europa.eu/Public/irc/env/d_2002_49/home (12.12.2008).

share of population is significantly higher, although limited when figures are compare to noise around major roads and railways.

Distance to target

Due to the previously existing practice of contour maps in the UK, the distance to target regarding noise mapping of airports is not easy to identify. The same holds true for action plans, as there has already been a similar instrument in national regulations before the END has been transposed. The White Paper from 2003 requests the establishment oft so called master plans for the future development of airports, including environmental issues (12.7-12.9, White Paper 2003). These plans should include detailed proposals for noise controls. Several master plans or interim master plans are available, yet without any reference to the END or SI 2238/2006.[81]

Until now, no action plan regarding the END obligations is available for English airports, so that the final consequences of the decision for the competent authority (airport operator) cannot be assessed - except for the fact that the delay might be the first visible result of this decision. The implementation of action plans is ongoing. For that purpose, the SI 2238 has been amended so that the deadline for the submission of action plans in round 1 and round 2 have been extended to 30th June 2008 and 2013 (Statutory Instruments 375 from 2008, regulation 3). According to UK government, the earlier date of 30 April for submission of action plans placed an unnecessary administrative burden on the airport operators, and the extension of the date alleviates this. Consultation guidance is given from DfT for the purpose of quality control.

As noise maps, action plans will only be adopted and transmitted to the European Commission after approval by governmental authorities, to ensure the requirements of END have been complied with. UK Government has the power to demand information from contour map and action plan producers at any time (Stone 2005). The guidance for actions plans has already been criticised. AEF demands the establishment of limit values or other criteria to establish priorities for action (AEF response 2008).

To illustrate the possible results of action plans for major airports in the UK, the examples from BAA owned airports Glasgow and Edinburgh which already available in a draft version (BAA Glasgow 2008, BAA Edingburgh). The action plan of Glasgow describes actions undertaken and links it to the targeted issue and a timetable (also see Appendix 7). In addition, it indicates a performance indicator and the number of people affected by a certain measure. The action plan has five different chapters. It is (1) demonstrated what is actually already undertaken (economically reasonable, describes the communication with affected communities (2), shows influence of noise policy on planning (3), demonstrates the organization of the airport operators noise management (4) and displays the engagement in future research and technical or logistical advancement (5). It does not contend indications of costs or quantifiable limits of reduction of noise. It has to be seen how close the linkage of White Paper master plans and action plans will be. On the one hand, the practice of master plans, which include mitigation measures could be seen as an indication for a short distance to the targets of the END (Personal communication Turner and Evans). On the other hand, in this perspective it is surprising that they have not been published yet.

By the view of government authorities, the implementation of END for the British aviation sector "went quite smoothly so far" (Personal Communication Turner and Evans 2009). However, the process faced some problems. The UK was late enacting the Directive and the noise maps for its major airports and is still consulting on the guidance to give airport operators on how to produce action plans. This raises the question why the government appointed airport operators as the competent authority for action plans in the first place. The implementation of the END was further complicated

[81] For example fort the airports of Liverpool (Peel Airports: Airport Master Plan to 2030) and London Heathrow: BAA: Heathrow Airport interim Master Plan

by the parallel use of L_{eq} and L_{den} noise measurements. What was introduced for pragmatic reasons in the first place turned out to be an additional cost burden as airport operators are more and more forced to use L_{den} and L_{night} for any planning project, in order to satisfy resident's requirements (Interview Havelock). Some observers labelled the implementation of the END in England as a 'big muddle' (Interview Stevens).

When compared to previous regulatory measures against aircraft noise at the national level the distance to target of the implementation is short as airport noise is already a highly regulated issue. Most of our airports already had quite extensive noise mitigation measures in place, which have been developed in consultation with the local community (Personal Communication Turner and Evans 2009). At the national level the UK has been seeking to reduce aircraft noise at source, amending land use planning regulations, changing operational procedures and placing restrictions on the use of the noisiest aircraft to meet ICAO requirements. Against this background „there is a certain amount of continuity between previous and existing regulations".

Finally, it is obvious that the large number of major airports constitutes a considerable disadvantage for British aviation industry, i.e. for operators of smaller airfields. It has thus been suggested that the threshold for the definition of major airports should be readjusted in a revision of the directive (Interview Havelock). A possible solution to this problem could be found in a definition that does not rely on the number of flight movements, as representatives from DEFRA and DfT pointed out: "the busiest airports do not necessarily cause the greatest noise impact" (Personal Communication Turner and Evans)

7.1.7.2 The Airport Sector in the United Kingdom: END and Competition

The airport sector in the United Kingdom is unique but different from the airport sector in Austria. The most striking difference is the number and the size of major airports. Therefore airports in the UK are generally more affected by the Environmental Noise Directive than airports in Austria. As can be seen in Appendix 1 the United Kingdom reported to have 20 major airports with more than 50,000 movements. With around 140 civil licensed airports (POST 2003b: 7) the United Kingdom has a surprisingly large number of airports, especially when this is related to the size of the country. This has to be related to its geographic situation as an island with a high need of air transport (Interview Stevens).

Nonetheless, passenger numbers are unevenly shared. Table 34 highlights the size of the UK's 20 largest airports. Most striking is the fact that the four airports Heathrow, Gatwick, Stansted and Manchester each have passenger numbers in excess of 20 million and the remainder with less than 10 million passengers. The total number of terminal passengers was 240 million for all 58 passenger airports in the UK. Compared to the year 2002 this is a 27.5 % increase. The largest and most important airport is London Heathrow. With its 68 million passengers 2007 Heathrow covers about 28 % of all UK airport passengers. Additionally, more than 1.3 million tonnes of cargo[82] are transferred from Heathrow to the rest of the world in 2007 (BAA 2009a). The extraordinary role of Heathrow has to be related to its role as major connecting hub to about 180 locations around the world. Heathrow has five terminals, two main runways and a cross wind runway.

Table 34: Size of UK Airports 2007 and 2002

	2007 Passengers (in 1000)	as % of all UK airports	2002 Passengers (in 1000)	as % of all UK airports	% Change 2002-2007
Heathrow*	67,852	28.2	63,035	33.4	7.6
Gatwick*	35,165	14.6	29,518	15.6	19.1

[82] Stansted 206,000, Gatwick 170,000.

	2007 Passengers (in 1000)	as % of all UK airports	2002 Passengers (in 1000)	as % of all UK airports	% Change 2002-2007
Stansted*	23,759	9.9	16,049	8.5	48
Manchester	21,892	9.1	18,618	9.9	17.6
Luton	9,919	4.1	6,474	3.4	53.2
Birmingham	9,134	3.8	7,911	4.2	15.5
Edinburgh*	9,037	3.8	6,911	3.7	30.8
Glasgow*	8,726	3.6	7,769	4.1	12.3
Bristol	5,884	2.4	3,415	1.8	72.3
Newcastle	5,624	2.3	3,387	1.8	66
Liverpool	5,463	2.3	2,835	1.5	92.7
Nottingham	5,407	2.2	3,233	1.7	67.2
Belfast	5,236	2.2	3,551	1.9	47.4
Aberdeen*	3,411	1.4	2,549	1.4	33.8
London City	2,912	1.2	1,602	0.8	81.7
Leeds Bradford	2,860	1.2	1,526	0.8	87.4
Prestwick	2,421	1	1,486	0.8	62.9
Belfast City	2,187	0.9	1,890	1	15.7
Cardiff Wales	2,094	0.9	1,416	0.8	47.8
Southampton	1,965	0.8	788	0.4	149.3
All UK Airports Total	240,722		188,750		27.5

*BAA ownership Source: Civil Aviation Authority 2009

The economic situation of airport operators

Although the passenger numbers are a good indicator of the economic importance of the airport sector in the UK, financial turnover in GBP offers a more appropriate and precise measure. Selected turnover rates can be found in Table 35, which ranks the 20th biggest airports in the United Kingdom according to economic turnover in the years 2005/6.

The turnover rights are equally impressive and range from ~ 1.2 billion GBP for London Heathrow to ~ 14 million for the Airport Bournemouth. The top five UK airports have an average turnover of 427 million GBP (without Heathrow 234 million GBP). Although there is a high correlation between passenger numbers and financial turnover there are some cases (Nottingham, Cardiff, London City) where turnover rates are disproportionately high relative to passenger numbers. Although small airports are economically less important they are of great significance and importance as they are the main source of competition for larger airports. The industry is very dynamic and a rapid growth from a small base is not unusual as the case of Liverpool airport suggest. The latter has experienced exceptional growth rates in the 1990s, which has had repercussions for other airports in its region (Starkie 2008: 6).

Table 35: Financial and Operating Data for Selected UK Airports, 2005–06[83]

	Airport	Turnover (in 1000 £)	ATMs**	Other movements***
1	London Heathrow*	1,195,400	472,954	5,981
2	London Gatwick*	361,500	254,004	9,058
3	Manchester	290,553	217,396	16,421
4	London Stansted *	176,500	180,729	15,465

[83] Source: Adapted from Starkie 2008: 20.

	Airport	Turnover (in 1000 £)	ATMs**	Other movements***
5	Birmingham	111,109	113,668	9,731
6	Glasgow *	82,615	97,610	13,296
7	Edinburgh*	77,381	117,312	9,808
8	London Luton	77,021	87,690	20,203
9	Newcastle	51,360	55,164	23,798
10	Nottingham East	50,566	56,224	24,490
11	Bristol	49,619	59,854	20,670
12	London City	40,180	61,179	9,733
13	Aberdeen*	33,954	94,665	17,851
14	Belfast Int.	31,206	43,780	37,093
15	Liverpool	28,799	43,312	37,347
16	Cardiff	22,103	20,689	22,337
17	Southampton*	22,022	45,109	13,351
18	Leeds Bradford	21,023	36,330	31,641
19	Exeter	17,707	14,481	40,572
20	Bournemouth	14,440	14,041	69,600

* BAA ownership** Movements of aircraft engaged in the transport of passengers, cargo or mail on commercial terms.
*** Includes test and training flights, aero club movements, military movements and privateflights.

The ownership structure of UK airports changed significantly with the liberalisation of the sector after the Airport Act was passed in 1986. Until the mid-eighties virtually all airports where owned by the public sector. As a result of the Airport Act the British Airport Authority (BAA) was dissolved and all its property, rights and liabilities were passed to the new company under the name BAA plc[84]. In 1987 the company BAA was floated on the Stock Market with a capitalisation of 1.225 million GBP. Before that, the British Airport Authority was owned by the state and responsible to the British parliament (BAA 2009b). Today BAA is a hundred percent privately owned which stands in contrast to the majority of European airport operators (also see Appendix 4). BAA owns the UK's major airports Heathrow, Gatwick, Stansted, Southampton, Glasgow, Edinburgh and Aberdeen[85]. In 2007, 150 million passengers used the BAA airports. This accounts for ~ 62.3 % of all airport passengers in the UK (BAA 2008b, see also Table 34). Since 2006 BAA is owned by ADI (Airport Development and Investment Limited), a consortium led by the Spanish company Ferrovial. Ferrovial is one of the world's leading infrastructure groups and involved in the construction of airports, highways, car parking and services (BAA 2008b).

The revenues of the BAA airports were £2.247 billion GBP in 2007 which is a 7.9 % increase compared to 2006. This resulted in an operating profit before tax of 627 million GBP, and a net profit after tax of 495 million GBP. Against this background BAA plans capital investments for the regulated airports in excess of 15 billion GBP (2007/08 prices) for the periods 2008/09 – 2017/18 (BAA 2008a: 3, 4).

Despite the dominant role of the BAA not all airports in the UK have been privatized. Local consortia own particularly regional airports. The UK's fourth largest airport in Manchester belongs to a consortium of local governments in North West England (Starkie 2008: 7). The Manchester Airports Group also owns the airports of Humberside, East Midlands and Bournemouth. Local authorities and regional development agencies are also often shareholders in their local airports. Ten airports in Scotland are controlled by the Scottish Executive (e.g. ministers) and run by the Highlands and Islands Airports Ltd. (POST 2003b: 7). The UK airport industry is thus "a mixed private-public sector industry but one currently dominated by the private ownership of assets". (Starkie 2008:7).

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84 By now BAA Limited.

85 With the airport of Naples in Italy, the BAA also owns one foreign airport.

The figures from the tables above indicate that the aviation industry in general and the airport sector in particular play an important role within the economy of the UK as the industry has significant economic leverage effects on its surrounding areas. The industry directly contributes to the UK economy through the turnover and profits of airports and airlines. A recent study by Oxford Economic Forecasting (OEF) estimated that the air transport industry contributed approximately 11.4 billion GBP (~ 1.1 %) to the UK's Gross National Product in 2004. It directly employed 186,000 people. Including the indirect contributions of the industry (e.g. through travel agents, tourism, supply chain of the industry) the industry supports over 520,000 jobs in the UK. In 2004/5 the industry contributed 3.6 billion GBP to the Exchequer (OEF 2006: 11). The Airport Operators Associations offered similar results only two years earlier, estimating that air transport directly supported around 185,900 jobs in the UK economy and around £11.2 billion of Gross Value Added. When indirect and induced effects are also included these figures rise to nearly 580,000 jobs and £22.2 billion of Gross Value Added (AOA and York Aviation 2005: 45).

Government officials also value the importance of the industry. In a speech to the Airport Operators Association Conference in November 2008 Secretary of State for Transport Geoff Hoon said that the remarkable growth of the aviation industry in the last decade "has helped underpin the competitiveness of the United Kingdom, creating the vital links needed to connect businesses across the globe". [86]The growth rate of the industry has indeed been remarkable and the government has forecast that aviation is likely to grow over the next 30 years at an average growth rate of about 4.25 % per year (DETR 2000).

Despite the importance of the aviation industry of the UK the Government acknowledges that noise is "widely recognised to be one of the most objectionable impacts of airport development and an important environmental issue for those living close to airports as well as further airfield under the main arrival and departure tracks" (DfT 2002: 12). Even without any growth scenarios aircraft noise already has the potential to affect the quality of life of at least half a million people with 80 % of these living close to airport in the southeast of England. These figures are likely to be exposed under different growth scenarios (POST 2003a).

The competitive situation of airport operators in the United Kingdom

Although the UK has a considerably high airport density, the bulk of airport activity is centred on the London airports. Heathrow, Gatwick, London City, Stansted and Luton together represent the largest air transport system in Europe, handling nearly 100 million passengers in 2000/01. As a matter of fact this has some implications on the competitive situation as the airports. Because Heathrow, Gatwick and Stansted belong to the same airport operator, critics argue that this constitutes a competitive advantage for BAA airports as the company has a monopoly in offering airport services in the region of South East-England.

On 29 March 2007 UK's consumer and competition authority OFT (Office of Fair Trading[87]) formally asked UK's Competition Commission (CC)[88] to determine whether the ownership of major airports through the BAA leads to any features of the market that prevent, restrict or distort competition and, if so, what remedial action might be taken. During the inquiry the CC occasionally stated that BAA's common ownership of Heathrow, Gatwick and Stansted is a feature of the market which prevents

[86] http://www.dft.gov.uk/press/speechesstatements/speeches/aoac (19.02.2009).

[87] http://www.oft.gov.uk (18.02.2009).

[88] The CC replaced the Monopolies and Mergers Commission in 1999, following the Competition Act in 1998. The Enterprise Act from 2002 introduced a new regime for the assessment of mergers and markets in the UK. The CC's legal role is focused on competition issues. The Enterprise Act also gave the CC remedial powers to direct companies to take certain actions to improve competition http://www.competition-commission.org.uk/about_us/index.htm (18.02.2009).

competition between them. In December 2008 the CC recommended to sell the airports of Gatwick and Stansted and Edinburgh (Competition Commission 2008a: Annex 1). Christopher Clark, chairman of the Competition Commission's BAA Airports inquiry, stated: "The most effective way to introduce competition in the South-East and in lowland Scotland is to require the three London airports and the two principal Scottish airports to be separately owned. We are proposing the sale of Gatwick, Stansted and Edinburgh airports to new independent owners with the operating capabilities and financial resources to develop each of them as effective competitors" (Competition Commission 2008b).

So far, the ruling remains provisional but is unlikely to be amended. BAA tried to avoid the recommendation previously and announced to sell Gatwick Airport in September 2008 after a first recommendation of the CC in August identified significant competition problems because of BAA's dominant market position (The Independent 2008). BAA chief executive questioned the use of selling the airports and stated that BAA does not believe that the CC has set out compelling evidence to support its view that selling Stansted as well as Gatwick will increase competition. BAA is also concerned that the proposed remedies may actually delay the introduction of new runway capacity and announced that BAA will continue to make its case to the Competition Commission. Nonetheless, analysts have predicted that Gatwick could fetch as much as £3 billion GBP while Stansted could be sold for about £2 billion (Daily Deal 2008). Personal Communications and an Interview with an expert from London City Airport (LCA) suggest that LCA will not benefit from the selling. While in principle it should make a competitive difference when all major London airports are under separate ownership, practically all airlines want to be at London Heathrow and concentrate their economic activities there. The issue of ownership doesn't matter for Heathrow airport. It was also pointed out that especially LCA serves as a niche airport for the business community in the City of London which only offers Inter-European flights and is therefore simply not a competitor with Heathrow, Gatwick, Luton or Standsted (Interview Inn).

Airport expansion and competition

The final outcome of this case should have implications on the competitiveness situation in the London area as BAA's ownership of three out of five London airports stifles growth at the smaller airports London City and Luton. As already stated, small airports are the main source of competition for larger airports (Starkie 2008: 6). But apart from smaller airports UK's major airports also compete with their main European rivals in France, the Netherlands and Germany.

To meet the forecast demand for flights the expansion of capacity will be required. A few years ago the Parliamentary Office of Science and Technology (POST) estimated that spare airport capacity is likely to be exhausted by 2015. Unless demands were managed or congestion tolerated, meeting the forecast growth to 2030 would require new capacity (POST 2003a, DfT 2003). Competition constitutes a massive issue in the debate, especially when related to London Heathrow and its role as international hub (Interview Stevens).

Heathrow and Gatwick already operate close to their full capacity and continuously claim for a permission of airports expansions. Nonetheless the opening of Manchester's second runway in 2001 was the first full-sized runway to be built in the UK for over 50 years. European competition with UK's major airports is strong and started to increase with the expansion (and further expansion plans) of the Airports Charles de Gaulle (4 runways), Amsterdam Schiphol (5 runways) and Frankfurt Main (fourth and fifth runway planned). As a result, the number of destinations served by Heathrow and Gatwick has declined relative to these other three major airports (POST 2003b: 7). Heathrow Airport has slipped from second to seventh in the ranking of number of destinations served since 1990. "At a critical time when Chinese airlines are seeking to expand routes to Europe, Heathrow's two runways are 98.5% full whereas our main competitors have 25% spare capacity. If the UK does not accommodate the demands of doing business with China, we risk losing out to our European competitors" (BAA 2008b: 41). Particularly BAA and British Airways point out that a third runway would relieve capacity and delay pressures. They refer to Amsterdam, Paris and Frankfurt, which have twice as many runways and fewer delays (The Times 2008). Similar to the Austrian Case some of these claims link a successful airport expansion with the United Kingdom's ability to compete in a globalised economy.

In January 2009 the British parliament has given a go-ahead for a third runway Heathrow. The issue was highly debated in public and in the Parliament. Except all reservations by the public and the house, Secretary of State for Transport Geoff Hoon justified the expansion plans with Heathrow's importance as an international gateway for the UK. He told MPs "It connects us with the growth markets of the future - essential for every great trading nation. But for too long it has operated at full capacity, loosing ground to international hub airports in other countries and with relatively minor problems causing severe delays to passengers." As a result of the expansion plans "Britain remains a place where the world can come to do business" (BBC 2009).

The decision for the airport expansion is the result of a long consultation process that attracted over 500,000 responses from the public and over 60 technical documents that were related with a wide range of environmental, economic and social impacts of growth at South East airports. As a result the Department of Transport publicised a White Paper on the Future of Air Transport (Department for Transport 2003b). On the basis of the consultation process and the White Paper the UK government identified a need for two new runways in the South East in the period to 2030. The first new runway should be added at Stansted and the second at Heahtrow airport, the latter only subject to some constraints. These include a commitment not to increase the size of the area significantly affected by aircraft noise, as measured by the 57 dB noise contour in 2002[89], confidence that the UK's European obligations with respect to air quality could be met; and public transport improvements to the airport (Department for Transport 2009: 8). The constraints for the third runway at Heathrow are a concession to critics of an airport further extension. Especially 57 dB L_{eq} noise contour takes into account harm and annoyance caused by aircrafts, which is perceived as a major problem of citizens living in affected areas (Also see Appendix 8). Although the Environmental Noise Directive entered national law when the final decision of a Heathrow extension was made it did not play a role in the decision-making process but "was just ignored"(Interview Stevens).

Opponents of a Heathrow expansion warn against devastating environmental noise effects to thousands of Londoners. According to plans by local authorities from late 2007 aircraft approaching the runway at Heathrow would use flight paths over north and south London before beginning their final descent over Kensington, Chelsea and Hammersmith. Some councils have called on the Government to rethink its plans. Hammersmith & Fulham leader Stephen Greenhalgh, who represents the 2M Group, made up of officials from the affected boroughs and said: "The maps detail just how few parts of the capital will escape the effects of the proposed new runway. In west London, where all the flight paths come together, the consequences could be devastating"(Evening Standard 2007).

As a consequence to the expansion plans and the publication of the White Paper BAA established compensation schemes for areas where depreciation of house prices due to aircraft noise are impossible to avoid. The aim of the compensation scheme for Heathrow airport is to protect local property values inside the expanded boundary of a three-runway Heathrow. Different mechanisms will ultimately enable home owners to sell their property directly to BAA at an unblighted market rate BAA 2008b: 12).

89 The 57 decibel (dBA) noise contour was supposed to be the most recent position at the time the White Paper was published. Its size in 2002 was 127 sq km (Department for Transport 2009: 8)

7.1.7.3 The Direct and Indirect Cost Effects of Noise Regulation

Cost of noise regulation

In early 2003 a treasury discussion document on Aviation and the Environment pointed out that the monetary values for the effect of aircraft noise ranged between 36 and 40 pence per passenger and estimated that total cost of noise impacts for all airports in the UK amount up to million 25 GBP for the year 2000 (Department for Transport 2003a: 13). This conservative estimation was questioned in a Government's Response to the Environmental Audit Committee's Report in the same year. The Government's Response argued that cost for Heathrow Airport alone might range from 37 million GBP to 66 million GBP (Secretary of State for Transport 2003: 5). These different estimations show that monetary valuation of noise raises difficult technical and methodological problems even before the END was implemented in the United Kingdom.

The EU Environmental Noise regulation in the United Kingdom is meant to reduce noise pollution in the surroundings of major roads, railway and airports and in agglomerations. According to the European directive, its interest is to reduce the number of people exposed to noise from various sources. Thus, it is meant to have substantial consequences on the authors of this noise. The Statutory Instruments implementing END are a follow-up to what is already seen as a high level of protection from aircraft noise, from the perspective of government representatives. Thus the interest is not only an increase in noise protection, but also some balancing environmental benefits and cost burdens, as the English environmental minister Jonathan Shaw said: "Balancing the increased demand for air travel with the desire for a peaceful environment is a difficult challenge. Much has already been done to reduce the noise from transport and industry, but there is more that we can do to limit, and in some cases reduce, the number of people affected by aircraft noise." (DEFRA 4 September 2008).

One possible consequence of this balancing approach would be to minimize harm and financial burden for affected industries. This interest is confirmed in statements of the Explanatory Memorandum to SI 2238. It says that the implementation does not have a direct impact on small businesses or airports, which have fewer than 50,000 aircraft movements per annum (2006: 28). It also made clear that there would be no competition effects of theses regulations. On the contrary, representatives from DEFRA and DfT stated that "through the AOA the various operators do work alongside one another"(Personal communication Turner and Evans).

In addition, government authorities point at the possible "future harm from standardization" on affected industries (DEFRA Explanatory Memorandum 2006: 15). This balancing approach has been criticised. In the view of environmental groups, it reveals that the objective of the national implementation is not to limit and reduce the number of people exposed, but simply to minimise it as far as practical (AEF 2008).

Another effect is the direct costs of noise regulation. In general noise mitigation works are usually financed through noise related landing charges and can generate large community funds. If noise measures take the form of operational restrictions these have generally been imposed by regional or state authorities when capacity is enhanced. Anyway, the constraint 'cost' is more than offset by the potential revenue from additional capacity (Interview Johnson).

Noise maps and action plans also cause a financial burden on the airport operator in the UK at "some considerable expense" for the airport operators (Interview Inn). This could turn out as a disadvantage compared to others, if it is significantly expensive to develop maps and plans. In other words, the other member states would subsidies their airports in paying the maps (see Austria). By the time of writing this case study, airport operators were not able or willing to assess their costs for noise mapping and action plans. This is unsurprising for the case of action plans. As mentioned earlier, airport operators are still waiting for the final guidelines and the revision of Consultation Draft for action plans (DEFRA 2008). Airport operators are simply not willing to spent scarce financial and human resources on a planning process without knowing the necessary details.

Nonetheless most airports have at least some ideas of how their noise action plans could look like but interview partners stated that no airport will complete their work on noise action plans until it received final government's guidance on the issue (Interviews Walmsley, Dawes and Inn). One interview partner stated that airport operators would use competition arguments to delay or weaken action plans (Interview Johnson). Nonetheless two exceptions are worth mentioning here. The two Scottish BAA airports Glasgow and Edinburgh already published draft versions of Noise Action Plans for consultation (see BAA Glasgow 2008, BAA Edinburgh 2008 and Appendix 8). The reason for the earlier publication must be related to the fact that they fall under Scottish legislation, which differently translates European Directives into Scottish Law (Interview Inn, Interview Dawes).

The Environmental Noise Regulations have an effect on state budgeting. In the Explanatory Memorandum to the Statutory Instrument 2238, the cost of mapping aviation was estimated from the number of airports required to be mapped in 2007, with a maximum of £40,000 per airport. This estimation was based on previous experience with noise mapping in other projects (DEFRA Explanatory Memorandum 2006: 24). With 18 major airports in England, one major airport in Northern Ireland and three major airports in Scotland, plus 13 airports within agglomerations (where it is not clear if the limit values is exceeded), this sums up to £1.39 million.[90] This sum is up to 12% of the estimated costs for noise maps from all sources (~£11.1 million)[91]. It has been confirmed by representatives from CAA that real expenses have been in the range of this amount (Interview Havelock).

According to the DEFRA, the estimation for the cost of action plans was much more uncertain, due to a lack of data and precedent for such an undertaking. The costs for all action plans are estimated with £ 2.3 million for all roads, railways and aircraft noise altogether (DEFRA Explanatory Memorandum 2006: table 5, see also Appendix 6).

Theses figures have been highly criticised by environmentalist groups. The AEF claims that the overall sum indicated by the DEFRA is only "a tenth of the real costs of collecting and processing the data. It will only really cover the processing of the data. It assumes that the data is already available (...) and that it is correct" (AEF 2008: 2). However, the UK government defends expected low cost for action plans with a short distance to target. As it has been stated above, the Government White Paper 'The Future of Air Transport' requests airport operators to produce "master plans". These plans should include detailed proposals for environmental controls, including noise controls (DEFRA Explanatory Memorandum 2006: 27). If it is assumed that airport operators already produced such master plans, according to the DEFRA, the incremental cost of ensuring that the noise-related element conforms with the END requirements for action plans, should be relatively modest.

Indirect effects of END on the competitive situation

The most important indirect cost of the END is its potential effect on the future expansion of airports in the UK. While the END was not an issue for the decision to build a third runway at Heathrow its effects for other airports are impossible to forecast. The END requests the use of L_{den} even if the resulting area does not vary (Interview Havelock). As mentioned above there are significant differences between L_{eq16} and L_{den} with more affected people using L_{den}. This might cause some problems for future expansions plans, especially if the revision of the END sets even stricter guidelines.

When asked for the potential impact of the END in the UK and the distance to the target one interview partner stated that one shouldn't overwrite the directive in the UK as it will not make that much difference when compared with the current situation. The directive will lead to some changes, which

[90] 2.1 Mio € (in 2006);

[91] 16,5 Mio € (in 2006)

won't be dramatic for airports (Interview Inn). It was also stated that nothing has changed after the implementation of the directive as the only implementation to date has been the maps while the consequential action plans and measures have not yet been developed. Any changes in noise exposure around airports before or after 2006 cannot be attributed to the END (Interview Johnson). Thus the END has not visibly improved the protection from aircraft noise in the UK (Interview Stevens). The Operational Noise Manager of Heathrow Airport pointed out that Heathrow specifically is probably more heavily restricted in terms of noise regulations than any other European airport (Interview Dawes 2009). This is especially true for the strong night flight regime, which only allows 16 movements per night (11.30pm and 6am). As London Heathrow was so heavily restricted even before the END the potential effects of the END should remain small.

7.1.8 Conclusions from the Case Studies and Consequences for the Competitive Situation

The adoption of the European Noise Directive (2002/49/EC) in June 2002 represents a milestone in European regulation of environmental noise. So far a common approach to avoid, prevent or reduce the harmful effects of environmental noise exposure was missing although the problem is publicly perceived as a problem of similar relevance as global warming.

This case study examined the implementation of the Environmental Noise Directive and its potential consequences for the Single Market. To narrow down the focus of this broad directive and to assess the consequences for a single industry, a special focus was set on aircraft noise and noise around major airports. In contrast to the regulation of noise around major roads and railways, the regulation of noise exposure in the environment of airports has potential effects on economic competition between airport operators in different Member States. In general airports play a key role for regional economic growth. The aviation industry alone contributes about 120 billion EUR to the European GDP. Approximately 1.2 million jobs can be directly or indirectly related to the aviation industry. From about 400 European airports only 74 major airports in 19 out of 27 EU member states are directly affected by the END legislation.

The main goal of the END is the collection and allocation of consistent and comparable data on noise exposure from different sources, with the requirement to produce noise maps and action plans which have to be made available to the public. It has been broad consensus that noise mapping and public access to this data constitutes an advancement regarding noise protection in MS. It remains nonetheless controversial whether the END leads to an increase in environmental quality. With its focus on data collection and the absence of uniform standards, the END does not level the playing field at present.

However, the directive can be interpreted as a first step in the direction of a more harmonised approach. It already had some observable effects on the relative competitiveness in the targeted industry in the airport sector, and thus on the single market. They can be related to differences in the national implementation of END. The nature of the END allows MS a leeway regarding the transposition of some of the prescriptions. Responsible for the differences in the effects of the ENDs' implementation is also the economic situation and geo-strategic position of major airports, the national regime before END and differences in the legal systems of the Member States.

To demonstrate these differences in more detail, Austria and the United Kingdom were selected as suitable candidates for an in-depth case study. Both countries were among three other MS that faced a legal action and ECJ ruling. The UK has 20 airports beyond the END threshold of 50,000 movements per annum and is thus particularly affected by the directive. UK's hub airports face competition from its European rivals in France, the Netherlands and Germany. Most importantly, the UK partially delegated the establishment of noise maps and action plans to airport operators, which are dominated by private enterprises. This ideally contrasts with the case of Austria, which is a small member state with only one major airport. The airport of Vienna competes with central European hubs and small airports in other MS that are not affected by the directive. Austrian national measures of implementation and a private mediation agreement for the only major airport go beyond the aims of the directive.

Delayed implementation

For both countries it is not clear whether their late implementation can be seen as an advantage for airport operators as the delay possibly postpones the costs of noise mapping and action planning. The contrary could be true as well. If harmonization of noise policy goes on – as intended by the European Commission – early adoption might turn out as an advantage. Stricter measures and binding standards in the future might impose only limited additional costs on frontrunners that have already implemented action plans and ambitious measures for the abatement of noise emissions.

Cost implications

The differences in the assignment of competencies to relevant authorities can be interpreted in several ways. As the case of Austria showed, implementation through governmental authorities involved no direct costs for airport operators but it eventually leads to higher costs if environmental authorities have ambitious targets. Direct costs in the UK have been higher as airport operators had to bear the costs for noise contours on their own. Therefore, a competitive advantage for airports could be assumed in MS where government agencies bear the costs. On the other hand, airport operators might have the possibility to influence action plans in the sense to include less costly measures than a government agency would do.

In both countries under study, airport operators have not been overly enthusiastic regarding a direct involvement. Interviewed airport operators also tended to downplay the role of noise policy for their competitive situation but there are strong arguments regarding the existence of competition between hubs and even regional airports that increasingly face privatization (See chapters 3, 5.2 and 6.2). Whether the delegation of authority to private airport operators constitutes a competitive advantage or a disadvantage is difficult to answer. The costs for noise maps are probably too small to imply a competitive effect whereas costs for action plans are impossible to assess as they have not yet been prepared or published - partly as a strategy to avoid costs.

But even if the direct costs of noise mapping are not relevant for competition (as some airport operators claim), there are indirect cost effects of END. Most economic forecasts of the industry see a strong requirement to add new capacity to many European airports. This is necessary to cope with the future growth of the aviation industry and the metropolitan area around major airports. But airport expansion might be complicated or even hindered as a result of action plans and strict anti-noise measures. In the case of Austria, representatives from the commercial chamber and industry associations have claimed negative consequences for the location of business and industry. Thus, differences in action plans and the definition of noise contours could result in different costs for airports that are targeted by the END.

Nonetheless some might also benefit. The case of Vienna is an example for a competitive advantage through even more demanding noise measures. A high level of protection measures as result of the mediation process and the participation of affected citizens and communities increase the changes for a successful expansion in the near future, securing the competitive position of an airport operator.

Measurement and limit values

The measurement of environmental noise also has some implications on the costs. Although intended by the EU legislation, so far no harmonized- but valid interim methods exist for noise measurement. The case studies clearly revealed that member states have an interest in keeping their national approaches. Noise indices introduced by END conflict with existing indices in several MS. In the UK, the DEFRA decided to use national Leq16 parallel to the European Lden and Lnight standard.

This led to confusion and public scepticism. It forced airport operators to produce additional Lden and Lnight contours in order to satisfy resident's requirements. A comparison of these noise maps with contours from other EU member states reveals that in the UK, the number of people affected from aircraft noise inside the Lden and Lnight is considerably higher than in most other MS, implying higher costs for noise abatement.

Definition of major airports

The definition of major airports could also have some implications on the competitiveness of airports operators. As was shown, only airports beyond the EU threshold are labelled as a major airport and are thus affected by the END. This could constitute a competitive advantage for small airports as they grow up to a level of 50,000 without any formal obligation to implement END measures. Taken together, some 60 European airports have more than 1.5 million passengers each but do not fall under END classification. On the other hand, small airports have high fixed costs and their inclusion under the END could be a disproportionate burden.

The threshold definition also reveals interesting differences between our two cases. Austria intends to go beyond the requirements of the END. In the second round of noise mapping and action planning, all airports will be included even if they do not exceed the 50,000 annual movements' threshold. The opposite is true for the UK. Due to its island position the country has high airport density with 20 airports affected by the END. Therefore interview partners articulated an interest not to include more than ten airports in case of a future revision of the directive, and not to define airports on the number of flight movements solely. On the other hand, it has also been criticized that the definition for major roads and railroads is extended from 2012 onwards but remains constant at 50,000 passages for major airports.

To conclude, there is no unambiguous evidence for actual market distortion, but some weak indication of possible effects of the Environmental Noise Directive and differences in national implementation on the relative competitiveness of airport operators. There are claims for more harmonization and stricter measures – e.g. supported by the Position Paper on dose response relationships between transportation noise and annoyance from 2002, pointing at a higher annoyance from aircraft noise when compared to road and railway noise – as well as claims for the maintenance of national approaches. The case of Austria shows that it depends on the geo-strategic position whether some airports can afford higher levels of protection, while others cannot (e.g. mountainous region). For a final assessment of the existence of a possible distortion of the common market, it remains to be seen how action plans will affect the situation of targeted industry.

The current financial and economic crisis will also have some effects on the aviation industry and the competitive situation of airport operators. While the overall effects of the crisis are impossible to assess within the scope of this study it seems likely that the current crisis will at least have some effects on further airport expansion and potential future merges. There is already some evidence that existing plans for airport expansions will be postponed due to its high costs which fall in an insecure investment climate and a world recession that affects nearly all industries.

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Abbreviations:

ACI	Airports Council International
ADI	Airport Development and Investment Limited
AEF	Aviation Environment Foundation
AOA	Airport Operators Association
ATAG	Air Transport Action Group
ATMs	Aircraft Transport Movements
AUA	Austrian Airlines
BAA	British Airport Authority
BGBl	Bundesgesetzblatt
BMVIT	Austrian Ministry for Transport, Innovation, Technology
CAA	Civil Aviation Authority
CALM	Coordination of European Research for Advanced Transport Noise Mitigation
CC	Competition Commission
dB	Decibel
DEFRA	Department for Environment, Food and Rural Affairs
DFT	Department for Transport
DG ET	Directorate-General of Energy and Transport
EASA	European Aviation Safety Agency
EC	European Commission
EIA	Environmental Impact Assessment
END	European Noise Directive
EP	European Parliament
EPUK	Environmental Protection United Kingdom (NGO)
ERCD	Environmental Research and Consultancy Department
EU	European Union
EUR	Euro (€)
FRAPORT	Frankfurt Airport
FWAG	Flughafen Wien AG
GBP (£)	Great Britain Pound
GDP	Gross National Product
HACAN	Heathrow Association for the Control of Aircraft Noise
HYENA	Hypertension and Exposure to Noise near Airports
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IPCC	International Panel on Climate Change
ITF	International Transport Forum

LCA	London City Airport
LFG	Luftfahrtgesetz
LFV	Luftfahrtsverket (Swedish Civil Aviation Administration)
LGW	London Gatwick Airport
LHR	London Heathrow Airport
Mio	Million
MPs	Members of Parliament
MS	Member States
N-ALM	Nordisk Arbetsgrupp för Luftfartens Miljöfrågor
OECD	Organisation for Economic Cooperation and Development
OEF	Oxford Economic Forecasting
OFT	Office of Fair Trading
ÖVP	Austrian People's Party
POST	Parliamentary Office of Science and Technology
SPÖ	Social Democratic Party Austria
UK	United Kingdom
UNEP	United Nations Environment Programme
VCÖ	Verkehrsclub Österreich
WHO	World Health Organisation
WKO	Wirtschaftskammern Österreichs (Commercial Chamber)

Appendices:

Appendix 1: List of "Major Airports" Reported by Member States According to 2002/49/EC

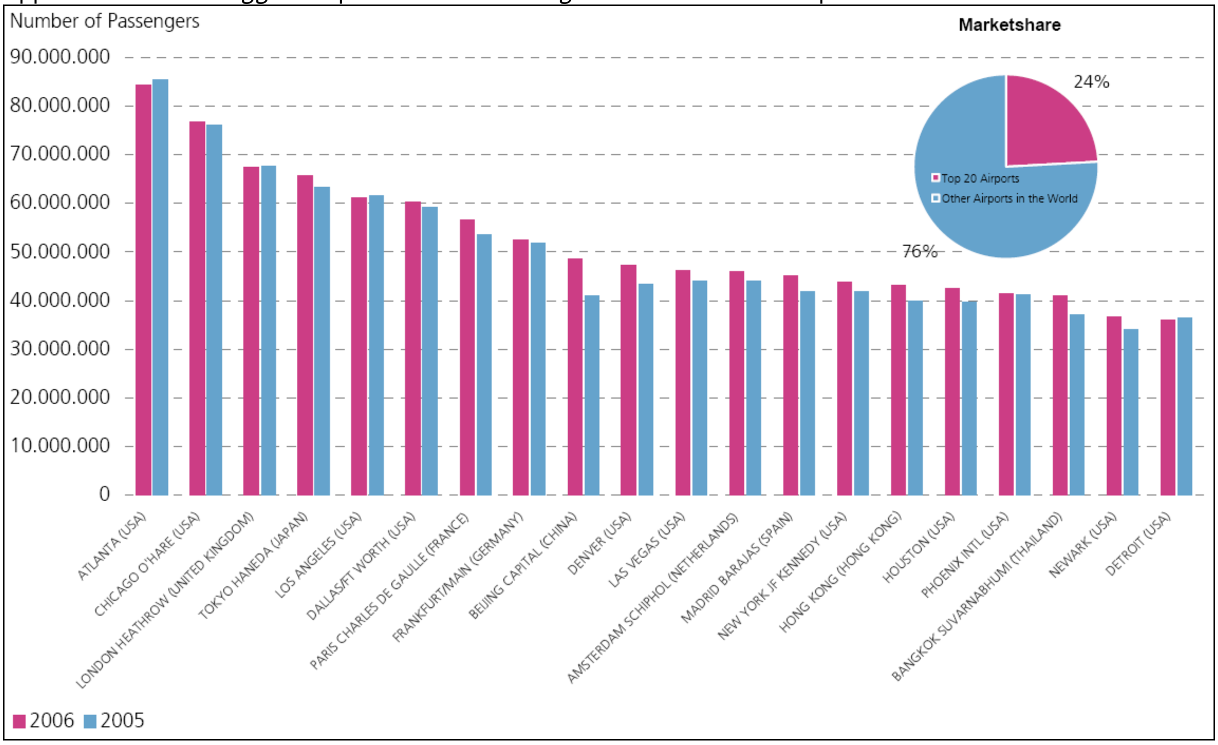
Member State	Major Airport designated by the Member State	Movements/year
Austria	Wien	224,809
Belgium	Brussels-National	253,257
Bulgaria	no major airport	
Cyprus	no major airport	
Czech Republic	Praha Ruzyn□	145,221
Denmark	Billund	53,671
	Roskilde	69,204
	Kobehavns	268,655
Estonia	no major airport	
Finland	Helsinki-Vantaa	173,000
France	Bâle-Mulhouse	66,455
	Bordeaux-Mérignac	56,900
	Lyon-St-Exupéry	122,273
	Marseille-Provence	96,969
	Nice-Côte d'Azur	164,079
	Paris-Charles-de-Gaulle	516,398
	Paris-Le Bourget	57,224
	Paris-Orly	218,760
	Toulouse-Blagnac	77,282
Germany	Berlin-Tegel	131,833

Member State	Major Airport designated by the Member State	Movements/year
	Frankfurt am Main	477,475
	Hamburg-Fuhlsbüttel	155,000
	Hannover	86,000
	Düsseldorf	200,583
	Nürnberg	78,043
	Munich	411,335
	Stuttgart	169,352
	Köln/Bonn	152,652
Greece	Eleftherios Venizelos (Athens, Spata)	189,936
Hungary	Budapest Ferihegy	111,753
Ireland	Dublin Airport	173,110
Italy	Roma Fiumicino	309,658
	Torino Caselle	54,008
	Napoli Mil. & Civ. (Capodichino)	nc
	Bergamo Orio Al Serio	51,635
	Bologna Borgo Panigale	59,326
	Catania Fontana Rossa	54,036
	Milano Linate	93,942
	Milano Malpensa	227,718
	Venezia Tessera	78,783
Latvia	no major airport	
Lithuania	no major airport	
Luxembourg	Luxembourg	89,074
Malta	no major airport	
Netherlands	Schipol	440,153
Poland	Warsaw - Frydyrick Chopin	108,000
Portugal	Lisbon	120,496
Romania	Henry Coanda Bucharest	55,430
Slovakia	no major airport	
Slovenia	no major airport	
Spain	Madrid - Barajas	
	Barcelona	
	Palma De Mallorca	
	Malaga	
	Gran Canaria	
	Valencia	
	Alicante	

Member State	Major Airport designated by the Member State	Movements/year
	Tenerife Sur	
	Tenerife Norte	
	Bilbao	
Sweden	Stockholm-Arlanda	
	Göteborg-Landvetter	
United Kingdom	London Heathrow	475,762
	London Gatwick–	250,970
	Manchester International	224,535
	London Stansted	191,931
	Birmingham Internaitonal	120,453
	London Luton	92,709
	Liverpool John Lennon International	82,200
	Bristol Lulsgate	77,550
	Newcastle International	76,114
	Nottingham East Midlands International	73,764
	Bournmouth-Hurn	73,164
	Blackpool Squires Gate	72,929
	London City	60,536
	Southhampton Easteigh	54,285
	Leeds Bradford	52,494
	Belfast Aldergrove International	55,779
	Edinburgh Turnhouse	124,597
	Glasgow International	107,095
	Aberdeen Dyce	92,867
	Prestwick	nc*

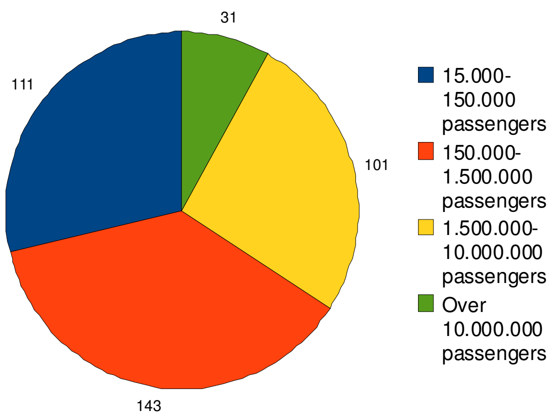
Source: DG ENV/C3, Source: http://circa.europa.eu/Public/irc/env/d_2002_49/home (12.12.2008). 74 "major airports" (7-03-2008) Source: Member States reports sent to EC under article 7-1 of the D. 2002/49/EC and available at: http://forum.europa.eu.int/Members/irc/env/airport_noise/home (see folder 'Data Reporting 2005') *nc = not communicated to EC.

Appendix 2: The 20 Biggest Airports In Terms of Flight Movements in Europe



Source: DG Energy and Transport 2007: Annual analyses of the European air transport market, p.117.

Appendix 3: Number of European Airports by Size (Passenger)



Source: DG Transport:(2008) "Facts & Key developments on Air Transport, p.1.

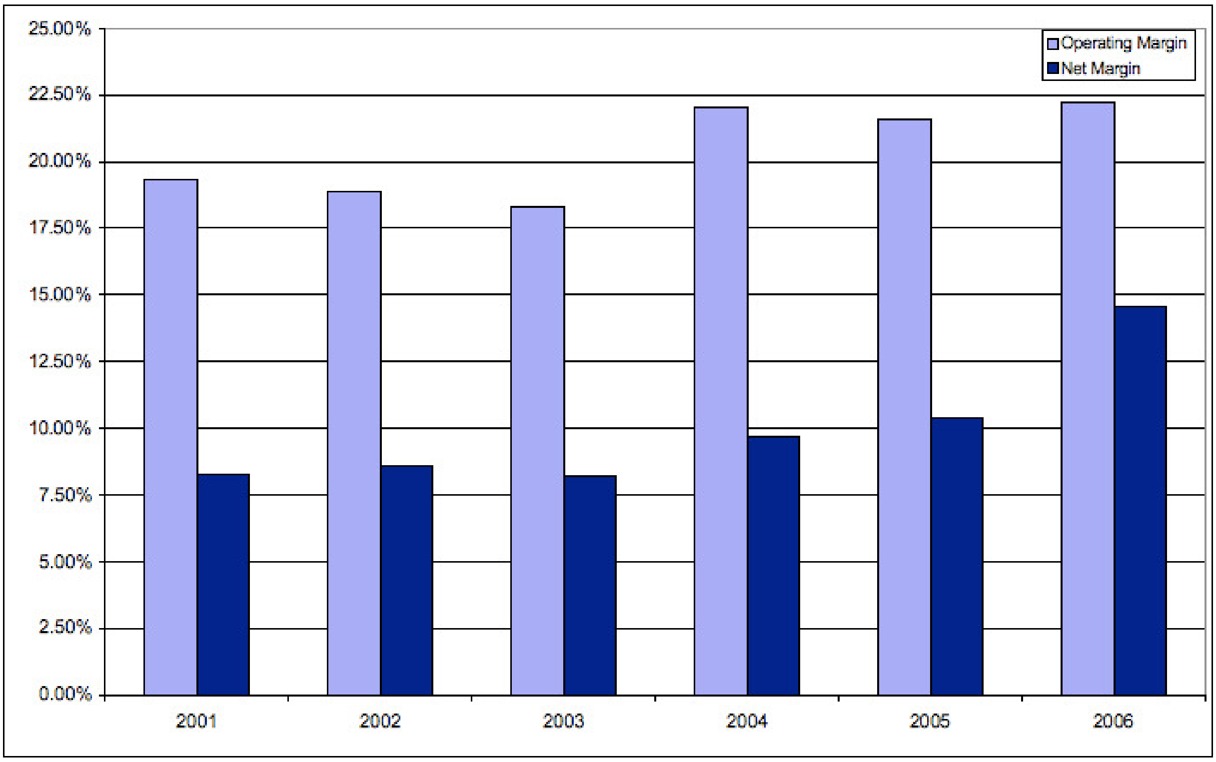
Appendix 4: Share Ownership Structure of Major EU Airport Operators 2006

	Country	Airport	Private sector	National	Regional	Municipal	Interests in other airport operator (Europe)
					Government		
BAA	UK	Heathrow, Gatwick, Stansted, Aberdeen, Edinburgh, Glasgow, Southpt.	100.00				Naples
Aeroporti di Roma	Italy	Rome Fiumicino, Rome Ciampino	96.99		1.58	1.43	Genova SAC

				National	Regional	Municipal	
Brussels	Belgium	Brussels	70.00	30.00			
Copenhagen Airport	Denmark	Copenhagen Kastrup, Roskilde	60.80	39.20			Newcastle
Flughafen Wien	Austria	Vienna	60.00		20.00	20.00	Istanbul, Riga, Cd Real, Bratislava, Kocise
Flughafen Düsseldorf	Germany	Düsseldorf	50.00			50.00	
Athens International	Greece	Athens	45.00	55.00			
Fraport	Germany	Frankfurt Main	41.42	6.58	31.70	20.30	Hahn, Hannover, Antalya, Bourgas, Varna
Aéroports de Paris	France	Paris Charles de Gaulle, Paris Orly, Paris Le Bourget and 10 airfields	32.50	67.50			Liege
SEA Aeroporti di Milano	Italy	Milan Linate, Milan Malpensa	0.88		14.56	84.56	Naples Orio al Serio Rimini
Manchester Airports Group	UK	Manchester, East Midlands, Bournemouth, Humberside				100.00	
Flughafen München	Germany	Munich		26.00	51.00	23.00	
Schiphol Group	Netherlands	Amsterdam, Rotterdam, Lelystad		75.80	24.20		Eindhoven
Aena	Spain	Madrid, Barcelona and 44 other Spanish airports		100.00			
LFV	Sweden	Stockholm, Gothenburg & 14 other Swedish airports		100.00			
Dublin Airport Authority	Ireland	Dublin, Cork, Shannon		100.00			Birmingham Düsseldorf
ANA Portugal	Portugal	Lisbon, Porto, Faro, Horta, Ponta Delgada, Flores		100.00			
Finnavia	Finland	Helsinki and 25 other Finnish Airports		100.00			
Polish Airports	Poland	Warsaw, Rzeszów, Zielona		100.00			
Letiste Praha	Czech Rep.	Prague		100.00			

Source: DG Energy and Transport: Analysis of the EU Air Transport Industry Final report 2006: 103f.

Appendix 5: Operating Margin of European Airport Operators



Source: DG Energy and Transport 2006: Analysis of EU Air Transport Industry Final report 2006: 107

Appendix 6: Summary of Costs for 2007 by Source and Devolved Administration

	England	Scotland	Wales	Northern Ireland	United Kingdom
Road	£6,319,000	£700,000	£269,000	£295,000	£7,583,000
Rail	£1,212,000	£208,000	£65,000	£106,000	£1,591,000
Aviation	£1,240,000	£120,000	£0	£39,000	£1,399,000
Industry (inc. Ports)	£348,000	£31,000	£21,000	£153,000	£553,000
Population Exposure	£1,333,000	£106,000	£36,000	-	£1,475,000
Action Plans*	£2,000,000	£159,000	£54,000	£44,000	£2,257,000
Additional costs	-	-	-	-	360,000
TOTAL	**£12,452,000**	**£1,324,000**	**£445,000**	**£637,000**	**£15,218,000**

* The costs for action plans represent a mid-point of a +/- 20% range given the anticipated uncertainty in costs. Source: Summary of costs for 2007 by Source and Devolved Administration (figures rounded to nearest '000). In: Explanatory Memorandum to the The Environmental Noise (England) Regulation 2006, 2006 No. [2238]

Appendix 7: BAA Glasgow Action Plan, Draft Version (Glasgow Approach to Managing Noise (the action plan 2008-2013)

Action	Impact	Timescale	Performance Indicator	Approx estimate Number of people affected by the action
1. Demonstrating we are doing all that is reasonably practicable to minimise noise impacts				
1a. Quietest Fleet Practicable				

Action	Impact	Timescale	Performance Indicator	Approx estimate Number of people affected by the action
We will develop, publish and implement a policy prioritising airlines operating Chapter 4 aircraft when introducing new business to Glasgow by the end of 2009.	Arrivals Departures Ground Noise	2009	Track the annual percentage of Chapter 4 operations Annual Contours	25550
We will review the landing fee differential at least every 3 years commencing in 2009.	Arrivals Departures Ground Noise	2009 2012	Conditions of use documents changes in charging. Track percentage within different charging categories. Annual Contours	N/A
1b. Quietest practicable aircraft operations, balanced against NOX and CO_2 emissions.				
Together with our partners in Sustainable Aviation we will develop a best practice guide for departures (DCOP) by the end of 2009.	Departures	2009	Publication of DCOP Number of documents circulated. Reduction in key metrics identified in the code. Annual Contours.	N/A
We will continue to promote continuous descent approaches (CDA).	Arrivals	Ongoing	Percentage of CDA achievement Percentage meeting joining point criteria As new metrics develop (height over sites for example) these could be added.	N/A
We will continue to fine aircraft in breach of the DfT departure noise limits.	Departures		Number of infringements	25550
We will increase the fining levels for departure noise infringements in 2008 and review levels at least every three years thereafter.	Departures	2008 2011	Publication of new fining level	25550
We will work with our partners in Sustainable Aviation to develop and promote low noise flight procedures through evaluation of future operational methods and implementation of best practice.	Arrivals Departures Ground Noise	Annual	Published update of activities in annual Corporate Responsibility report	N/A
Continue to engage with our aviation partners through to seek to improve adherence to the AIP.	Arrivals Departures		Update of actions to airport consultative committee	N/A
Ground Running of aircraft engines. To ensure that the environmental impact of aircraft engine running on the local community is kept to a minimum, aircraft operators with maintenance commitments at the airport are expected to plan their schedule to avoid the need for ground running of engines at night. Night for these purposes is defined as the period between 2200 –	Ground Noise	Ongoing	Number, location & duration of engine runs	200

Action	Impact	Timescale	Performance Indicator	Approx estimate Number of people affected by the action
0700 hours local time.				
We will undertake a review in 2009 of our stand planning procedures to identify any opportunities to prioritise stand allocation so as to minimise ground noise impacts.	Ground Noise	2009	Number of aircraft on ground noise sensitive stands during noise sensitive periods	200
In conjunction with our partners in Sustainable Aviation we will continue to lobby for and seek to support continual improvements in technology and operations towards the ACARE goal of 50% reduction in perceived external noise by 2020 based on new aircraft of 2020 relative to equivalent new aircraft in 2000.	Arrivals Departures Ground Noise	Ongoing		N/A
1c. Effective and credible noise mitigation schemes				
We will continue to offer a relocation assistance scheme for those households within the airports 69db Leq noise contour, in line with Government policy.				0
We will consult separately on the introduction of a new noise mitigation scheme like that in operation at London Heathrow and Gatwick, by the end of 2009				200
We will benchmark our noise mitigation and compensation measures with other comparable airports in 2010 and 2013.	Perceived Impacts	2010 2013	Ranking table	N/A
We will continue to offer a relocation assistance scheme for those households within the airports 69db Leq noise contour, in line with Government policy.				N/A
2. Engage with communities affected by noise impacts to better understand their concerns and priorities, reflecting them as far as possible in airport noise strategies and communication plans				
We will continue to offer a free phone number for complaints and enquires regarding aircraft noise.	Community Trust & Awareness	Ongoing	Number of contacts by contact method.	25550
We will consider introducing a flight track information system (delayed by 24 hours) via Webtrak.	Community Trust & Awareness	Ongoing		N/A
We will annually review our communication material to ensure relevance and ease of understanding.	Community Trust & Awareness	Anually		N/A
We will continue to log all complaints relating to aircraft operations and publish the statistics quarterly.	Community Trust & Awareness	Ongoing	Number of callers, contacts and events by month, by area.	N/A
We will seek to respond to 100% of all complaints and enquiries within 48 hours and publish our performance at the Airport Consultative Committee.	Community Trust & Awareness	Ongoing	Response Rate Tracker	N/A
We will publish a summary report detailing the feedback we receive in	Community Trust &	2008/09	Publication of Noise Action plan and	N/A

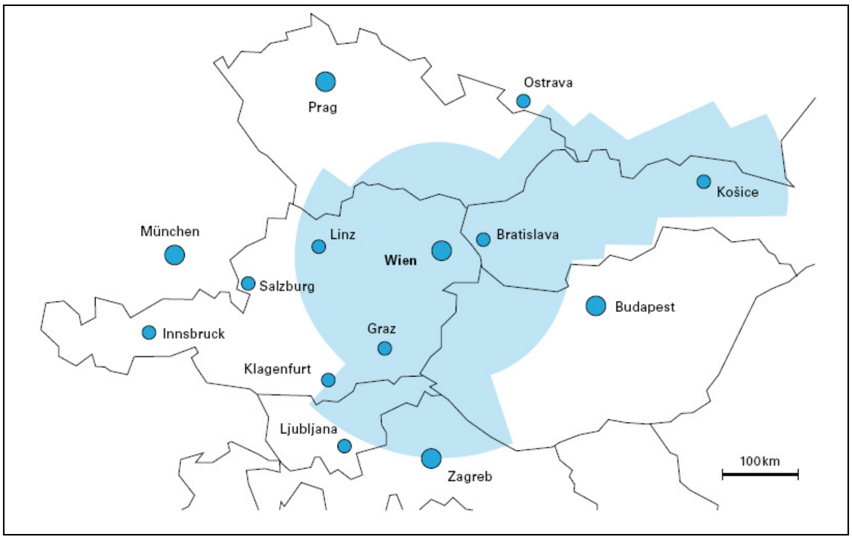
Action	Impact	Timescale	Performance Indicator	Approx estimate Number of people affected by the action
relation to this proposed action plan within 6 months of the close of the consultation	Awareness		feedback report.	
We will publish our progress against the action plan on an annual basis.	Community Trust & Awareness	2009, 2010, 2011, 2012, 2013.	Corporate Responsibility Report, % of actions complete	N/A
We will conduct local community opinion surveys every three years commencing in 2010.	Community Trust & Awareness	2010 2013	Survey Results	N/A
We will continue to direct all money raised by noise infringements to the Glasgow Community Trust.	Community Trust & Awareness	Ongoing	Number of infringements and fines raised published in CR report	N/A
We will review, develop and consult on alternative metrics for describing the impact of aircraft operations during the course of this action plan.	Community Trust & Awareness	Ongoing	Number of new metrics introduced	N/A
3. Influencing planning policy to minimise the number of noise sensitive properties around our airports				
We will continue to engage with the local planning authority to ensure awareness of aircraft operations is considered in the development of sensitive land use.	Land Use Planning, Community Trust & Awareness	Ongoing	Ongoing	N/A
We will commission and publish forecast Leq contours for air noise for 2013 in 2010.	Land Use Planning, Community Trust & Awareness	2010 2013	Publication of contours on time	N/A
We will commission and publish forecast Lden contours for air noise for 2013 in 2010.	Land Use Planning, Community Trust & Awareness	2010 2013	Publication of contours on time	N/A
4. Organising ourselves to manage noise efficiently and effectively				
We will continue to operate and enhance our Noise Management systems by various means such as; Holding quarterly management system reviews Anaylising noise data periodically Review noise complaint trends	Consistent and effective management	Ongoing		N/A
5. Achieving a full understanding of aircraft noise to inform our priorities, strategies and targets				
At a corporate level we will continue to support work to better understand the interdependencies of aircraft operations management.	Arrivals Departures Ground Noise	Ongoing	Groups participating in Research Funding provided Number of trials ongoing.	N/A
At a corporate level we will participate fully through groups such as ANMAC to debate current arrival and departure policy.	Arrivals Departures Ground Noise	Ongoing	Minutes of ANMAC Number of ANMAC meetings	N/A

Source: "Our Approach to Managing Noise (the action plan)". In: Glasgow Airport Noise Action Plan 2008-2013. Draft for consultation, May 2008

Appendix 8: Reported Annoyance and LAey by Site

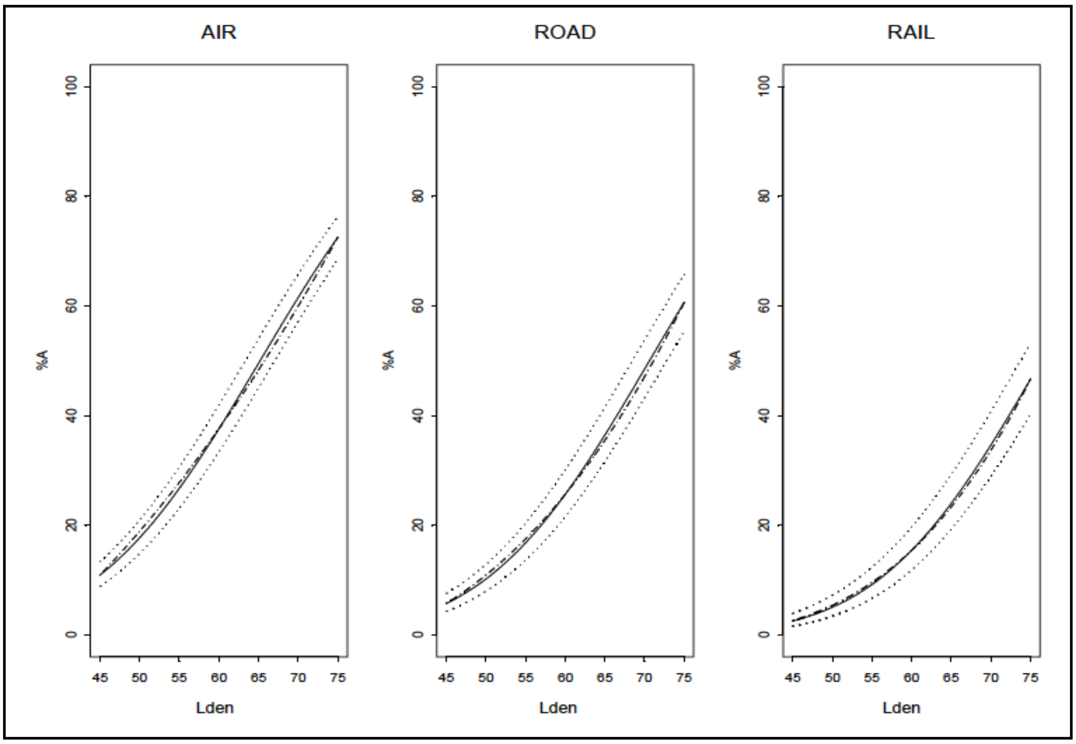
		% of Respondents at Least					
Location	Airport	16h Laeq	Mean Annoyance	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed
Tooting	Heathrow	40.9	19	35%	11%	0%	0%
Colliers Wood	Heathrow	41.6	17	35%	0%	0%	0%
Fallowfield	Manchester	41.9	15	22%	5%	0%	0%
Withington	Manchester	42.9	12	10%	0%	0%	0%
S Wimbledon	Heathrow	43.1	25	36%	31%	5%	5%
Stockport	Manchester	43.1	14	21%	0%	0%	0%
Dukinfield	Manchester	43.3	19	34%	6%	6%	0%
Harlford	Manchester	44.0	11	4%	0%	0%	0%
Heaton Moor	Manchester	44.0	25	56%	13%	7%	0%
Gatley	Manchester	45.3	17	23%	14%	0%	0%
South Ealing	Heathrow	46.0	41	70%	54%	24%	7%
Sunbury	Heathrow	46.5	22	38%	14%	6%	0%
Teddington	Heathrow	47.2	42	78%	49%	33%	0%
WaltonThames	Heathrow	47.5	24	38%	31%	0%	0%
Hersham	Heathrow	47.6	39	77%	54%	14%	3%
Kempton Park	Heathrow	48.9	27	56%	17%	12%	0%
Virginia Water	Heathrow	49.6	30	64%	28%	5%	0%
Sutt'nColdfield	Birmingham	49.7	46	72%	53%	34%	22%
West Ealing	Heathrow	50.4	45	77%	56%	32%	12%
Hanworth	Heathrow	50.4	30	62%	36%	3%	0%
North Ealing	Heathrow	50.5	50	88%	62%	36%	12%
Windsor For'st	Heathrow	50.9	29	55%	23%	9%	8%
Chiswick	Heathrow	52.7	48	81%	63%	34%	12%
W Brompton	Heathrow	53.0	35	72%	38%	14%	3%
Bredbury	Manchester	53.9	55	97%	73%	44%	11%
East Sheen	Heathrow	54.7	64	96%	83%	57%	34%
Kneller Hall	Heathrow	55.2	42	93%	49%	13%	6%
C'tle Bromwich	Birmingham	55.6	39	69%	47%	21%	8%
Knutsford	Manchester	55.6	53	94%	68%	41%	12%
Eton	Heathrow	56.1	52	82%	71%	40%	20%
Dedworth	Heathrow	56.2	54	82%	72%	44%	22%
N Stockport	Manchester	56.6	61	95%	77%	55%	30%
Cheadle Heath	Manchester	58.4	53	86%	65%	42%	24%
Old Windsor	Heathrow	58.7	59	94%	78%	50%	25%
South Windsor	Heathrow	59.3	73	99%	93%	73%	48%
Hounslow H'th	Heathrow	59.7	74	100%	96%	73%	49%
S Hounslow	Heathrow	59.8	66	96%	80%	61%	42%
Glebe Farm	Birmingham	59.9	48	84%	57%	27%	20%
Isleworth	Heathrow	60.3	62	96%	86%	49%	31%
Colehall	Birmingham	61.0	57	84%	73%	52%	24%
Cheadle	Manchester	61.6	57	93%	87%	46%	11%
W Hounslow	Heathrow	61.7	64	94%	79%	61%	37%
CheadleHulme	Manchester	62.8	59	86%	82%	48%	27%
Osterley	Heathrow	63.1	76	97%	96%	80%	58%
Kitts Green	Birmingham	64.2	68	88%	77%	68%	56%
Adapted from Masurier et al. 2007: 7.2, 7.3							

Appendix 9: Catchment Area Flughafen Wien



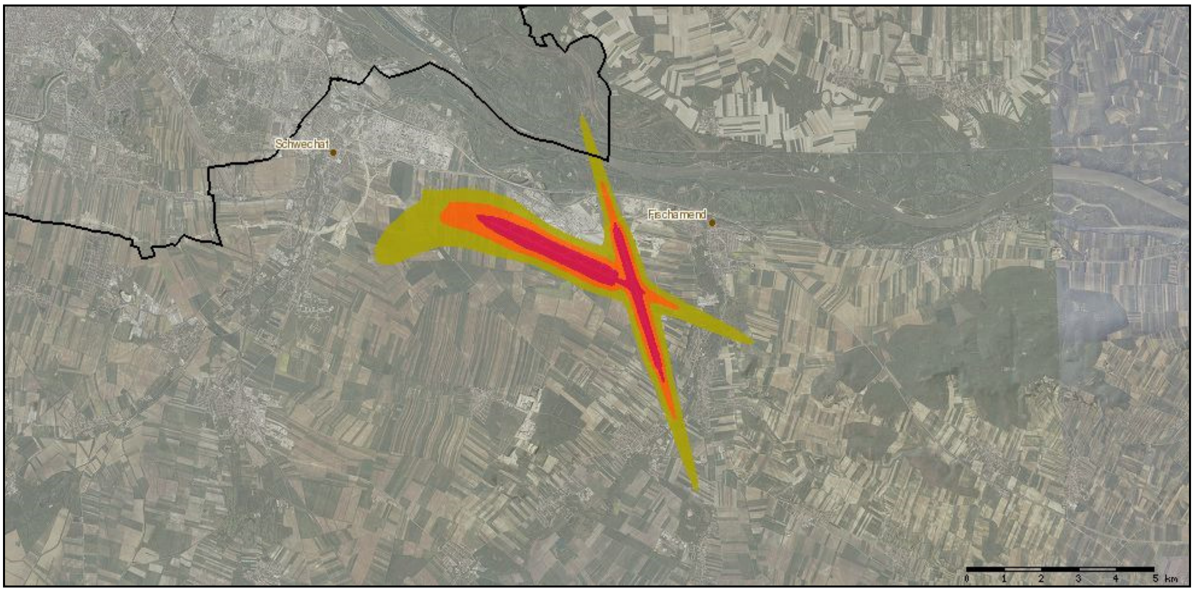
Source: (FWAG Business report 2007: 45

Appendix 10: Percentage Annoyed Persons As a Function of Noise Exposure of Dwelling (Lden)

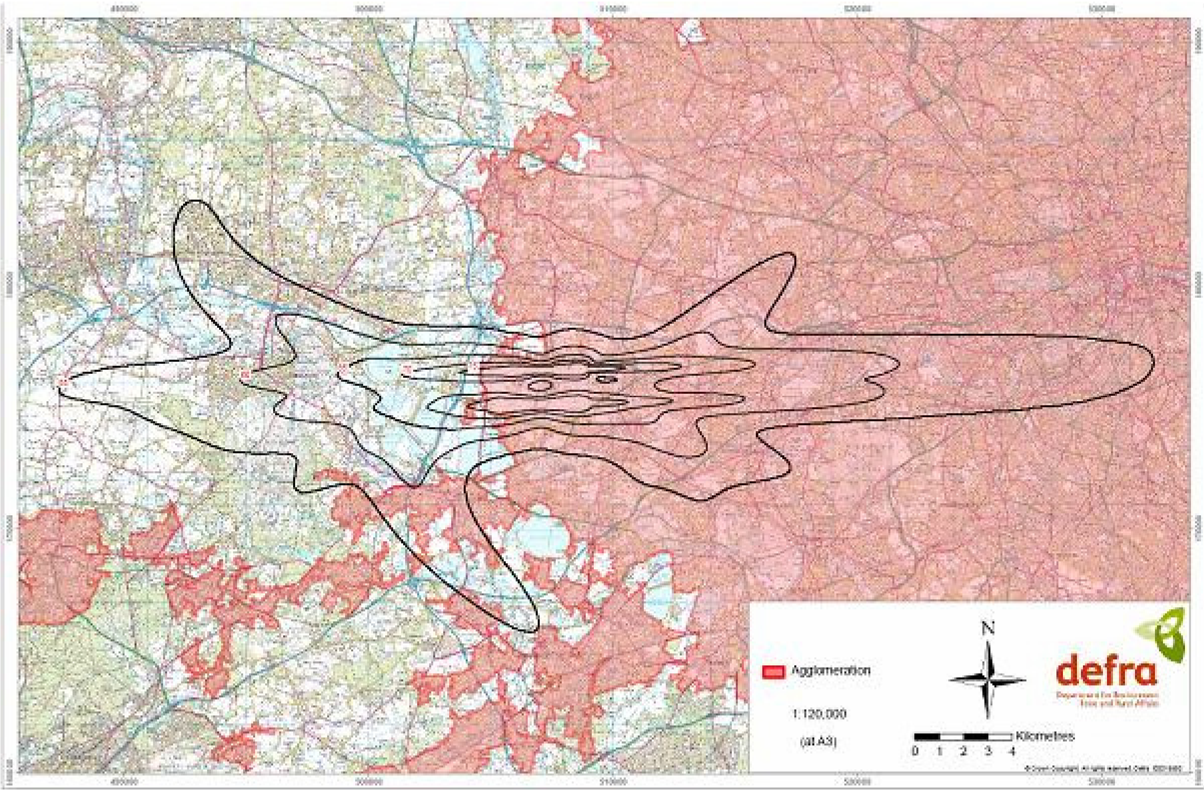


Note: The solid lines are the estimated curves, and the dashed lines are the polynomial approximations. The figure also shows the 95% confidence intervals (dotted lines). Position Paper 2002: 5

Appendix 11: Noise Map for Wien-Schwechat (Lden)



Appendix 12: Noise Map for London Heathrow (Lden)



7.2 *Case Study on the End-of Life Vehicles Directive and the European Single Market*

By Stefan Werland

7.2.1 Executive Summary

The case study investigates whether the environmental standards of the European End-of-life Vehicles Directive (ELV Directive) remove or even exacerbate competition distortions of the European Single Market. Accordingly, its aim is not to provide a comprehensive analysis of the ELV Directive, but to gain a better understanding of possible market effects of environmental regulation, using the example of End-of-life vehicles.

Since ELVs form one priority waste stream in the EU, the study focuses on its effects on the ELV treatment sectors in the EU Member States. ELV disposal enterprises compete as suppliers of steel scrap on the international market. The Directive provides minimum recycling targets and environmental equipment standards for ELV treatment operators. All Member States transposed these minimum requirements into national legislation. The study indicates that overall the implementation of unitary environmental standards for the treatment of ELVs removes an existing competition distortion among the treatment enterprises. This distortion stemmed from pre-existing legislations in some Member States, while in others ELV treatment was not regulated before. For example, while Dutch and German treatment operators had to comply with technical equipment standards and to employ labour intensive treatment practices, ELV treatment and disposal was not regulated in the UK before the Directive. Accordingly, the transposition of the Directive led to higher adaptation costs for treatment operators in those countries without prior legislation. Since this effect is merely a time-delayed adjustment and its consequences are comparable to those from previous regulation in other Member States, these costs cannot be regarded as competition distortion. Indications for possible 'new' market distortions emerge from diverging domestic take back systems and the lack of clearly assigned responsibilities between car manufacturers and treatment operators in the ELV Directive. As long as scrap metal prices sufficed to cover the treatment of ELVs, cost effects of the different take back systems were not considered a problematic competition issue. However, this might change when international scrap metal market prices stay at their current level. Trans-boundary exports of ELVs do exists and pose problems to domestic treatment operators in exporting countries (shortage of supply). However, most cars are exported to Eastern Europe and non-European countries and further used. These movements do not stem from market distortions in the treatment sector; and there is no mentionable trans-boundary competition for ELVs as raw material in the treatment sector yet.

Overall, the study finds that monitoring and enforcement of the Directive seems to be the most pressing issue at the moment. Another issue of concern are differences and inconsistencies in Member States' waste policies (e.g., gate fees or landfill bans) and in the definitions for example of treatment operations. Most of these topics are dealt with in the current amendment of the European Waste Directive.

7.2.2 Introduction

The European End-of-life Vehicles Directive aims at regulating the waste flows that emerge from the disposal of old cars in Europe. Among other things, the Directive demands that the last owner free of charge may return ELVs. However, the Directive does not specify how domestic return systems have to be organised in the Member States or whether producers and importers, or recycling and disposal companies will bear possible costs that arise from the transposition of the Directive. The organisation of take-back systems may lead to diverging cost structures for recyclers and disposal enterprises throughout Member States. Metal scrap is an internationally traded commodity and different cost structures for suppliers of metal scrap (i.e. recycling and disposal enterprises) may lead to competition distortions in the international commodity market.

Competition distortions are situations in which costs for using environmental resources and services (e.g., using environment as a sink for ELV waste) differ between competitors. Distortions have to be distinguished from effects on relative competitiveness, which stem from costs that arise from the adaptation to a unitary European standard. These costs may differ for example because of diverging prior legislation in Member States. In these cases temporary adaptation costs may appear, but standardisation would lead to a removal of an existing competition distortion.

The study distinguishes between two types of costs: First, costs of internalisation may arise for example from investments in mandatory pollution control equipment. The second category are transaction costs which stem from modalities contained in the regulation; for example from reporting and monitoring requirements but also from the organisation of take-back systems or the designation of responsibilities between different domestic actors.

The study argues that costs from internalisation differ throughout the cases. This is mainly due to a lack of prior regulation of ELV disposal in the UK. The recycling and disposal sector in the UK faces much higher adaptation costs than the Dutch and German sector to comply with requirements from the Directive. However, since pre-existing legislation in the Netherlands and Germany already set high environmental standards for the technical equipment in advance of the Directive, the implementation removes an existing market distortion and leads to an adjustment of costs throughout the EU Member States. However, since the take-back systems are organised differently throughout the Member States, costs for the respective treatment sectors may diverge from different distributions of responsibilities among the “economic operators” identified in the Directive.

7.2.3 European Policy

End-of-life Vehicles are cars that turn into waste. For 2005, the amount of waste from ELVs in the European Union was estimated about 10 million tonnes of waste per year. As the average weight as well as the number of new vehicles in the European Union is increasing, this amount is expected to grow to 14 million tonnes per year by 2015. Since cars contain heavy metals and dangerous fluids that need to be treated adequately the inappropriate treatment or disposal of ELVs constitutes a danger for the environment.

The European Commission has identified End-of-life Vehicles as priority waste stream. With its focus on reuse, recycling, and recovery, the ELV directive is essentially a waste directive (communication with UNEP officer). According to the concept of waste hierarchy as laid down in the Thematic Strategy on the sustainable use of natural resources[92], the prevention of waste from ELVs should be given priority, followed by reuse, recycling, (energy-) recovery and, as least favourable possibility, the disposal of automobile shredder residue (ASR) in landfills.[93] In a broader sense, the recycling of ELV waste possibly contributes to higher resource efficiency in the automobile production. The Eu ELV Directive has the objectives (1) of minimising the amount of waste from end-of-life Vehicles[94], (2) to promote the reuse, recycling, and recovery of waste from ELVs, and (3) to make ELV treatment more environmentally sound.

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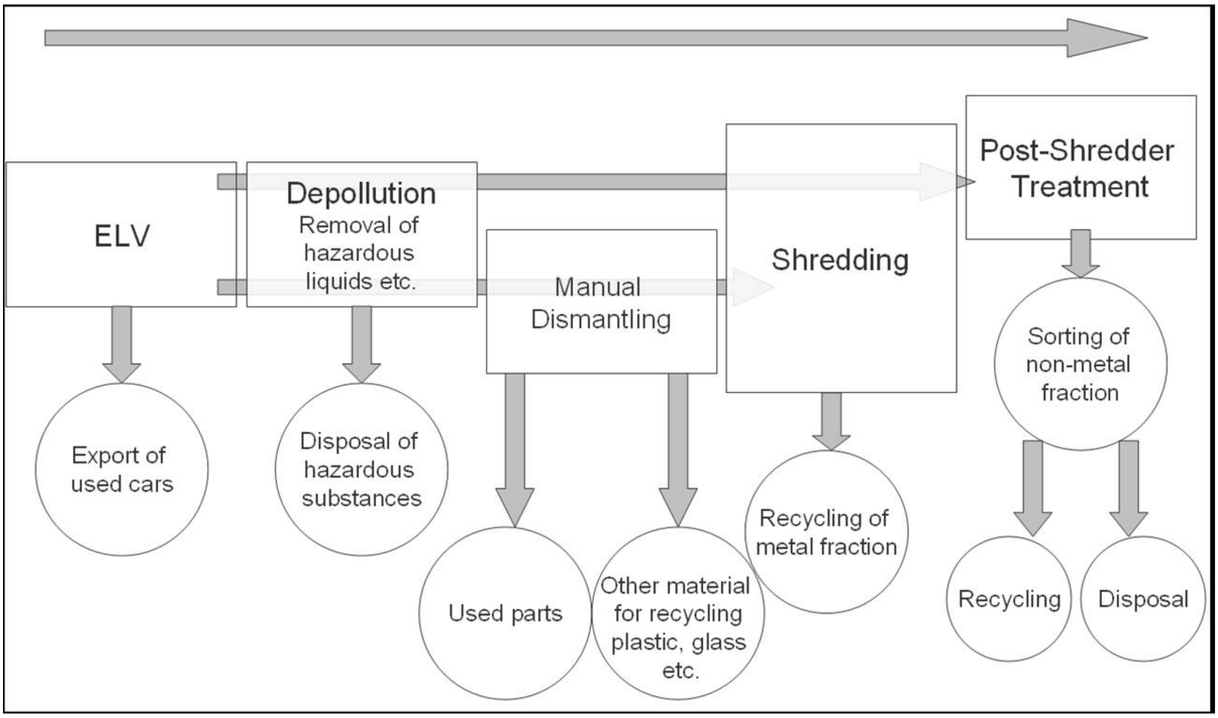
[92] COM/2005/670 final.

[93] Cf., Directive 2008/98/EC, Art.4

[94] End-of-life vehicles are defined as cars that hold up to a maximum of eight passengers in addition to the driver, and lorries up 3.5 t. (M1 und N1); Special purpose vehicles such as ambulances, campers and hearses are excluded from the targets of the ELV Directive; cars produced in limited numbers may also be excluded by Member States. Cf., Directive 2008/98/EC, Art.4

About 75% by weight of a typical ELV is made up of ferrous and non-ferrous metal, mainly steel and aluminium. This portion generally is recycled and further processed into secondary metals. Recycling of the metal fraction is technically relatively unproblematic and cost effective. The total share of polymeric materials (plastics) in modern cars is estimated 10–15% by weight with a tendency to grow (Öko-Institut 2003: 15). The increasing use of plastics in motor vehicles may contribute to a lesser weight and thus potentially to higher fuel efficiency and lesser CO2-emissions[95], but has led to problems with recycling of ELV waste. The recycling of polymers either demands labour intensive dismantling of plastic parts by hand before the car body is shredded, or the use of new, capital intensive shredder technologies. Pilot facilities have been developed mainly in reaction to the ELV Directive or pre-existing legislations in Member States[96]. Since there exists no relevant market for secondary plastic materials, there is no economic incentive for the sorting of plastics from ELV waste. In 2007 DG Environment estimated that only 3.4% of plastics contained in ELVs were effectively recycled.[97] The non-ferrous rest of ELVs was mainly landfilled as Auto Shredder Residue (ASR) at the turn of the century (SEC(2007)14). ASR has a highly diverse composition and possibly contains dangerous substances such as heavy metals.

Figure 27: ELV treatment



7.2.3.1 European Ideal

The Directive aims at minimising the environmental impact of ELVs. The ideals to be achieved by the Directive focus on three different issue areas: (1) the prevention of waste from ELVs; (2) the collection and adequate treatment of ELVs; and (3) the legal approximation of ELV treatment schemes in EU Member States.

95 However, these tendencies are counteracted by an increasing size of many motor vehicles.

96 For example, the VW-SiCon project explicitly refers to the ELV directive: http://www.sicontechnology.com/index.asp?id=30 [assessed: 5.3.2008]

97 DG Environment 2007 http://ec.europa.eu/environment/integration/research/newsalert/pdf/83na2.pdf

Prevention of waste from ELVs and recyclability

Concerning the stage of designing new cars, the Directive demands that they be constructed in a way that makes it possible to reach the reuse, recycling and recovery targets. To fulfil these targets, "producers should ensure that vehicles are designed and manufactured in such a way as to allow the quantified targets for reuse, recycling and recovery to be achieved" (22). Another aim of the ELV Directive is to avoid the use of hazardous substances and to increase the use of recycled materials in new cars.

ELV capture and treatment

Organisationally, the ideal is that all ELVs are captured by and treated in authorized treatment facilities (ATFs) that fulfil minimum environmental standards. To avoid the abandonment of old cars, the Directive requires that last owners of ELVs do not have to pay for the treatment of their car when delivering it to a collection point (Art.5)

Harmonisation of treatment schemes

Since there are several Member State with pre-existing ELV legislation (NL, Germany, Sweden etc.) while other Member States did not have ELV treatment schemes, the Directive aims at harmonizing the different national measures concerning end-of life vehicles. Thus, from a legal perspective the ideal to be achieved is "...to ensure the smooth operation of the internal market and avoid distortions of competition in the Community" (ELV-Directive, (1). The Directive therefore aims at harmonizing existing schemes and at introducing minimum requirements for all Member States.

7.2.3.2 Instruments

The ELV Directive is the first EU Directive to endorse the principle of extended producer responsibility (EPR): it aims at the integration of the environmental costs of products into their market prices. Manufacturers and importers of vehicles should be made responsible for their products throughout their life cycle and until their final disposition, including recycling and final take back of the vehicles. The following chapter outlines the instruments that are suggested in the Directive to achieve their goals. Instruments proposed in the Directive include:

Design for recycling and coding standards

The Directive enacts that parts of new cars are coded in a way that allows the identification of their material composition during the manual dismantling process. With a view on the later ELV treatment, i.e. to make dismantling and depollution easier, manufacturers and importers are obliged to provide dismantling information that identifies the different components and materials of car parts and the location of all hazardous substances (Art. 8(3)). Furthermore, vehicles that are put on the market after July 1st 2003 were not to contain hexavalent chromium, cadmium and lead; exceptions to this ban are listed in Annex II of the Directive, which is reviewed and updated on a regular basis. These demands are coupled with the European type approval regulations. Moreover, the use of recycled materials in new cars is encouraged.

Installation of a collection system for ELV and free take back provision

Since the economic value of an ELV may be negative, mostly depending on scrap metal market prices, the Directive contains a free-take back provision for ELVs. While the organisation of collection systems is left to the Member States, producers or professional importers are expected to meet all or a significant part of the costs of the treatment of their branded cars at the end of their life (Art.5(4)). This provision employs a life cycle perspective with the principle of extended producer responsibility (EPR). Until 1 January 2007 Art.5(4) applied to cars that were put on the market after 1 July 2002, since January 2007 the article applies to all vehicles. However, because of high scrap metal prices on the market, no negative costs for ELV treatment did arise yet (communication with representatives from EFR and BDSV).

Member States have to ensure that "economic operators" set up collection systems with authorised treatment facilities that meet minimum environmental standards (6(1)). These actors issue Certificates of Destruction to the last owner of a scrapped ELV.[98] Concerning the downstream ELV actors, the Directive sets minimum requirements for the technical equipment of treatment facilities and the treatment of ELVs (Annex I).

In a report on targets for reuse, recycling and recovery for 2015 the European Commission states that "the targets set by the ELV Directive generate both substantial environmental and economic benefits and that repealing or reducing the targets would reduce these benefits. The magnitude of the benefits generated is intimately linked to eco-innovation". Since the metal fraction of ELV waste already is recycled, the recycling of plastics will be the key determinant to fulfil the 2015 targets (COM (2007)5 final:3). However, there still exists no adequate and cost effective recycling technology, nor is there a market for recycled plastic products. Thus, the non-metal fraction (plastics, glass, tires, textiles, etc.) usually was landfilled as Automobile Shredder Residue (ASR).

Minimum targets for reuse, recycling, recovery[99]

Article 7(2) contains an 85 per cent minimum target for reuse and recovery of all ELV material by January 2006. At least 80 per cent of ELV material by weight had to be reused and/or recycled at this time. The implementation report of the European Commission indicates that not all Member States achieved the demanded quotas, and that performance differs considerably between Member States.[100] While Lithuania reported 88% for reuse/recycling in 2008; 92% reuse/recovery (2008), and Germany: 86,8% reuse/recycling; 89,5% reuse/recovery (2008), Italy only reported 70,3% reuse/recycling and 72,7% reuse/recovery (2008).[101] However, since these data are provided by the Member States themselves, most interviewees casted doubts on the accurateness and comparability of the data.

The respective targets to be achieved in 2015 are 95 per cent (reuse/recovery) and 85 per cent (reuse/recycling); i.e. the use of ELV residues for energy recovery is allowed up to 5 per cent of weight from 2006 to 2015 and up to 10 per cent by 2015. Since the metal fraction that makes up ca. 75 per cent of ELV waste by weight already is recycled in a cost effective manner, higher targets can be understood as instruments of technology forcing, i.e. to push technological innovations in ELV treatment technology specifically for the processing of the non-metal fraction of ELV waste.

Minimum requirements for treatment facilities and treatment procedures

Treatment facilities have to fulfil minimum environmental standards as contained in Annex I of the Directive. These standards comprise: storage and treatment sites for non-treated ELVs have to be equipped with impermeable surfaces, spillage collection facilities, cleanser-degreasers and equipment for the treatment of water. Annex I furthermore contains prescriptions for the treatment and depollution of ELVs such as the removal of batteries, glass, catalysts and components that contain mercury. Explosive components such as airbags need to be neutralised before shredding. Fuel, oil, and other liquids have to be removed and collected separately. In order to facilitate recycling, components that contain copper, aluminium or magnesium, as well as tyres and large plastic compo-

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[98] However, the concrete organisation of collection schemes and the determination of responsible actors is not prescribed in the Directive and left to the Member States.

[99] Reuse means that certain components of vehicles can be used for the same purpose again; recycling means the reprocessing of materials, recovery also includes energy recovery through combustion of waste material.

[100] A new report will be presented in June 2009:

[101] Eurostat; End of life vehicles, Data 2006 (updated 2 Nov. 2008)

nents have to be removed and from ELVs before shredding if these materials are not segregated in the shredding process.

Other relevant EU legislation

Since ELVs are identified as a priority waste stream in the EU it is not always possible to distinguish clearly between effects of the ELV Directive and of waste legislation. For example the ELV Directive contains targets for recovery and recycling, while definitions of these processes are subject to waste legislation. Just as recycling and recovery targets, waste legislation (definition of waste fractions, landfill bans and landfill gate taxes) can be seen as an instrument to push ecological innovation and be used as technology forcing instruments for the treatment of ELV waste.

7.2.3.3 Affected Industries:

The Directive (Art. 2(10)) identifies a range of 'economic operators' as relevant actors. This list contains car manufacturers, importers, distributors, collectors, dismantlers, recoverers, recyclers, shredding companies, insurance companies etc. Member States are requested to build up adequate collection systems to ensure the collection and environmentally sound treatment of old cars and to identify those actors that will be responsible for ELV treatment.

Car manufacturers:

While their headquarters are located in only few Member States, car manufacturers increasingly employ transboundary assembly chains and maintain production sites in several EU and non-EU countries. Professional importers that are affiliated to car producers are active in all Member States. This oligopolistically structured sector is well represented and politically influential. Car manufacturers communicate actively and regularly with EU institutions and were actively engaged for example in the amendment procedure of Annex II (communication with EC desk officer).

The ELV Directive is the first EU Directive that endorsed the principle of extended producer responsibility (EPR): it aims at the integration of the environmental costs of products into their market prices. Manufacturers and importers of vehicles should be made responsible for their products throughout their life cycle and until their final disposition, including recycling and take back of the vehicles. According to the Directive, automotive producers have the responsibility to ensure that recycling and recovery targets are met. Furthermore, automobile manufacturers are obliged to pay for costs that arise when cars are disposed (Principle of extended producer responsibility).[102]

Concerning the production and design of new vehicles[103] the Directive limits the use of "hazardous substances" (Art.4(1)) and prohibits the use of four heavy metals – lead, mercury, cadmium, hexavalent chromium. (Art.4(2)). In order to facilitate recycling, car manufacturers are to provide information about materials used in their products and to determine the location of hazardous substances in the cars.

The Directive does not contain requirements that are applicable only to cars that are manufactured in the EU or in specific Member States. Rather, regulations on the design and production of new vehicles refer to the type approval of all cars, both from Member States and from abroad, that are put onto the European market. Since the Directive regulates market access for domestic and for imported automobiles, domestic and foreign car manufacturers are affected in the same way. The main concerns of the car industry at the moment are the ban of certain materials, especially in spare parts for older branded cars (communication with European Commission desk officer).

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[102] Since recent scrap metal prices on secondary material markets suffice to make the treatment of ELVs cost covering, no additional costs from ELV treatment arise for car producers at the moment. However, falling prices for scrap metal might change this situation in the future

[103] Vehicles that were put on the market after July 1, 2003.

Treatment sector

Although the Directive primarily builds upon producer responsibility – with a focus on the automotive industry – it also affects economic operators that are concerned with treatment, recycling, and disposal of ELVs. The downstream industry dealing with ELVs includes car collectors, dismantlers, recoverers, recyclers and shredders. The Directive contains minimum requirements for the technical equipment of treatment facilities and recycling / recovery targets that will have to be fulfilled. Since legislation on the treatment of ELVs existed only in some Member States prior to the ELV Directive, the de facto technical equipment of treatment facilities differs significantly between Member States. The same holds true for the accomplishment of treatment procedures for ELVs.

While the collection and dismantling of ELVs in most Member States is dominated by many small enterprises, shredders and shredding technology are capital intensive. Accordingly, there are relatively few shredder plants that are mostly owned by medium- and large-scale companies. These companies increasingly act transboundary, mainly with enterprises from Western Europe investing in the new EU Member States (communication with EFR representative).

Most important European associations of the sector are the European Group of Automotive Recycling Associations (EGARA), European Ferrous Recovery and Recycling Federation (EFR), the Bureau of International Recycling (BIR), and the European Shredder Group (ESR).

Competition in the treatment sector

There are signs of increasing competition between treatment operators from different EU Member States. Transboundary competition in the treatment sector can be found both on the input side (demand for ELVs) as well as on the output side (supply of scrap metal on commodity market).

One major concern of the ELV treatment sector in most Western European states is the drainage of used cars to new Member States and non-European countries. According to EU waste shipment regulations, non-hazardous post-shredder waste and depolluted ELVs can be moved across borders for recovery. Commission Decision 2005/293/EC (7) states that "as a consequence of the internal market, Member States may export the end-of-life vehicles generated on their territory to other countries for further treatment." One closely connected problem is that it is not clearly determined when a car still is considered a used car or whether it is an ELV and has to be treated (and traded) as waste.[104]

The export of old and used cars leads to shortages in the supply of ELVs as shredder input in some Member States. As an example, it is estimated that only ca. 30 per cent of all cars that are deregistered in Germany are shredded in this country (cf. Fergusson 2005:22). The German 2006 Report to the European Commission claims that the export of second hand cars increasingly has implications for the treatment sector. For the Netherlands, estimations are that about 50 per cent of all deregistered cars are exported (communication with ARN representative). Although the drainage of ELVs is explicitly no effect of the Directive, it has implementations for treatment actors: Dutch and German Interview partners from the treatment sector indicated that the export of used cars to Eastern Europe and non-European countries led to an emerging transboundary competition between car dismantlers for ELVs and that there is an increasing transboundary trade of ELVs and car wrecks in the European Union (no quantification). For example, a growing number of British ELVs is treated in Dutch facilities (communication with ARN representative).

On the output side, shredded steel scrap is an internationally traded commodity with an international market price and competing suppliers from different countries. Diverging conditions for ELV treatment can influence production costs that arise in the production chain of scrap as secondary material. The ferrous fraction of ELV is used as secondary resource for the production of metal. 118

[104] This indeterminacy gives the possibility to declare ELVs as used cars and thus to the illegal export of waste.

million tons or 56% of steel production in the EU 27 stem from the use of steel scrap (EFR 2008). Steel scrap is an internationally traded commodity with a market price.

7.2.3.4 Pre-existing Market Distortion

The End-of-Life Vehicles Directive came into force on 21 October 2000. Member States were to transpose the Directive into national law by 21 April 2002. Several Member States, e.g. the Netherlands, Sweden, or Germany had introduced national legal acts on the treatment of end-of life vehicles already before the ELV Directive came into force in 2002. In many other Member States such as the UK, the treatment of ELVs was not regulated until then. In these cases, treatment operators were not obliged to dispose cars according to environmental regulations but only removed parts and materials that are economically viable. Car wrecks were shredded without prior depollution. Shredder residue from non-depolluted ELVs contains large quantities of environmentally harmful substances such as heavy metals, fuels, oils, brake fluid etc. Moreover, treatment operators frequently charged last owners for taking back their ELV what encouraged the abandoned of old cars.

7.2.4 Member States Implementation

7.2.4.1 Identification of cases

One explicitly stated aim of the Directive is to harmonize the "different national measures concerning end-of life vehicles [...] to ensure the smooth operation of the internal market and avoid distortions of competition in the Community" (ELV Directive, (1)). The 2006 Implementation Report of the European Commission indicates that all Member States adopted the quotas for reuse, recycling and recovery of ELVs as suggested in the Directive.105 The Report is based on data that have to be delivered by Member States every three years. All Member States indicated to have prohibited the use of dangerous materials in new cars and introduced information requirements to be provided for automobiles that enter the market. There are no indications of market distortions on the automobile market since obligations for car manufacturers do not differ between Member States, and regulations apply both to domestic manufacturers and producers from other EU- and non-EU countries.

The ELV Directive is based on Article 175(1) of the EC Treaty. Member States may go beyond its requirements and adopt more stringent measures at a national level when transposing the Directive. However, there are no additional measures reported. As only Member State, the Netherlands introduced a more ambitious, tightened timeline that made the 2006 recycling/recovery targets mandatory already for 2003 and the 2015 targets to be achieved in 2007. This timetable was dropped in when it became obvious that adequate treatment technology would not be available in time and the quotas would not be achieved within this timeframe. Annex I and II that contain minimal requirements for the technical equipment of collection and treatment facilities, prescriptions for the treatment process, and exemptions from the ban of hazardous materials are transposed in all Member States in the same way. Thus, the Directive contributes to a level playing field for treating End-of Life Vehicles in the European Union.

While all Member States have introduced a free take back provision for the last holder/owner of an ELV[106], there are differences concerning the organisation of take-back systems. Thus, cases have been selected on the basis of differences in take-back systems and the assignation of responsibilities. The Directive does not specify the distribution of costs and responsibilities between car manufacturers and treatment operators, but merely claims that "economic operators" have to bear all or at least a significant part of the costs of ELV treatment.

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[105] Since 2006: 80% reuse and recycling and 85% reuse and recovery; from 2015: 85% reuse and recycling; 95% for reuse and recovery of ELV waste

[106] ENDS Europe, 8 May 2007

One possible way to organise the collection and treatment of ELVs is that car manufacturers and importers conclude contracts with existing treatment operators that take back cars of their own brands without costs for the last owner. Their contracted car manufacturers would reimburse dismantlers and collectors for possible negative costs. This business-to-business model is employed in Germany for example. In the Netherlands, a private limited liability company (Auto Recycling Nederland) is responsible for the collection and treatment of ELVs. The Dutch system is based on a fee, which the owner of a car has to pay when it is first registered in the Netherlands. This fee is administered by ARN and used to finance the treatment of the car at the end of its life (fee based approach). The UK system is operated by two take-back service providers that hold contracts with automotive producers and by non-contracted treatment operators.

Germany and the Netherlands had introduced legislation regarding the treatment of ELVs well in advance of the ELV Directive. These regulations contained minimum recycling quotas, depollution and dismantling obligations, and equipment requirements for treatment sites. The UK did not have strict environmental prescriptions, ELV disposal was less labour and capital intensive and required investments in technical equipment were considerably lower. Since costs for the use of the environment as sink for ELV waste were not the same across the countries, there existed a historic market distortion between treatment sectors within the EU.

While the introduction of recycling targets or minimum environmental standards for treatment facilities led to an overall trend towards convergence, effects of adjacent policy fields (waste policies) increasingly affect the ELV treatment sector by regulating the disposal of ELV waste. Germany for example introduced a ban for untreated ELV shredder light fraction and waste with a too high caloric value that is planned to become effective in Mid-2009. The Netherlands will follow in 2009 or 2010 (communication with EGARA). Other Member States introduced gate fees – again with varying levels from Member State to Member State, while still others do not have such regulations or grant exemptions (communication with BDSV).

Conclusion

Pre-existing legislation concerning ELV treatment and resulting costs of internalisation differed significantly throughout the three cases. Thus, there existed a historic market distortion in the EU. When transposing the ELV Directive, all countries adopted the same targets (minimum requirements as contained in the ELV Directive). However, the organisation of take back-systems and the assignation of responsibilities differ significantly between the Netherlands, Germany, and UK. The following section investigates in how far the implementation of the ELV Directive led to a harmonisation of costs for the use of the environment or whether it aggravated the existing competition distortion.

7.2.4.2 Costs of internalisation

From an environmental economics perspective, a situation of undistorted markets exists when all competitors have to internalise the same costs for the use of the environment. Costs of internalisation also comprise those costs for enterprises that arise from the fulfilment of requirements of the ELV Directive. These might vary because of deviations of national standards from the European Ideal. The Directive contains e.g. minimum standards for the technical equipment of treatment facilities or for depollution and dismantling practices. Prior to the ELV Directive, costs of internalisation differed across the cases: while legislation in the Netherlands and in Germany demanded investments in technical equipment and labour-intensive depollution and dismantling practices, the UK treatment sector did not face such costs. Since all Member States adopted the same recycling and recovery quotas and minimum requirements for treatment facilities and dismantling procedures when transposing the ELV Directive, this historical market distortion has been resolved. Even though the UK treatment sector suffered higher adaptation costs for complying with EU standards, costs of internalisation may not vary because of different targets and minimum standards.[107]

It has to be noted that most available cost estimations are ex-ante estimations that were given before the Directive came into force. Many of these data were issued by stakeholders and thus tend to be interest-laden. The lack of more reliable ex-ante data might be related to the fact that car recycling recently is cost covering because of high scrap prices. Thus, there are no estimations on extra costs, which economic operators had to pay if car recycling was not cost effective.

The Netherlands

The Netherlands had an EVL collection and treatment system in place already before the European Directive came into force. The Dutch system was installed in the early 1990s and is said to have served as one example for the European ELV Directive (communication with EGARA).

The Auto & Recycling Foundation (Stichting Auto & Recycling) was set up in 1993 by the Dutch automotive sector associations (car manufacturers and importers, dismantlers, dealers and repair shops) to organise the take back of end-of life vehicles in the Netherlands (cf. chapter "costs of regulations"). The system became operational in 1995 and is managed by a private limited liability company, Auto Recycling Nederland (ARN). The Auto & Recycling Foundation owns all shares of the company. ARN contracted treatment facilities collect and treat ca. 90 per cent of all ELVs in the Netherlands. Companies that contract with ARN had to fulfil requirements for equipment and dismantling procedures already prior to the transposition of the Directive; for example they were obliged to depollute and dismantle cars before delivering them to shredder companies or to hold environmental licences. ARN states "a reorganisation has taken place in the industry over the last few years."[108] Thus, for the remaining treatment facilities, adaptation costs for technical equipment of treatment facilities and for changing dismantling and depollution practices were estimated to be low. According to EGARA, depollution and dismantling of a car according to Dutch regulations takes between 1h30 and 2 hours. Overall recycling costs per ELV were estimated in 2001 to be 96€ (GHK/BIOIS Annex 4: 52).

A fee of currently ca. €15 that the owner of a car has to pay when it is first registered in the Netherlands funds the Dutch system. The fee is calculated taking into account i.a. the average dismantling time per ELV, the average composition of ELVs, average costs of recycling, the expected number of car wrecks, etc.[109] ARN administers the fee and uses it to reimburse dismantlers for their labour costs for dismantling. These premiums currently are ca. €75 per ELV.[110] ARN also pays recyclers for processing those ELV waste fractions that cannot be recycled in a cost-economic way. In 2007, ARN spent € 17,415,807 for outsourced work, most of which was for depolluting and dismantling of ELVs, and for recycling of non cost-covering material (ARN 2008; communication with ARN). Under this system no additional costs for accredited treatment enterprises may arise from the treatment of ELVs. While the main income of treatment operators stems from the sale of spare parts and dismantled car wrecks, possible costs from implementation (e.g. from manual dismantling and recycling operations) are covered and reimbursed by ARN. Auto recycling Nederland also invests into the development of treatment technology. A post shredder technology plant is currently being built and will be operative in 2009/2010.

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107 Cf. ACEA 2005b: Table: ELV Legislation & EU ELV Directive Implementation

108 http://arn.nl/engels/2praktijk/221.php [12.032009]

109 2002/204/EC

110 The difference between the fee of €15 and the premium of €75 is covered using ARN's liquid resources (ARN 2008).

Roughly 50 per cent of cars that are deregistered in the Netherlands are exported afterwards. Data from the European Automobile Manufacturers' Association indicate that out of 473.000 deregistered cars 272.000 ELVs were treated in the Netherlands (ACEA 2005b). According to ARN there are too few ELVs to ensure the efficient utilisation of the installed treatment capacities or, as an ARN representative put it, "too many treatment facilities" in the Netherlands (communication with ARN representative). According to ARN, British ELVs are increasingly imported for dismantling and shredding (communication with ARN representative).

Germany

The German End-of Life Vehicles legislation came into force already in the late 1990s. ELV disposal was first regulated in the Act on the Disposal of End-of Life Vehicles and the End-of Life Vehicles Ordinance (Altautoverordnung) from 1998. The Ordinance contained minimum requirements for the equipment of treatment facilities that over all match requirements contained in the ELV Directive. Targets contained in the Ordinance prescribed that in 2002 a maximum of 15 per cent of weight per ELV may be disposed. A quota of maximum 5 per cent of weight was foreseen for 2015. Thus, targets contained in the German ELV Ordinance matched those of the ELV Directive already in advance.

The First German ELV Directive Implementation Report111 indicates that demands from the national ELV Ordinance had led to a shakeout ("Marktbereinigung") in the treatment sector. According to Arbeitsgemeinschaft Altauto there was a reduction in numbers from 3.000 to 1.115 authorized treatment facilities in Germany after the national ELV regulation came into force. Since then the number of ATFs stayed constant (Umweltbundesamt 2008). According to the German steel scrap federation (Bundesvereinigung Deutscher Stahlrecycling- und Entsorgungsunternehmen e.V., BDSV) its members invested more than €100 million in shredder technology after the German ELV Ordinance came into force (BDSV 2008b).

The transposition of the ELV Directive into German law was done by an amendment of the Ordinance in 2002. According to the GHK/BIOIS study, an ex-ante assessment of the effects of the transposition of the ELV Directive that was carried out by the German Federal Government before the transposition of the Directive[112] did not project high impacts on the treatment sector. Since most requirements came into place in the context of the 1998 End-of Life Vehicles Ordinance, demands from the ELV Directive were already met in advance. A collection system for ELVs already was in place. Some additional costs (no quantification) for the treatment sector were expected depending on whether the required depth of dismantling ELVs prior to further treatment would be increased.

However, cost estimations from different domestic stakeholders that were published before the transposition differed significantly. Estimated costs of ELV treatment per car in Germany range between €80 and €130 according to the German car owners association ADAC (GHK/BIOIS; Annex 4: 28), and between €300 and €450 per car according to BDSV (2002); with costs of handling and drainage of an ELV estimated to be €50 to €100 and further dismantling was thought to cost between €250 and €350, depending on car type and depth of dismantling.113

Regarding shredder technology, the achievement of the 2015 targets was expected to have possibly considerable effects on costs (no quantification). As main reason for this it was suggested that the low-cost option of landfilling ASR would cease in the coming years (Cf. chapter "additional meas-

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[111] First German ELV Directive Implementation Report according to Art. 9(1) of Directive 2000/53/EC on end-of-life vehicles, on the basis of the questionnaire established by COM Decision 2001/753/EC. Covered period: 21 April 2002 - 21 April 2004.

[112] Begründung zum Gesetzesentwurf der Bundesregierung vom 05.12.2001, referred to in GHK/BIOIS Annex 4: 36.; such diverging cost estimations are an indication of high stakes and dispute on who will cover the costs that possibly emerge from the transposition of the ELV Directive.

[113] http://www.bdsv.org/members/redaktion/archiv_pressemeldung/Nachteil.pdf

ures").114 According to the German BDSV, a medium-sized shredder costs some € 5 million to construct while compliance with environmental standards entails expenditure of a further € 5 million.115

Thus, there are no signs that the transposition of the ELV Directive did affect the ELV treatment sector profoundly – possibly besides the fulfilment of the 2015 targets. Since national legislation anticipated the transposition of the ELV Directive, treatment operators were urged to undertake most investments in environmental equipment already previous to the Directive's implementation.

UK

The United Kingdom transposed the ELV Directive in two steps (2003 and 2005). The End-of-Life Vehicles Regulations 2003 mainly were concerned with the depollution and treatment of ELVs and the technical equipment of treatment facilities while the 2005 regulations mainly dealt with producer responsibility and setting up a system of free take back:116

The ELV treatment sector in the UK in 2007 consisted of 1466 licensed ATFs.[117] While dismantlers and scrapyards in the UK normally are small and medium-sized enterprises, the UK shredding industry is highly concentrated with two firms together having a market share of over 70 per cent in 2004 (DTI 2004: 39). Against the trend in many other Old Member States, the European Automobile Manufacturers' Association indicates that almost all cars that were deregistered in the UK in 2004 were treated within the country (2.110.000 out of 2.200.000) (ACEA 2005b).

Prior to the transposition of the ELV Directive there existed no specific ELV treatment regulations in the UK. An initiative that includes car manufacturers, dismantlers and recyclers, Automobile Consortium on Recycling and Disposal (ACORD), was set up in 1991. In 1997, ACORD members signed a voluntary agreement that committed themselves to recovery targets for ELV material of 85 per cent by weight by 2002 and 95 per cent by 2015. However, these targets were not legally binding and did not affect ELV treatment practices or de facto recycling quotas.

Before the ELV Directive came into force, dismantlers in the UK were not obliged to depollute cars before further treatment. The non-recycled fraction, i.e. the automobile shredder residue mostly was landfilled containing hazardous substances such as heavy metals, fuels, oils and break fluids (DTI 2005:10). In 2000 ACORD estimated this fraction to be 20% of ELV waste, in total 422,000 tonnes (DTI 2005:36). A spokesperson of British Vehicle Salvage Federation (BVSF) noted in 2003 that "at the moment most salvage firms send most vehicles for shredding without depolluting to directive standards, and therefore the 75% to 80% recycling rate does not apply to all 2 million ELVs in the UK."[118]

The transposition of the ELV Directive was forecasted to have high impacts on the UK ELV treatment sector. Since no minimum environmental standards for technical equipment and treatment practices existed prior to the transposition, costs were predicted to arise mainly from investments into treatment facilities such as impermeable surfaces, storages or water treatment installations. Accordingly, before the transposition of the Directive into UK law the treatment sector complained about high investment costs that were necessary to comply with the requirements of the Directive. The GHK/BIOIS study reports that the British Metals Recycling Association (BMRA) estimated in 2001 that costs would be as high as £100,000 for depollution facilities for a shredder and £ 240.000 for the required building, the storage of liquids etc. (GHK/BIOIS ANNEx4). The Department of Trade and Industry (2003) estimated in its 2003 Regulatory Impact Assessment that annual costs of such

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114 Bundesregierung (no date) Begründung zum Gesetzentwurf der Bundesregierung über ein Gesetz zur Entsorgung von Altfahrzeugen – Entwurf; referred to in BHK/BIOIS Annex 4, 36

115 http://www.recyclingbizz.com/nonferrous/LA768000.html

116 http://www.environment-agency.gov.uk/business/regulation/31887.aspx

117 COM(2007) 618 final

118 http://www.letsrecycle.com/do/ecco.py/view_item?listid=37&listcatid=270&listitemid=4759

investments would be between £50 million and £109 million over ten years. BVSF assumed that an average treatment facility ATF would have to spend min. £40,000 to £50,000 to comply with the ELV regulations. (GHK/BIOIS Annex4: 104). The installation of a plant for separation the Automobile Shredder Residue that would be necessary to reach the 2015 targets is estimated to be ca. £2-5 million. A representative of Cartakeback stated "there's a lot of work to be done to meet the 95% target for 2015 so we are already working on it. For instance, we are pioneering new technology to recover more material post-shredding".[119]

Concerning treatment practices, the regulatory impact assessment that was carried out on behalf of the former UK Department of Trade and Industry (now the Department for Business, Enterprise and Regulatory Reform (BERR)[120] indicated that with the transposition of the ELV Directive additional activities that previously were not done in the UK became mandatory, inter alia the depollution of ELVs prior to further processing and the reuse, recycling and recovering of ELV materials other than the metalfraction and spare parts.

The Directive requires that ELVs be depolluted before further treatment. According to the DTI assessment, estimations on the average time required for depollution of ELVs range between 45 minutes and 1 hour 15 minutes what equates to £12 - £20 per ELV (DTI 2005: 36). The Neutralisation of airbags and the draining of air conditions are estimated to take further 20 minutes (BERR 2005). “Industry players” predicted costs of depollution to be between £15 and £30 per ELV (DTI 2005: 35) DTI concludes that it would take in average 1 hour to depollute an ELV accordingly to requirements of the ELV Directive (DTI 2005: 15).[121] Overall costs of ELV depollution are estimated to be £24 mio to £60 mio annually.

Recycling and recovery rates in the UK in 2006 were reported to be below the Directive’s 85% target. BERR blamed small dismantlers that were failing to recover materials other than the metal content of ELVs.[122] Additional costs for the treatment sector to fulfil the 2006 targets were predicted by DTI as follows: The manual removal of bumpers and glass from ELV are estimated to take additional 15 minutes while post shredder segregation is judged much cheaper (DTI 2005: 17). British Vehicle Salvage Federation indicated in 2003 that costs for treatment would be at least £50 to £60 per ELV.[123] According to the DTI consultation paper (DTI 2004) overall costs for achieving the 85% target in 2006 were estimated to be £7 million to £11 million.

In general, the DTI regulatory impact assessment forecasted costs from the implementation of and compliance with the ELV Directive would be at £57 to £82 million annually for the period 2005 to 2025; absolute figures for this time span would range between £953,000 and £1,167,000.

The TRL Report predicted ‘potentially significant costs’ for the treatment sector and forecasted a reduction in the number of ELV treatment facilities (TRL report Part2: 13). Since 2004, the number of ATFs has fallen from 2,000 to 2,500 (DTI 2004: 13) to ca. 1500 in 2007 (COM(2007)618 final).

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119 http://www.letsrecycle.com/do/ecco.py/view_item?listid=37&listcatid=228&listitemid=8325

120 Full Regulatory Impact Assessment (RIA) for the Department of Trade and Industry’s Statuary Instrument – The End of Life Vehicles (Producer Responsibility) Regulations 2005 – Transposing Articles 5 and 7 of Directive 2000/53/EC of the European Parliament and of the Council to the End of Life Vehicles in the UK

121 Referring to DEFRA, the BERR estimates that depollution of an ELV (removal of fluids) will take 20-30 minutes and associated dismantling activities another 20-30 minutes (DTI 2004:11).

122 http://www.just-auto.com/articleprint.aspx?id=94572

123 http://www.letsrecycle.com/do/ecco.py/view_item?listid=37&listcatid=270&listitemid=4759

Conclusion: Costs of Internalisation

Table 36: Costs of internalisation

	NL	Germany	UK
Effects on structure of treatment sector	None (Reorganisation of the treatment sector after setting up ARN)	None (Reduction from 3.000 to 1.115 ATFs after ELV ordinance; number stayed constant since then)	Decline from 2,000 to 2,500 ATFs in 2004 to 1466 licensed ATFs in 2007.
Expected costs of 2006 targets	Low	Low; some possible additional costs expected depending on required depth of dismantling BDSV members invested > €100mio in Shredder technology after the ELV Ordinance)	min. £40,000 - £50,000 per ATF (BVSF) (~ € 60.000-75.000) Over all costs: £7-11 mio (~ €10-16mio [DTI, 2004]
Expected costs of 2015 targets	PST plant financed by ARN ; additional costs are covered by ARN	“possibly considerable effects on costs” Ca. €5 mio per medium sized shredder	£2-5 million per plant (€ 3-7.5 million)
Expected costs to comply with environmental requirements (AnnexI)	Low	€5mio per medium sized shredder (2015 targets)	£ 340 000 per shredder (BMRA) (~€500.000)
Recyling costs / ELV	€96 [2001]	€80 to €130 (ADAC) €300 to €450 [BDSV 2002]	min. £50 to £60 (€75-90) [BVSF 2003]
Cost for depollution / ELV	1:30h – 2:00h	€50 to €100 (BDSV) [2002]	45 min to 1:15h; £15 and £30 per ELV £24 mio to £60 mio annually[DTI 2005]
Dismantling		€250 to €350 (BDSV) (depending on required depth of dismantling) [2002]	
Other	In 2007, ARN spent € 17,415,807 for outsourced work, most of which was for depol-		Estimated overall costs: £57 to £82 million annually from 2005 to 2025; absolute

	luting, dismantling, and recycling of ELVs.		costs between £953,000 and £1,167,000. (DTI regulatory impact assessment)

The Directive contributes to a level playing field and to converging ELV policies in the Member States. Recycling and recovery targets as well as requirements for treatment and treatment facilities are the same throughout the Member States. Differences in costs of internalisation do not stem from different standards, but from diverging starting positions. In those Member States where ELV treatment legislation was in place already before the ELV Directive was transposed only minor adjustments had to be made in order to comply to the Directive. In contrast, the transposition of the Directive led to relatively higher investment costs in Member States without pre-existing ELV legislation. It is interesting to observe that the divergence in estimations between domestic stakeholders (e.g. in Germany and the UK) is higher than between different Member States; while car manufacturers tend to estimate costs relatively low, treatment operators predicted rather higher efforts.

Since the accessible data seem to be comparable only to a limited extend (estimations differ within one country; different dates, different definitions etc.) the effect on the treatment sector might serve as a proxy measure. It can be observed that both the installation of the Dutch system and the domestic ELV regulation in Germany had comparable effects on the national treatment sectors as the transposition of the Directive in the UK. Resulting divergences in adaptation costs are temporarily Investments that had been made in some Member States following national regulations had to be accomplished in the remaining Member States when the Directive was transposed. Moreover, the case studies show that prior to the EU regulations, costs for using the environment (as disposal / sink) were not the same throughout the EU: Some Member States did not have environmental requirements when treating and disposing ELVs. Thus, the ELV Directive contributes to a level playing field and removed a historic market distortion.

7.2.4.3 Costs of regulation

Costs of regulation are those costs that are determined by the specific choice of instruments and measures that are applied within the Member States in order to fulfil the requirements from the ELV Directive. These instruments define who is made responsible for the fulfilment of demands and who has to pay costs that possibly arise from the transposition of the Directive.

The ELV Directive is the first European Directive that explicitly refers to the principle of extended producer responsibility (EPR). Manufacturers are made responsible for their products throughout their life cycle. In this regards, the Directive gives leeway to Member States in setting up take-back systems when transposing the Directive into national legislation. This openness may be justified by the pre-existence of different collection schemes in some Member States prior to the ELV Directive. While all Member States have introduced a free take back provision for the last holder/owner of an ELV (ENDS Europe, 8 May 2007), there are differences concerning the organisation of take-back systems in the Member States.

The Netherlands

The Netherlands is a country with an already (pre-ELV) existing highly regulated system of car disposal that was introduced as voluntary system of free take back. According to a study carried out by GHK and BIOIS in 2005, the Netherlands "have implemented the provisions of the Directive more fully than other MS, at the present time" (GHK /BIOIS (5)). Responsibility for the treatment of ELVs lies with "Autorecycling Nederland" (ARN) that was established as a private limited liability company by the Dutch automobile and recycling sector. Its membership includes car dismantlers, car collection companies, recycling enterprises, car manufacturers and importers, as well as car dealers/workshops and damage repair companies.[124] ARN holds contracts with 261 car dismantlers, 5 car collection companies, 40 recycling enterprises, and 13 shredder sites. Its market share in the Netherlands was 90% in 2007 (85% in 2008, communication with ARN representative), the number of collected and treated ELVs in 2007 was ca. 220.000 (ARN 2007). Car disposal in the Netherlands is funded by a charge ("'waste disposal fee'") applied to all new cars. The disposal fee of 15€ (before January 2007: 45€) is paid by the first owner when the car is registered in the Netherlands for the first time. The fee is submitted to a fund that is administered by Auto Recycling Netherlands. A recycling premium is paid to dismantlers, recyclers and transporters that are contracted by ARN. Dismantlers are refunded on the basis of quantities of material actually dismantled and submitted for processing and not per car wreck. The specific payment depends on the time a dismantler needs to dismantle that material and is calculated by using the number of kilograms, litres or pieces of material submitted by the company.[125] Actually, the premium equates ca. 75€ per ELV (communication with ARN representative). In general the dismantling premiums constitute supplementary income for the car dismantling companies. Their main income is from the sale of used parts and the trade in dismantled car wrecks.

The fee is also used to pay for the recycling of those materials that is not economically feasible. In this case the premium is paid by weight or volume of recycled materials. Dismantlers need an environmental permit from provincial executives to issue Certificates of Destruction and to delete a car from the register. Non-licensed Garages and auto repair shops are no longer allowed to dismantle or treat ELVs. Besides direct payments to dismantlers, transporters and recyclers, ARN invests into the development of processes and markets for recycled materials and into treatment technology. A post shredder treatment plant currently is constructed by ARN.

ARN contractual partners not only stem from the Netherlands, but also one German and two Belgian shredding companies are contract with ARN (communication with EGARA). ARN reports for 2006 that of the total 192.224 ELVs, 42.242 were treated abroad (ARN 2007),. In 2007, shredder companies in Germany and Belgium processed 27% of the 166,004 end-of-life vehicles that were registered with shredder companies (ARN report 2007).

Since it is the first owner and not the producer/importer of a new car who has to pay the disposal fee, the Dutch approach does not fulfil the principle of EPR. Interviewees argued that this was because there are no domestic car manufacturers in the Netherlands.

The European Commission scrutinized the Dutch system in 2001. Reasons were that the system was deemed to overcompensate dismantling companies and potential effects on markets and the limitation of the system only to companies with an establishment in the Netherlands and thus would discriminate companies from abroad. Further concerns were expressed by stakeholders (waste disposal companies) that claimed a "distortion of competition between participating and non-participating car-dismantling companies, with respect to matters such as the commercially profitable parts contained in a wreck" (2002/204/EC). The Commission concluded that the waste disposal system for car wrecks did not include state aid and that payments for dismantlers would be remunerations for provided services and that there was "no evidence that the management of the system by ARN has provided specific advantages for other participants in the system". Likewise, ARN's investments in technologies were deemed "to be used entirely in the interest of the system without conferring specific advantages on the companies in the research" (2002/204/EC).

Germany

Germany introduced end-of live vehicles legislation already in the 1990s. The disposal of End-of-Life vehicles had been regulated in 1998 by the End-of-Life Vehicles Ordinance. The transposition of the

[124] http://www.arn.nl

[125] http://www.arn.nl.

ELV Directive into German law was done by an amendment of the Ordinance in 2002 (Act on the disposal of end-of life vehicles / End-of life Vehicles Act). German ELV legislation already contained a free take-back obligation for car manufacturers and importers according to which manufacturers had to take back cars of their own brands in authorised permitted collection facilities or authorised dismantling facilities free of charge (§3(1)). A return network for ELVs consisting of around 15,000 reception points, over 1000 recycling businesses and 65 shredder plants was established in 1998.[126] Collection points could be set up either directly by the manufacturers or through contracts with existing treatment facilities (§3(3)).

Contracts that ensure the free take-back of ELVs are negotiated between the automotive manufacturers and treatment facilities. Automotive manufacturers would have top pay for negative costs from the treatment of ELVs if this could not be done in a cost covering way. However, according to BDSV, most of these contracts contain clauses that unburden car producers from possible payment duties and treatment facilities would have to bear also negative costs from ELV treatment (personnel communication with BDSV representative). While the car producers are interested in avoiding costs from the disposal of ELVs, the motivation for treatment facilities is to ensure a minimum flow of ELVs to their facilities, seeing the increasing export rates of used cars.

UK

The United Kingdom transposed the ELV Directive in two steps (2003 and 2005). 2003 transpositions mainly concerned the depollution and treatment of ELVs and the technical equipment of treatment facilities while the 2005 regulations mainly dealt with producer responsibility and setting up a system of free take back. The 2005 ELV Regulations require car manufacturers to set up networks of ATFs into which last owners can deliver their ELVs free of charge, even when those ELVs have no or negative value.[127] This System came into force in 2007. To fulfil this obligation, car manufacturers and importers hold contracts with one of two service providers (Autogreen and Cartakeback.com) that were founded to operate the take back system and to ensure the free take back provision of the ELV Directive. 11 UK shredder operators in response to the European End-of-Life Vehicles Directive founded Cartakeback.com[128] while dismantling companies in order "to manage the entire legislation as required by the End-of-Life Vehicle Directive" set up Autogreen.[129]

Contracts between car producers and services providers are based either on an individually negotiated membership charge fee that was paid only once when the contract was concluded, or on an annual basis. In these contracts service providers assume the responsible to ensure the fulfilment of the recycling targets and the other requirements on the manufacturers' behalf (Coates / Rahimifard 2007:287). Against lobbying efforts of the treatment sector, automobile manufacturers did not have to support necessary investments in treatment facilities since the value of on average ELV was estimated to be positive when the collection contracts were negotiated (Coates / Rahimifard 2007:287). Only 30 per cent of treatment facilities are contracted with one or both of the service providers.[130] Non-contracted treatment operators may accept ELVs outside of a producer contract.[131] However, they are themselves legally required to meeting the recycling targets for their processed ELVs and to cover possible costs of free take back and treatment of ELVs by themselves" (DTI 2005: 13).

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[126] BMU, End-of-Life Vehicles; http://www.bmu.de/english/waste_management/doc/3443.php

[127] http://www.environment-agency.gov.uk/business/regulation/31887.aspx

[128] http://www.cartakeback.com/en/about-us.asp

[129] http://www.autogreen.org/default.asp

[130] http://www.letsrecycle.com/do/ecco.py/view_item?listid=37&listcatid=228&listitemid=8325

[131] According to SEC(2007/1348) Today, such producer-contracted ATFs number around 350, and are supplemented by a further 850 uncontracted ATFs

Only authorized treatment facilities are allowed to issue Certificates of destruction for which they may not charge the last owner of a car (TRL report Part2: 13). DTI estimated costs for vehicle de-registration in a range between £6.5 and 10.5 million annually (DTI, 2003). According to the DTI regulatory assessment (2004), obtaining an authorization as treatment facility is estimated to generate annual costs of £600 per site, not including inspection costs of £400 per site and year (GHK/BIOIS Annex4 : 104).

Table 37: Costs of internalisation

	NL	Germany	UK
Organisation of free-take back	Installation of ARN	Car manufacturers hold contracts with ATFs	Car manufacturers hold contracts with take back service providers
Financing / responsibility	Fee paid by first owner of a car at registration (€15)	Car manufacturers; contracts with ATFs	Car manufacturers pay fee to service providers to ensure compliance with targets; free ATFs are responsible to reach targets themselves.
Costs for operators	costs for dismantling / recycling are refunded by ARN	No costs yet; positive value of ELVs Possible costs would stay with ATFs (contracts)	No costs yet; positive value of ELVs Possible costs would stay with service providers (contracts) or free ATFs.

7.2.4.4 Conclusion: Costs of Regulation

The leeway given to Member States in setting up collection system led to different responsibilities and also to different cost structures in the Member States. While in the Netherlands it is the first owner of a car who has to pay for its future disposal, this responsibility de facto stays with private dismantlers in Germany and with private dismantlers and service providers in the UK. Since these approaches affect the distribution of costs between producers, consumers, and the treatment sector, but do not alter overall costs for the use of the environment, this divergence is not judged to be a market distortion from an environmental economics perspective (although it constitutes an avoidance of the principle of extended producer responsibility).

7.2.4.5 Additional measures

No additional measures concerning the implementation of the ELV Directive are reported in the 2006 Implementation Report of the European Commission. The Netherlands were the only Member State that introduced a tightened timeframe for the meeting of the targets contained in the Directive. Since the 2006 recycling and recovery targets from the ELV Directive already had already been met in 1997, the Dutch government advanced the EU Directive's 2006 target (80% reuse and recycling; 85% reuse and recovery) to the first year after the Directive had to be transposed (2003). The 2015 target was to be met in 2007. However, this tightened timeline was dropped after complaints of the automobile sector and when it became apparent that the needed post-shredder technology would not be available in time (ARN 2007a).[132] Dutch ELV regulation now is in line with the minimum requirements and targets of the European ELV Directive.

Intersecting policy fields and the availability of treatment technology possibly influence cost structures when dealing with end-of-life vehicles under the ELV Directive. The European Commission identifies ELVs as a priority waste stream and national waste legislations in the Member States influence cost structures for ELV treatment. Although waste policies do not specifically deal with ELV treatment, they are closely linked to recycling and recovery targets determined in the ELV Directive. Same as recycling/recovery targets, landfill bans and landfill gate fees can be used as technology forcing instruments for the development of better treatment technologies. At the turn of the century, a share of about 75% of ELVs by weight, i.e. mainly the metal fraction, was recycled. The rest was landfilled as automobile shredder residue or, together with other waste as shredder light fraction. The annual amount of automobile shredder residue and shredder light fraction amounted to 2-2.5 million tonnes in the EU. Regulations that are relevant for ELV treatment include landfill bans (Germany, Netherlands) or increasing landfill taxes. Such instruments are met in all Member States[133] while their design differs. "Waste disposal arrangements vary significantly in detail and in effectiveness from one state to another. Many of these arrangements date back many years, and were not originally designed to meet the requirements of the ELV Directive" (Fergusson 2005: 8).

The Netherlands

Dutch waste legislation prohibits the deposition of waste that can be further processed e.g. for energy recovery or through incineration. Exemptions from the landfill ban for ASR are granted until a post shredder treatment plant that is financed by ARN will be operative in late 2009 or 2010 will become effective when post shredder technology plant (PST) is operational (communication with EGARA). Until then, a landfill tax for ASR is charged. There are two landfill tax rates in the Netherlands. Which rate applies depends on the existence of alternative treatment methods for the specific waste stream. ASR was assigned to the higher tax rate in 2008 (ARN 2008).

Germany

Responsibility for waste policies in Germany lies with the Federal Government and the Bundesländer. German landfilling regulation that came into force in 2005 demanded that shredder residue be pre-treated before being landfilled (Technische Anleitung Siedlungsabfall and Abfallablagerungs-Verordnung). However, exemptions from the landfill ban for automobile shredder residue and shredder light fraction still are granted. Besides the possibility to dispose SLF at one landfill, the mineral fraction is used in mine filling (Bergversatz) or as base layer for landfills (Umweltbundesamt 2008). According the Federal Ministry for the Environment, these exemptions are expected to phase out after the currently re-negotiated landfill law[134] will become effective.

UK

Prior to the transposition of the ELV Directive in the UK, the depollution of end-of-life vehicles was not mandatory before they were shredded. The resulting ASR contained considerable amounts of heavy metals, oils and other environmental hazardous substances when landfilled. Edwards et al. estimate that in 2004 ca. 21% of ELV weight in the UK was sent to landfill (Edwars et al.:1213). Land-

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[132] The same was true for additional measures that demanded that tyres had to be taken off ELVs before further processing. This regulation was also dropped in 2007 (ARN 2007a).

[133] SEC(2007)14: 10

[134] Verordnung zur Vereinfachung des Deponierechts

fill taxes in the UK are augmented £8 per tonne and year. The 'tax escalator' started in April 2008, bringing taxes from £24 to £32 a tonne and will continue until it reaches £48 a tonne in 2010-11.[135]

According to the Environment Agency Statement on Shredder Residues, only waste from ELVs that were depolluted according to the DTI/Defra depollution guidance will be considered non-hazardous and may further be disposed off in landfills. Shredder residue from non-depolluted ELVs has to be disposed off in hazardous-only disposal facilities. However, concerning the classification of hazardous waste, the UK environment agency expressed concerns regarding the adequacy of existing testing methods for shredder residues.[136]

7.2.4.6 Conclusion: additional measures

ELV treatment is closely linked to the European waste policy since the ELV Directive contains recycling and recovery targets for ELV waste. Definitions of recycling and recovery are given in the revised EU Waste Framework Directive.[137] While the ELV Directive makes the depollution of ELVs mandatory in all Member States, some Member States introduced additional measures for the disposal of ELV waste such as landfill bans and gate taxes at deposition sites. Although such instruments exceed the European minimal standard, different approaches are not regarded as competition distortion (à Case 4).

7.2.5 Industry

7.2.5.1 Summary of complaints

This section will depict the core complaints of the concerned industries. Over all, both the automotive industry and ELV treatment operators appreciated the Directive. The automobile sector does not complain about market distortions that arise from the ELV Directive (communication with EC desk officer). Since the value of ELVs depends on prices for scrap metal and current scrap metal market prices suffice to make ELV treatment a cost-covering operation, ELVs at present do not have a negative market value, which producers would have to pay under some take-back schemes. There are no complaints from the car manufacturers about costs that arise from the free take back provision and different collecting systems.

Manual dismantling or the use of post shredder technology can either achieve the reuse/recovery quota of 95 per cent. The availability of post shredder technology in the Member States differs significantly (communication with EGARA representative). Manual dismantling of ELVs is labour intensive and the plastic fraction consists mainly of four polymers that can be produced from virgin raw materials at low costs and often at better quality (Zenhoven, Saee, 2003). Thus, it is claimed that there exists no recycling market for the dismantled plastic that would match the additional costs of dismantling (Duncan 2005, 12). However, technological progress towards better and more cost efficient recycling of the non-metallic fraction can be stated – mainly because of technology forcing instruments that are comprised in the Directive and from intersecting policy fields (recycling and recovery targets; landfill policies).

Effects of different waste legislations were judged as cost relevant in the interviews (EFR, BDSV, ARN, EGARA). Most interview partners proposed that differences in waste policies constitute relevant

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[135] Budget confirms £32 per tonne Landfill Tax from April, 12-03-2008, letsrecycle.com http://www.letsrecycle.com/do/ecco.py/view_item?listid=37&listcatid=217&listitemid=9782

[136] Environment Agency, 2005, Statement on Shredder Residue (Issued 1 February 2005) http://www.environment-agency.gov.uk/static/documents/Business/shredderstat0105_831903.pdf

[137] 2008/08/EC Art.3.

sources of competition distortions. Differences between Member States concerning the treatment of ELV waste that were mentioned in the interviews include:

1. differences in the definition of waste fractions (cf. Duncan 2005),
2. methodological differences (analytical standards) in the process of determining hazardous waste, especially concerning the shredder light fraction.
3. options and criteria for landfilling of automobile shredder residue or waste incineration (personnel communication with representatives from BDSV and ARN).[138]

Inconsistent Definitions

Industry associations claim that there are differences, which possibly lead to market distortions. These primarily stem from differences in monitoring and enforcement, diverging processes of verification, procedural standards (e.g. definitions of waste fractions) and from intersecting policy fields – mainly from national waste policies. Concerning treatment procedures, stakeholders expressed their concern that "differing approaches within EU member states to the transposition of the [ELV] directive were creating a high degree of investment uncertainty since treatment technologies that were acceptable in one country or region would not necessarily gain approval in another"[139] ACEA argued that "the definition of 'feedstock recycling' varies from one Member State to another and between regions. "[…] Due to the lack of a uniform definition, 'recycling' and 'energy recovery' figures are not comparable between Member States" (ACEA 2005:9, BDSV, no date)[140] and that "the ban on tipping combustible waste is not applicable throughout Europe".[141] Furthermore it is argued that there would be 'contrasting views on whether using the organic fraction of the shredder residue as a reducing agent (feedstock recycling) in a blast furnace qualifies as recycling' in the different Member States (Reinhardt 2005: 64).[142] According to the consultation carried out for the EU Commission, stakeholders complained about diverging definitions of waste fractions in the Member States (Duncan 2005).

At the same time, stakeholders regarded the ongoing process of harmonizing waste definitions between different environmental directives as problematic with "serious consequences when the recycling definition becomes too narrow and excludes, for example, feedstock recycling." (Reinhardt 2005a). Stakeholders complained that use of the plastics fraction from automotive shredder residue as a reducing agent in blast furnaces would no longer count towards the recycling target. ACEA claimed that this would cause problems to fulfil the 85 per cent recycling target (e.g. Reinhardt 2005).[143] However, these complaints apply to all Member States and are not relevant for competition on the Single Market.

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[138] Directive 200/76/EC (December 4, 2000) on the Incineration of Waste and Directive 1999/31/EC (April 26, 1999) on the Landfill of Waste.

[139] [ecycling today, 6/9/2004; http://www.recyclingtoday.com/news/news.asp?ID=5928]

[140] Comments of the Automotive Industry on the Directive 2000/53/EC

[141] http://www.arn.nl/engels/5pers/522_10.php

[142] The revised Waste Framework Directive (*2008/98/EC on waste and repealing certain Directives)*, contains definitions of reuse, recycling, and recovery in Article3.

[143] According to the revised Waste Framework Directive, the combustion of waste or its use as energy source (feedstock recycling) will no longer be counted as recycling However, only a minor share of shredder light fraction is used for energy recovery (12% in Germany in 2006); the rest was disposed (58%) or recycled (30%). The overall share of energy recovery in the treatment of ELV waste was ca. 2 % in Germany (2006). (Umweltbundesamt 2008)

Methodological and Analytical determination of Hazardous Waste

Since it does not appear to be possible to remove all hazardous substances from car bodies before shredding, automobile shredder residue is likely to contain dangerous substances and to be classified as hazardous waste. ELVs and shredder light fraction (SLF) are categorised in the European Waste Catalogue and the Hazardous Waste List. During the interviews conducted, representatives of the treatment sector claimed that there were different techniques and analytical methods employed to determine whether waste is defined hazardous in the Member States. Although this is not a regulation of ELV Directive, it possibly impacts cost structures for the treatment sector and might – in combination with the ELV Directive's recycling and recovery targets – lead to competition distortions. The techniques and analytical procedures differ from Member State to Member State, and even within some States, bearing potential effects on cost for ELV treatment (communication with BDSV representative).

Enforcement & exemptions

Interviews indicated that there were considerable differences in monitoring, verification procedures, granted exemptions etc. that possibly lead to effects on transboundary competition. Although transposition of the ELV Directive contributes to comparable legal conditions throughout the Member States, interviewees from the treatment sector complained about the poor enforcement of ELV legislation in many Member States; especially in new Member States but also in Western European countries. A spokesperson of a Dutch treatment operator argued that 'the most important environmental laws within Europe have been more or less harmonised, but there is still the problem that in a great many EU countries compliance is not enforced with equal vigour. They do things any old way there, so the shredders can work much more cheaply.'[144] In Germany, for example, the landfill ban for untreated shredder residue was said to be bypassed by storing waste as intermediary disposal at treatment facilities. For example, BDSV complained that enforcement of ELV legislation by local authorities was poorly done (BDSV 2008). At the same time, a spokesperson of BDSV claimed "…we keep the best environmental standards, but that's why we are losing material".[145]

Take back systems

According to a spokesperson of the European Automobiles Manufacturers Association (ACAE), there existed a 'non-uniform interpretation and implementation of the ELV Directive between Member States, affecting the design of car return systems, recycling standards and legal treatment of the financial reserves that are necessary. These differences are costly when trying to meet single market needs and, importantly, are distorting the market in Europe'. (Reinhardt 2005:63). Without getting much clearer and without providing numbers, the ACAE spokesperson declared that concerning the organization of take back systems "the Directive's demands are on a generic level and interpretation is left to individual Member States. This has led to a lack of harmony in approach and consequential market distortions" (Reinhardt 2005: 66).

7.2.5.2 Changes in competitiveness

Diverging costs for adaptation to the European Standard stem from investments into treatment facilities. In some Member States, such investments had already been effectuated before the ELV Directive was transposed (following national ELV legislation) so that only minor adjustments had to be made. These processes already had led to market adjustments in these States. In Member States without pre-existing ELV legislation, such as the UK, the transposition led to significant adaptation costs and consequently to a decrease in the number of authorized treatment facilities in the recent

144 http://www.arn.nl/engels/5pers/522_10.php

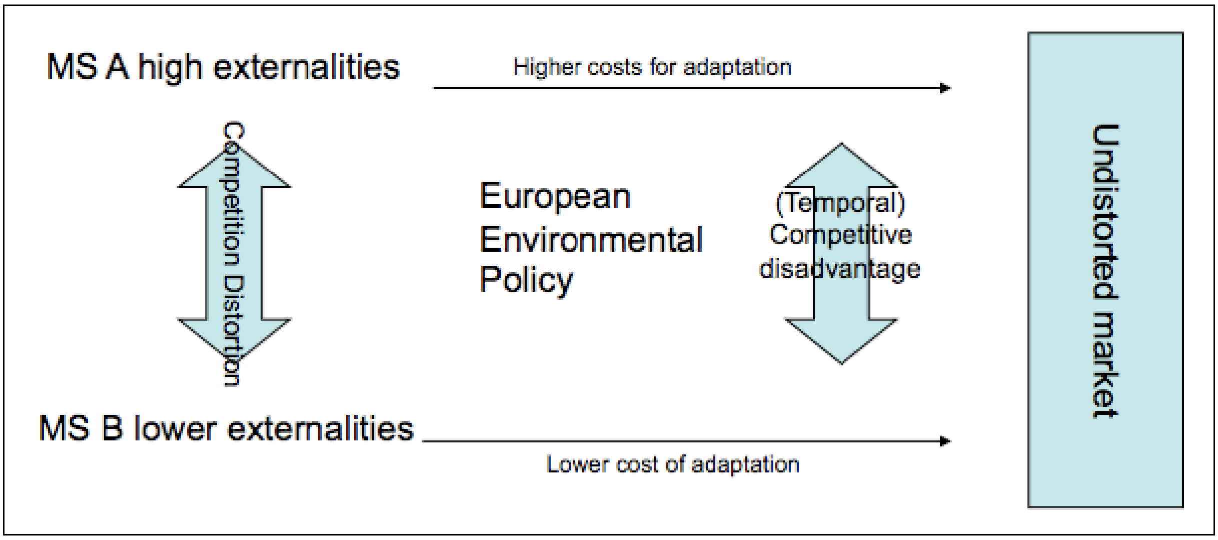
145 Quoted in: RecyclingBizz.com, German Shredders run short of ELV feed, Feb.01, 2005

years. These investments were carried out in order to fulfil the common European Standard and will be only temporarily until a common European standard is reached.

Before the Directive came into force, minimal standards and costs of internalisation differed – in particular between UK and the other two cases. The possibility of shredding undepolluted ELVs in the UK – what would be judged as a subsidy of a 'dirty' industry practice and led to suboptimal environmental outcomes – was abolished with the transposition of the Directive. Thus, the transposition of the ELV Directive contributes to a level playing field and removes a historical market distortion (cf.: Research Protocol, Case 1).

Industry complains about high adaptation costs cannot be judged as a sign of market distortion since these costs arise from the fulfilment of a common standard. Effects of the transposition on the British treatment sector were adaptations to a common standard and comparable to those effects from previous domestic measures in the Netherlands and in Germany.

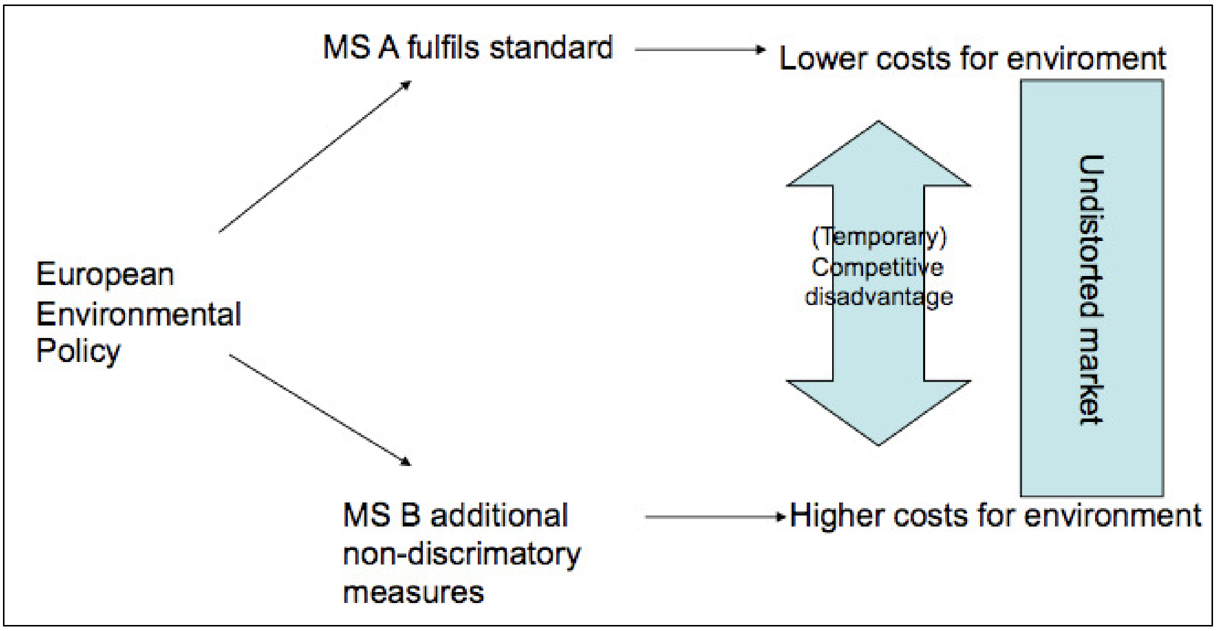
Figure 28: European policy removes historical market distortion



The design of take-back systems led to different cost structures and responsibilities in the Member States. Basically, this is a question of the domestic distribution of costs between different actors (consumers, producers, treatment operators); while overall costs for the use of the environment are the same. Thus, the diverging organisational forms of take back systems are not considered a competition distortion in environmental economic terms.

Landfill bans and gate taxes are "measures on top" of the European Waste policy. Since such instruments do not undermine but exceed European standards and thus do not lead to suboptimal (compared to the European ideal in the Directive) outcomes. These measures are technology forcing instruments that aim at inducing the development and use of better technology (e.g. post shredder technology). Since industries may acquire such technologies, this case does not represent a case of competition distortion. (Cf. Case 4 of the research protocol)

Figure 29: Additional measures on top of EU environmental policies



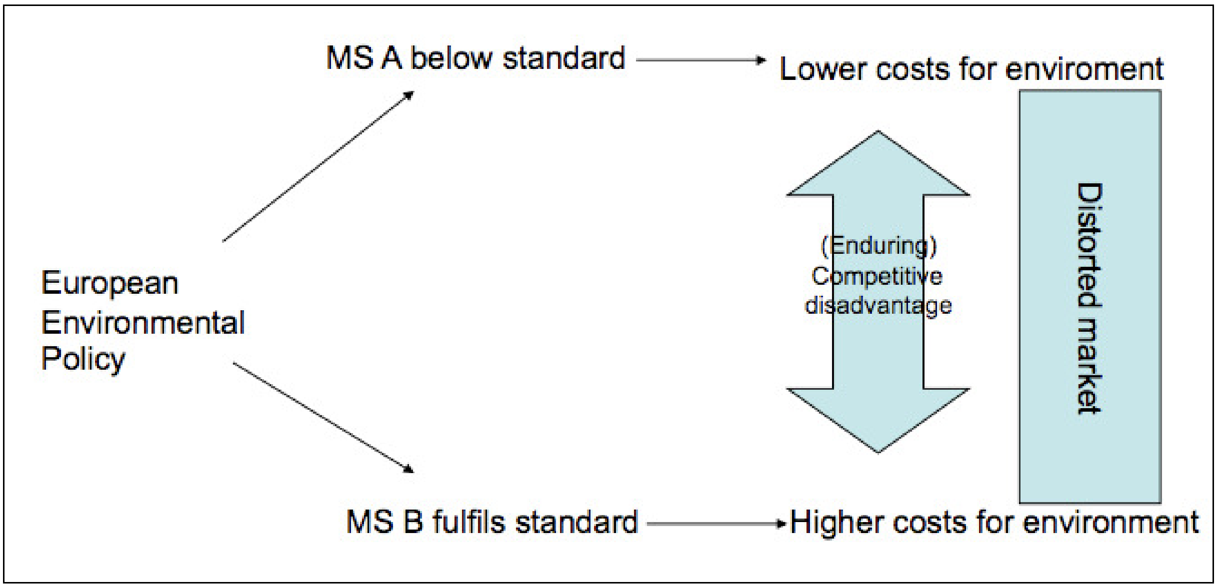
7.2.5.3 Competition distortion

Competition distortion signifies a situation in that not all operators on a same market have to bear the same cost for the use of environmental resources. While all Member States reported to have transposed the requirements of the ELV Directive, most interview partners and many stakeholders complained about a lack of enforcement in the different Member States (verification of minimum standards, granted expectations, intermediary storages). However, this is not an effect of the transposition of the ELV Directive as such but a question of monitoring and enforcement that possibly contributes to a Case2-situtation where some Member States de facto stay below the European Ideal.[146]

Another indication of a possible competition distortion that is connected to the transposition of the ELV Directive stems from the intersecting waste policy field. The ELV Directive contains recovery and recycling targets what makes the disposal of ELV waste a cost relevant issue for the treatment sector. Complaints of stakeholders about diverging definitions of recovery and recycling throughout the Member States were settled with the revision of the Waste Framework Directive in late 2008 (definitions of recovery and recycling are provided in Article3). In contrast, diverging analytical methods for the determination of hazardous waste potentially contribute to a Case 2-situation, where prices of the use of environmental resources are not the same in all Member States – and thus signify a market distortion.

[146] One major problem in this context is the export of second hand cars and the lack of clear standards to determine whether a car is considered a used car (for further use) or whether it is waste – and will possibly be dismantled in countries with weaker enforcement.

Figure 30: MS stay below European ‚ideal'



7.2.6 Conclusion

Case studies indicated that manufacturers de facto avoided taking responsibility for the treatment and disposal of cars from their own brands (i.e. to avoid the principle of Extended Producer Responsibility). This was done either by transferring (financial) responsibility to service providers (UK), to contracted dismantling operators (Germany), or to the first owner of a car (The Netherlands). However, concerns about different collection and treatment systems are not raised at this time since high scrap metal prices make ELV treatment economically efficient. This situation might change if ELV treatment no longer was cost covering, e.g. through falling scrap metal prices – a situation as it had been in the early 1990s, when lasts owners had to pay to get rid of their old car.

At the same time, the Report from the Commission to the Council and the European Parliament on the Targets Contained in Article 7(2)(b) of Directive 2000/53/EC states that the recycling and recovery targets of the Directive "generate both substantial environmental and economic benefits. [...] The magnitude of the benefits generated is intimately linked to eco-innovation, without which the spreading of existing technology will generate low economic and environmental benefits whilst eco-innovation would lead to significantly amplified benefits" (COM(2007)5 final (3)). Exemplarily, Auto Recycling Nederlands (ARN) states that the development and installation of a new post shredder treatment plant "is needed in order to be able to meet the statutory requirement that at least 95% of the weight of a car must be reused by 2015" (ARN 2008).

The leeway concerning the organisation of take back systems can be justified since some different approaches to ELV treatment already existed in the Member States prior to the ELV Directive. Other reasons are different availability of treatment technology and diverging wage costs (e.g. for manual dismantling) throughout the Member States what makes it reasonable not to prescribe specific measures how to reach the given targets. Over all, the Directive introduces a level playing field in the EU and in a market that increasingly has transboundary effects. Further standardisation might contribute to a removal of the remaining sources of possible competition distortions, but might at the same time threaten existing and efficient take-back systems. Since the Directive provides mandatory minimum standards, the organisation of the take-back system should be left to economic operators.

The introduction of the ELV Directive led to an overall convergence of national legislations and thus removed historic competition distortions that stemmed from different requirements and costs for using the environment as a sink for disposal of ELV waste.

However, monitoring and enforcement still seem to be the most pressing issues that stand in the way of establishing level playing field in practice. Signs of competition distortion that were found in the case studies do not stem from the transposition of the ELV Directive itself but from the Directive's enforcement in the Member States and from its interdependency with EU waste legislation (Waste Framework Directive).

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7.3 *Case Study on the EU Emission Trading Scheme (ETS) and its impact on the Cement Industry*

By Adarsh Varma

7.3.1 Introduction

7.3.1.1 This Study

The aim of the EU single market is to achieve an integrated market with unrestricted movement of all factors leading to increased competition and hence increased efficiency of markets. The main features of the Single Market, commonly known as the 'four freedoms', are: the free movement of goods, services, capital and persons. The rules concerning these four freedoms are supplemented by additional rules for harmonization and improvement of the business environment and the protection of intellectual property rights. Competition distortion arises when companies are not competing under equal conditions or there are differences in achieving the 'four freedoms'. The reasons for this might be manifold, e.g. monopolies, trade barriers, industrial structures, market failures, etc.

Competition distortion could arise in the case of environmental policy areas due to a lack of standardisation of environmental policies between Member States. This is mainly due to the public good character of the environment and other market failures, costs of production and abatement and finally prices which do not fully reflect the use of environmental resources and externalities. All these factors could differ by business sector across Member States and lead to competition distortion.

The purpose of this case study is to identify whether the EU Emission Trading Scheme is causing competition distortion in the Single Market and to develop policy options to overcome these distortions, if any exist. The main aim of the EU ETS as an environmental policy measure following the lines of the polluter pays principle is to internalise the cost of using environmental resource and the subsequent emissions. Undistorted markets from an environmental economics perspective would be markets in which all firms would internalise and have the same costs for their use of environmental resources. Optimal internalisation would be a situation in which every company would bear the full cost of environmental resource use resulting in environmental protection and fair competition. However, Phase I (2005-2007) results from the EU ETS showed that firms where not optimally internalising their external costs. The allocation mechanism made it difficult to ensure scarcity of allowances leading to high levels of over compliance. The case for competition distortion due to the EU ETS arises because the allocation of emission allowances was not set centrally, but by the national allocation plans (NAPs) of the 25 individual member states. Although these NAPs were subject to the approval of the Commission, the total EU allocation was an outcome of decisions made at different levels.

We thus consider the case for competition distortion due to the EU ETS by looking at the way EU ETS is implemented in Member States. This includes comparing the cost of regulation in terms of compliance requirements and procedures. We consider whether differences in implementation lead to differences in the internalisation of environmental costs. We also consider if some member states may have additional measures on top of the EU ETS to achieve tighter standards than that required by the EU ETS, which exacerbate or ameliorate this situation.

In order to present the case for competition distortion due to the EU ETS we have used the following data sources and methods:

Table 38: Data sources and methods

Case for Competition distortion	Method	Sources

Case for Competition distortion	Method	Sources
Differences in National Allocation Plans (NAPs) including allocation methods and limits	The value of surplus allowances as a share of turnover also gives an indication of competition distortion	European Commission documents, EU ETS sector associations, MS cement sector associations and European Environment Agency (EEA)
Differences in Implementation	No. of CAs, no. of regulatory instruments and differences in monitoring, reporting and verification. This serves as a proxy for variation in cost of compliance across MSs	European Commission and MS EU ETS websites and EEA
Complimentary Member States Policies	Complimentary climate change unilateral policies in MS might impose additional compliance burden but the link for competition distortion is not entirely clear	European Commission and MS Environmental authority websites and International Energy Agency

The case for competition distortion has only been monetised based on differences in NAPs across Member States in this case study. An assertion can be made that differences in implementing the EU ETS and complimentary Member State policies may lead to competition distortion across Member States. However, it would require detailed interviews and case studies to confirm and quantify the assertion, which is beyond the scope of the study.

A study for DG Environment (2007) found that the aspiration to create a 'level playing field' for environmental policy in Europe is still quite challenging. Although the major share of environmental policy initiatives is nowadays decided at the European level, and despite the existence of a number of international environmental agreements, the implementation of environmental policy, such as the EU ETS, is still carried out at the national level. The study found that companies in Southern Europe are clearly behind the other regions in terms of environmental expenditures. This confirmed that the way in which European Directives have been implemented can have a clear effect on their impact. In new Member States larger specific environmental investments were needed during the past five years than in old Member States, as a result of the need to catch up with European legislative requirements in a relatively short period of time. Surveys for the study also suggested concerns for a global level playing field compared to a European level playing field. Thus, we should also consider if competition distortion within the EU also affects the competitiveness of EU producers with the rest of the world. This is even more critical for the EU ETS as most of the sectors (energy intensive such as steel, cement, chemicals, etc.) are affected by international competition.

For a more detailed analysis we have chosen the cement industry in three Member States – Germany, Poland and Spain. We have chosen these three countries because these countries along with Italy, Greece and France account for 70% of the cement production capacity in Europe[147]. Furthermore, the ratio of EU ETS allowances to the number of cement installations differs in the three Member States allowing for useful comparisons. The three Member States also have different implementation mechanisms and fairly contrasting domestic climate change policies. The market con-

[147] Data provided by Cembureau.

ditions also differ in the three Member States (see section 2.2 and 2.3 for more details. There was also good data availability and high level of support from the cement sector association in these three Member States. The reason for choosing the cement industry is due to the fact that it is exposed to competition in the single market as well as internationally. Moreover, the cement industry has a very high carbon cost per value added and has been allocated the second largest amount of EU ETS allowances after the electricity and energy generating sector.

7.3.1.2 Description of the EU Emission Trading Scheme

The EU ETS is the world's first trans-national emission trading scheme and came into effect in January 2005, with the first phase running from 2005 to 2007, followed by a second phase from 2008-2012. It is a cap and trade system aimed at putting EU member states on course to meet their targets under the Kyoto Protocol. The cap covers only carbon dioxide (CO_2), although other greenhouse gases (GHGs) may be added in the future.

The EU ETS Directive 2003/87/EC[148] established a scheme for greenhouse gas emission allowance trading within the Community, recognising that, in the longer-term, global emissions of greenhouse gases will need to be reduced by approximately 70 % compared to 1990 levels. The 2003/87/EC was amended by the Directive 2004/101/EC. This amendment reinforces the link between the EU's emission allowance trading scheme and the Kyoto Protocol by making the latter's 'project-based' mechanisms (Joint Implementation and the Clean Development Mechanism) compatible with the scheme. This will enable operators to use these two mechanisms in the allowance-trading scheme to fulfil their obligations. The result will be lower compliance costs for installations in the scheme. It is estimated that annual compliance costs in the period 2008-12 for all installations covered in the enlarged EU will be reduced by more than 20%.

The EU ETS is one of the most important instruments of EU climate policy due to its ability to achieve absolute emission reductions in an economically efficient manner[149]. The European Council has made a firm commitment to reduce the overall greenhouse gas emissions of the Community by at least 20% below 1990 levels by 2020, and by 30% provided that other developed countries commit themselves to comparable emission reductions and economically more advanced developing countries contribute adequately according to their responsibilities and respective capabilities. The EU ETS is expected to play a significant role in achieving these reductions.

The EU ETS was implemented on the basis of National Allocation Plans (NAPs). These plans established the total number of emission allowances Member States intended to allocate and the methods of allocating them to the different installations involved. Member States had considerable discretion in drafting their NAPs and this led to widely different allocation rules. The differences in the NAPs due to this are discussed in section 3.2.

For the purposes of this study we will only use the experience from Phase I of the EU ETS to look at the issue of competition distortion.

7.3.1.3 Overview of first trading period 2005 -2007

In its first phase, the EU emissions trading scheme (EU ETS) covered CO_2 emissions from power generation, oil refineries, coke ovens, iron and steel, cement, lime, glass, ceramics, and pulp and paper, as well as from all combustion plants with a rated thermal input of more than 20MW of capacity. The first phase included some 15,000 installations in EU-10 and 10 Accession countries, representing approximately half of EU CO_2 emissions that fall under the activities specified in Annex I of the Directive. Each installation obtains emission allowances for the whole period and allowances are

[148] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:275:0032:0046:EN:PDF

[149] http://register.consilium.europa.eu/pdf/en/07/st11/st11429.en07.pdf

allocated to installations covered by the scheme by the Member States of the EU by means of a national allocation plan (NAP) and according to defined criteria. If a company fails to surrender sufficient allowances to its Government at end of each yearly reconciliation period, it faces a fine of €40/tonne in Phase 1 and €100/tonne in Phase 2, in addition to having to purchase the equivalent shortfall for retirement the following year.

Under the Directive, at least 95% of the allowances for Phase I (2005-2007) were allocated to the installations free of charge. For the five-year period beginning 1 January 2008, Member States must allocate 90% of the allowances free of charge. Member States have to ensure the free circulation of allowances within the European Community. Each year, no later than 30 April, they have to make sure that the operators of the installations surrender the correct quantity of allowances commensurate with the total emissions over the previous year. The surrendered allowances are subsequently cancelled.

Monitoring and reporting of emissions

At the end of the year, the operator is required to submit a report to the competent authority detailing with the greenhouse gas emissions produced by the installation during that year. These reports must comply with the 'guidelines for the monitoring and reporting of emissions', adopted by the Commission on the basis of the criteria laid down in Annex IV to the EU ETS Directive. When verifying the reports submitted by operators, due account has to be taken of the principles set out in Annex V to the EU ETS Directive. If a report is not verified as satisfactory in accordance with the criteria in the Annex, the operator has to cease trading allowances until the report is deemed satisfactory.

Allowance allocation

In total, 11,908 installations participated in the first trading period. The actual number of installations covered under the Emissions Trading Directive changed over time due to new entrants, closure of installations, or new Member States entering the scheme. The overall number of allowances allocated by competent authorities increased from 2,096 million EU Emission Allowances (EUAs) in 2005 to 2,153 million EUAs in 2007. Compared to the actual verified CO2 emissions for the same period for the EU-27, an over allocation of allowances by 4 % was observed for 2005 — the first year of the trading period — which decreased to 1 % by 2007.

Based on Carbon Market Data calculations[150], the EU emissions trading scheme (EU ETS) installations were **long by 7.5 Mt** in 2007 (they emitted 7.5 million tonnes CO2 less than they were allowed). This figure is derived from the verified emissions data submitted so far by approximately 94% of the 11,300 installations currently included in the trading scheme. It shows that EU ETS installations emitted - on average - **0.4%** less CO2 than the number of distributed allowances they received for free. These data do not include Romania, Bulgaria, and Malta.

Sectoral effects of the EU ETS allocation

On average, the power sector contributed about 60% to the EU ETS total allocation, with country differences ranging from 17% to 80%, which is equivalent to about 25% (3-56%) of shares in EU/national total emissions. The cement sector is the second largest activity covered by the EU ETS, after electric power and heat[151].

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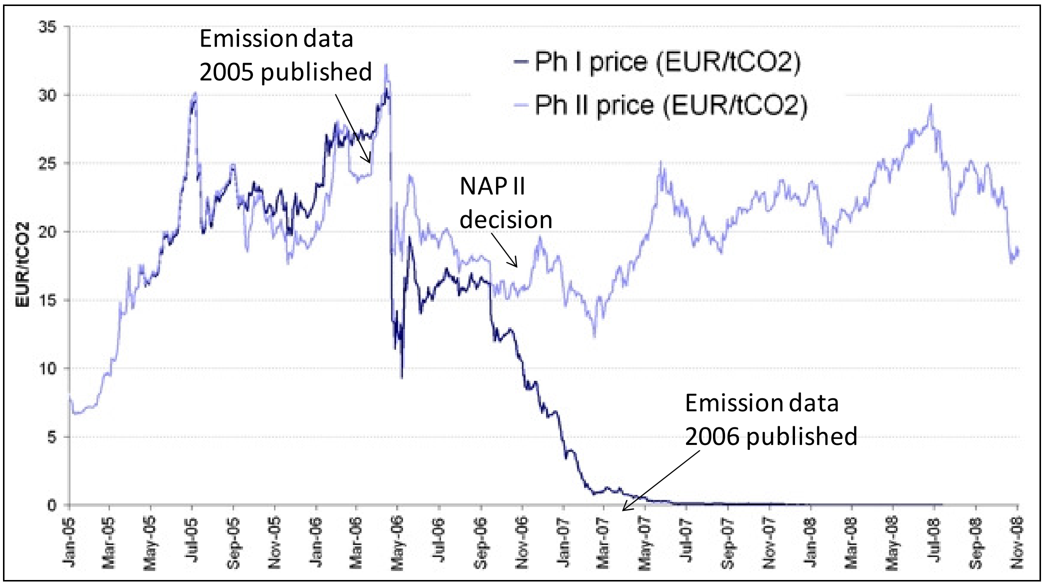
150 http://www.carbonmarketdata.com/pages/Press%20Release%20EU%20ETS%20Data%20-%20April%202008.pdf

151 http://www.holcim.com/holcimweb/gc/CORP/uploads/HolcimLtd_PositionPapers_05_AllowanceAllocation.pdf

Allowance price

The price for one tonne of carbon dioxide started at around €7 per EUA, rose to a maximum of approximately €30 per EUA and dropped sharply after the publication of the first verified emissions in April 2006 to below €10 per EUA. The warm winter of 2006–2007 confirmed that overall emissions would be less than allocations and the EU carbon market for the period 2005–2007 would remain long[152]; as a result the price dropped to below €1 per EUA in spring 2007 (see Figure 31). With the absence of the possibility to use allowances from the first trading period for the subsequent period the excess allowances had no value to operators anymore. The Phase II price has fluctuated between €20-€25 per EUA for most of 2008.

Figure 31: EU ETS OTC (over-the-counter) Closing Prices 2005–2008



Source: Point Carbon (from EEA website[153])

7.3.2 The Cement Industry

7.3.2.1 Introduction

In this section, we present an overview of the economic profile of the cement industry including production, consumption, trade, turnover and employment.

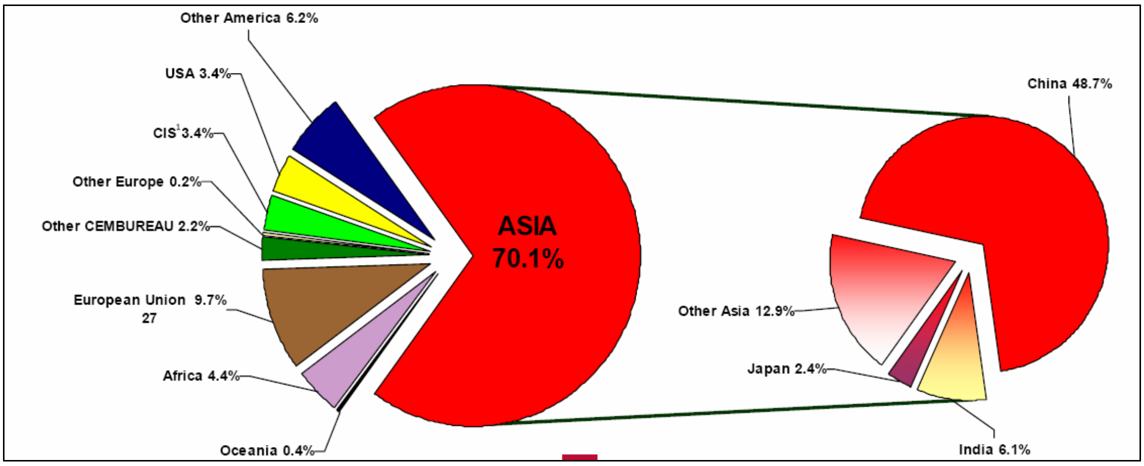
7.3.2.2 Cement Production and Consumption

EU-27 accounted for 10% of world production (2.77 billion tonnes) in 2007. Asia accounts for 70% of global production with nearly 50% of production coming from China (Figure 32). In EU-27 production increased by only 1.8% in 2007 compared with the previous year.

[152] A sector is short of allowances in case that verified emissions are higher than allowances allocated to the sector. It is long if allocated allowances exceed verified emissions.

[153] http://dataservice.eea.europa.eu/atlas/viewdata/viewpub.asp?id=3920

Figure 32: **2007** World Cement Production by Region



Source: Cembureau 2007 Activity Report[154]

Spain, Italy, Germany, France, Poland and Greece accounted for 70% of total EU cement production in 2007 (Table 39). For the purposes of this case study we will look at Germany, Poland and Spain in more detail.

Table 39: Top 10 EU Cement Producing Countries (2007)

	Country	Cement Production (Ktonnes)	
1	Spain	54,720	191,274 (70%)
2	Italy	47,542	
3	Germany	34,434	
4	France	22,268	
5	Poland	16,979	
6	Greece	15,330	
7	United Kingdom	12,602	
8	Portugal	10,563	
9	Romania	10,282	
10	Belgium	8,380	
	EU27	**272,779**	

Source: Cembureau

Cement consumption matches very closely with cement production. The group of Europe's 6 biggest cement producing countries mentioned above is also the group of countries which are the biggest consumers of cement (representing 70% of the European cement market) (Table 40).

[154] http://www.cembureau.be/Documents/Publications/Activity%20Report%202007.pdf

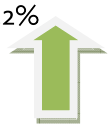
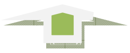
Table 40: Top 10 EU Cement Consuming Countries (2007)

	Country	Cement Consumption (Ktonnes)	
1	Spain	55,997	
2	Italy	46,368	
3	Germany	27,352	185,768
4	France	24,803	
5	Poland	16,762	70%
6	United Kingdom	14,486	
7	Greece	11,034	
8	Romania	9,776	
9	Portugal	7,823	
10	Belgium	5,945	
	EU27	**265,945**	

Source: Cembureau

A discussion of the cement consumption activity from the CEMBUREAU 2007 Activity report is given Table 41below. It shows the difference in consumption trend and the reasons for the level of consumption activity in the 3 MSs.

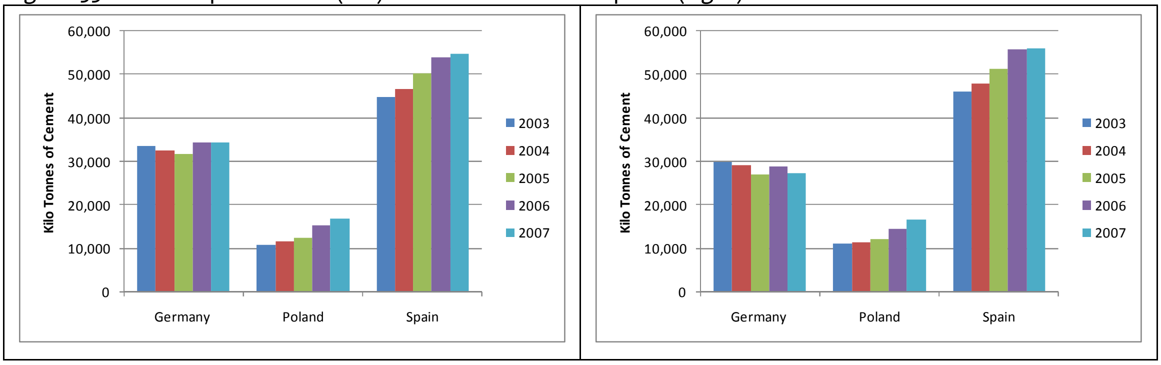
Table 41: Case Study Country Analysis (from Cembureau)

Country	Cement Consumption in 2007 compared to 2006	Country Activity
Germany	5.9% 	Sharp decline (-30%) in housing demand due to the pull-in effect of announced changes in VAT and public subsidy regimes in 2007. Sustained increase (10%) of non-residential demand mainly for production halls, factories and storage. Positive growth (about 7%) in civil engineering pushed mainly by high tax revenues and public authority demands, but activity levels still remain very low.
Poland	15.2% 	Continued increase in demand for building services to be met by both central and local authorities.
Spain	0.2% 	The end of the residential construction activity boom and the downturn of the business cycle had an important impact on the cement industry. This situation will be a turning point for the cement sector, which has surpassed historical records of consumption and production over the last ten years. In addition, the cement sector has managed to lead the consumption list of EU countries since 2000.

Source: Cembureau 2007 Activity Report

The trend over time in cement consumption and production differs in the 3 MSs, with consumption and production fairly flat in Germany and higher rate of growth in Spain followed by Poland. Cement production in Germany, Poland and Spain increased by 2%, 53% and 22% respectively between 2003 and 2007. Cement consumption fell by 9% in Germany and increased by 51% in Poland and 21% in Spain for the same period.

Figure 33: Cement production (left) and cement consumption (right) in kilo tonnes

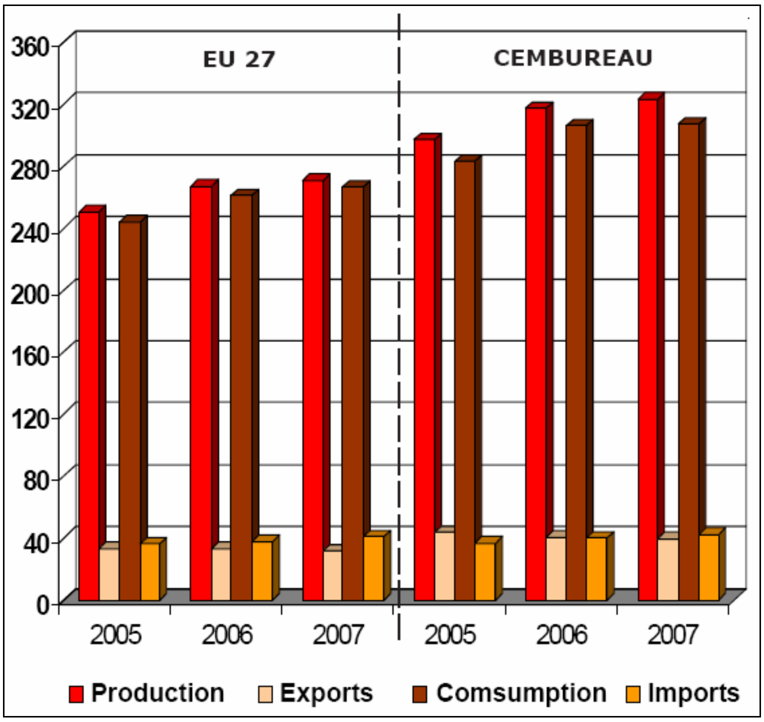


Source: Cembureau

7.3.2.3 Trade

The key factor in the correlation between national cement production capacities and national markets is the need for proximity between the supply side and the demand side for cement, in order to satisfy the latter in terms of quantity, quality and deadlines. There is some intra and extra EU Trade but most of EU's domestic production is consumed within the EU. Cement imports have been increasing steadily over the last 10 years (Figure 35). Imports accounted for 17% of EU-27 consumption in 2007 and increasing (Figure 34).

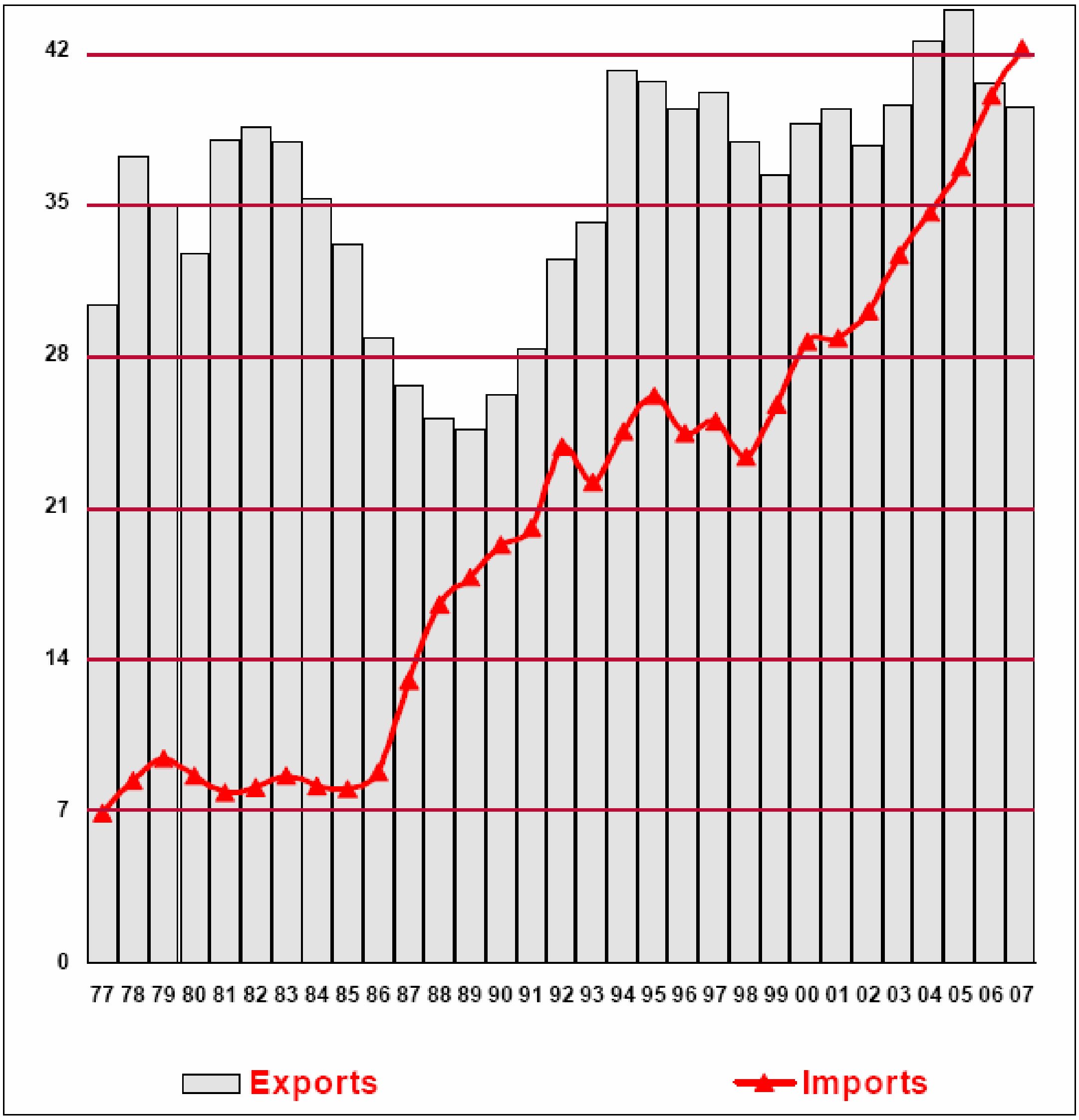
Figure 34: Cement Trade (Cembureau member countries), in million tonnes



Source: Cembureau

Imports accounted for 16% of EU-27 production in 2007 but have been steadily increasing in the last 5 years, mainly from China, Turkey and Morocco.

Figure 35: CEMBUREAU TRADE - Cement & Clinker 1977-2007 (million tonnes)



Source: Cembureau

The five of the six major cement producing and consuming countries in the EU-27 are also the five major importers. From Table 42, 77% of EU cement exports are to countries within the EU-27, 40% within the EU-15. 65% of all cement imports are from countries in the EU-27. Nearly 26% of all imports into the EU-27 are Spanish clinker cement. The Spanish import market is very different form the other 2 countries and the EU as a whole. 77% of Spanish imports are clinkers, 90% of which come from outside the EU-27. In contrast 60% of German imports are Portland cement 100% of which is sourced within the EU-27, and 68% from within the EU15. For the three study countries, Portland cement forms the majority of exports: Germany 60%, Spain 87% and Poland 40%.

Comparing Table 42 with Table 39 and Table 40 above shows that exports, in 2007, as a share of national production was 25% in Germany and only 3% in Poland and 3% in Spain and imports as a share of national consumption was 5% in Germany, 4% in Poland and 25% in Spain.

Table 42: Intra and Extra EU Trade for Selected Member States, 2007 (million tonnes)

	Intra EU Trade		Extra EU Trade		All trade (extra and Intra)	
	Imports	Exports	Imports	Exports	Imports	Exports
Germany	1.3	8.0	0.0	0.7	1.3	8.7
Poland	0.6	0.5	0.0	0.1	0.6	0.6
Spain	3.2	1.2	10.9	0.4	14.1	1.5
EU 27	**22**	**26**	**19**	**8**	**41**	**34**

Source: Eurostat (http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/&product=EU_external_trade&depth=4)

7.3.2.4 Key Economic Indicators

The manufacture of glass, ceramics, cement and working of stone (which corresponds to 'other non metallic mineral products', NACE 26) was the main activity of some 102,000 enterprises that produced a turnover of €211 billion in 2004 in the EU-27 (Table 43). The sector generated a value added of around €73 billion, which represents a 1.4 % share of the non-financial business economy as a whole (NACE C-K, excl. J) and a 4.5 % share of manufacturing industry (NACE Section D). It employed 1.6 million persons, corresponding to 1.3 % of the total employed in the non-financial business economy and 4.6 % of manufacturing industry. The cement and concrete sector had a turnover of €94 billion and value added of €31 billion in 2004 in the EU-27, which is 0.5% and 0.6% share of the non-financial business economy as a whole (NACE C-K, excl. J).

Table 43: Manufacture of Other Non-Metallic Mineral Products (NACE Subsection DI), Structural Profile, EU-27, 2004

	No. of enterprises		Turnover		Value added		Employment	
	('000s)	(% of total)	(EUR million)	(% of total)	(EUR million)	(% of total)	('000s)	(% of total)
Other non-metallic mineral products	102	100	211,281	100	72,875	100	1,600	100
Glass and glass products	18	18	44,000	21	16,000	22	391	24
Ceramic goods and clay products	20	20	38,000	18	15,000	21	400	25
Cement and concrete	26	26	94,000	44	31,000	43	530	33
Stone and miscellaneous non-metallic mineral products	37	37	33,000	16	10,600	15	290	18

Source: Eurostat (SBS); Note: Rounded estimates based on non-confidential data.

In terms of Member States (Table 44), Germany had the highest valued added for the other non-metallic mineral sector[155] followed by Italy, Spain, France and the UK. Italy had the highest employment in the other non-metallic mineral sector. Czech Republic was ranked first (1.9%) followed by Spain (1.7%) for turnover as a share of the non-financial business economy.

[155] Please note that cement-concrete is a sub-sector of the other non-metallic mineral sector (NACE subsection DI).

Table 44: Manufacture of other non-metallic mineral products (NACE Subsection DI), Structural profile: ranking of top five Member States, 2004

Rank	Value added (EUR million) (1)	Employment (thousands) (2)	Share of non-financial business economy			
			No. of enterprises (3)	Turnover (3)	Value added (3)	Employment (4)
1	Germany (13,235)	Italy (249.5)	Lithuania (1.0 %)	Czech Republic (1.9 %)	Czech Republic (3.0 %)	Slovakia (2.5 %)
2	Italy (12,609)	Germany (248.3)	Portugal (0.8 %)	Spain (1.7 %)	Portugal (2.6 %)	Czech Republic (2.3 %)
3	Spain (10,116)	Spain (191.7)	Slovakia (0.8 %)	Slovakia (1.7 %)	Slovakia (2.5 %)	Portugal (2.1 %)
4	France (8,427)	France (143.7)	Poland (0.8 %)	Portugal (1.7 %)	Romania (2.5 %)	Poland (1.8 %)
5	United Kingdom (8,344)	Poland (137.2)	Czech Republic (0.8 %)	Italy (1.6 %)	Bulgaria (2.3 %)	Slovenia (1.8 %)

Source: Eurostat (SBS); Note: (1) Greece and Malta, not available; Luxembourg, 2003. (2) Greece and Malta, not available; Luxembourg and Slovenia, 2003. (3) Ireland, Greece, Cyprus and Malta, not available; Luxembourg, 2003. (4) Ireland, Greece, Cyprus and Malta, not available; Luxembourg and Slovenia, 2003.

7.3.3 Key environmental indicators

Like all industrial processes, cement manufacturing produces CO2. Very high temperatures are needed to burn raw materials and give the clinker its unique properties. CO2 is generated from three independent sources: de-carbonation of limestone in the kiln (about 538 kg CO2 per tonne of clinker), combustion of fuel in the kiln (about 335 kg CO2 per tonne of cement) and use of electricity (about 50 kg CO2 per tonne of cement). Thus, there is a continuous incentive to increase energy efficiency.

In 2006 the cement industry in the European Union produced about 269 million tonnes of cement and emitted about 0.75 tonne of CO2 per tonne of cement via direct emissions (fuel combustion and raw material de-carbonation) and 0.05 tonne of CO2 per tonne of cement via indirect emissions (use of electricity from fuel based power plants). Direct and indirect emissions of CO2 together amounted to about 0.8 tonne of CO2 per tonne of cement. It should be noted that the EU ETS only caps direct emissions related to cement production. As mentioned earlier, the cement sector is the second largest activity covered by the EU ETS, after electric power and heat[156].

Overall, the cement industry contributes to about 3% of the total anthropogenic emissions of CO2 in the European Union[157].

There are three measures by which the cement industry can save direct CO2 emissions in the immediate future:

- Improvement of energy efficiency (a maximum of 2% is still feasible) – move from wet kilns to dry kilns[158];
- Reduction of clinker/cement ratio (introduction of useful industrial by products)';
- Increase in the use of waste as alternative fuel (national initiatives, adequate national implementation of certain directives regarding specific waste).

Over the last two decades, the EU cement industry achieved considerable savings in energy consumption (about 30%). Since bulks of the emissions are process emissions attributed to the processing of the raw material (lime stone) further reductions are limited by the law of thermodynamics.

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156 http://www.holcim.com/holcimweb/gc/CORP/uploads/HolcimLtd_PositionPapers_05_AllowanceAllocation.pdf

157 Cembureau

158 http://www.wbcsdcement.org/index.php?option=com_content&task=view&id=42&Itemid=104

The European Cement Industry has still some catching up to do, in terms of the intensity of CO_2 emissions per tonne of cement produced compared to Japan, Australia and New Zealand. The CO_2 intensity in Europe is 0.84 tonne of CO_2 emissions per tonne of cement produced compared to Japan with 0.73 tonne of CO_2 per tonne of cement produced, and Australia and New Zealand with 0.79 tonne of CO_2[159].

7.3.4 Case for competition distortion

7.3.4.1 Introduction

In this section we look at the potential reasons for competition distortion due to the EU ETS. There are a number of factors, for the literature and discussion with key experts, potentially responsible for such distortion. The main factors to consider are:

- Differences in National Allocation Plans (NAPs) including allocation methods and limits
- Differences in Competent Authorities
- Differences in Monitoring and Reporting Guidelines
- Differences in Verification

We also look at whether existing unilateral policies in member states to achieve even tighter emission standards is a cause for competition distortion. Though it is difficult to make actual comparisons because of inherent data limitations and differences in regulation, industry structure and market conditions.

The above differences will be discussed in detail for Germany, Poland and Spain in particular. Competition distortion due to the EU ETS will affect the ability for cement producers to compete within the single market and with the rest of the world.

7.3.4.2 Differences in National Allocation Plans

One of the requirements for implementation of the EU ETS Directive was the development of National Allocation Plans (NAPs), which lay down the overall CAP for the country and the allowances that each sector and individual installation covered under the Directive receive. These NAPs need to comply with criteria contained in Annex II of the Directive.

Despite a number of European Commission guidelines160 emphasising the need for simpler allocation rules and benchmarking, Member States have a wide margin of discretion in drafting their NAPs, and this has led to widely different allocation rules. Furthermore, allocating allowances for free, or at prices below the market price, constitutes State aid. Any form of State Aid creates an unfair advantage in trade and leads to competition distortion. A good discussion of the criteria for a non-distortive distribution of allowances is given in article by Ann Theo Seinen (2007) in DG Competition's Competition Policy Newsletter (2007).

All Member States decided to base the distribution of allowances in the first place on "expected needs". In order to do so, several Member States used estimates of expected needs at installation level. The main problem of this approach was in the very nature of the assessment to be made: it relies significantly on installation specific factors, in particular planned growth of output, which is difficult to verify in an objective manner. Some Member States instead of relying on individual esti-

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[159] http://www.wbcsd.ch/Plugins/DocSearch/details.asp?DocTypeId=270&ObjectId=MjYxNDQ&URLBack=%2Ftemplates%2FTemplateWBCSD2%2Flayout.asp%3Ftype%3Dp%26MenuId%3DNzQ2%26doOpen%3D1%26ClickMenu%3DLeftMenu

[160] http://europa.eu/scadplus/leg/en/lvb/l28012.htm

mates, based allocations on historical emissions. Usually, the historical data is used to distribute 'sector totals' which are established in another, non-discriminatory way with safe guard measures for minimising the risk of over-allocation. Risks of over-allocation were identified for the NAPs of the Netherlands and Poland (Seinen, 2007). An alternative to allocations based on expected needs consists in basing allocations on benchmarks, i.e. fixed emission levels per quantity of output. No Member State bases all its allocations on benchmarks, a few applied benchmarking only to the energy sector.

Many Member States proposed additional rules. Austria, Belgium and the Netherlands, e.g., applied a "reduction potential factor" based on individual assessments of the potential to reduce emissions. Others distinguished between process emissions and combustion emissions. Process emissions are intrinsically linked to the production process and cannot be reduced beyond certain levels determined by physical laws. Denmark, Greece and Sweden therefore applied a "compliance factor" close to one to process emissions and imposed a stricter compliance factor on combustion emissions.

Lastly in Phase I, only Denmark, decided to auction the maximum 5%, all other Member States auctioned less than 5% and thereby foregoing State revenues.

Table 45: Key Figures from Phase I (2005-2007) of the EU ETS for Selected Member States

Country	Number of Installations	Allocated allowances (1,000 EUAs)	Verified Emissions (kt CO_2)	Difference between allocation and verified emissions	
				Absolute	Relative
Germany	1,942	1,486,272	1,440,012	46,260	3%
Poland	869	712,659	622,384	90,275	15%
Spain	1,066	498,064	549,861	-51,797	-9%
EU - 27	**11,908**	**6,321,233**	**6,171,272**	**149,961**	**2%**

Source: EEA (2008). See Annex for a list of all Member States.

Verified emissions were higher than allocations in only a few Member States (in Austria in 2005, in Denmark and Slovenia in 2006 and 2007, in Greece in 2007, in Ireland, Italy, Spain and the United Kingdom for the whole trading period). By contrast, allocations exceeded verified emissions by more than 10 % and in at least one year in fourteen Member States, of which eight are EU-12[161] Member States. There is an apparent difference between EU-15 and EU-12 Member States. On average, EU-15162 operators allocated emissions allowances in amounts close to the verified emissions, whereas EU-12 operators, on average, allocated 14 % more than the actual emissions.

Allocations for the Cement Sector

For the Cement Sector, Phase I saw generous allocations in Eastern Europe, but less generous ones in the West in general, creating an unlevel playing field. The sector was over-allocated some 7.2% of CO2 emission quotas, representing a surplus of 12.1 million tonnes of CO2 in emission rights (as against a total of 168 million tonnes of CO2 in 2005 emitted by the EU25 cement sector)[163].Out of the 12.1 million extra tonnes in 2005, over half was held by German and Polish installations; the remainder of the over-allocations was awarded to cement installations in Belgium (1.2 million tonnes), the Czech Republic (0.8 million tonnes) and France (0.3 million) (ETUC, 2007).

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161 New Member States - Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia, Malta, Cyprus, Romania and Bulgaria.

162 Old Member States - France, Greece, Sweden, United Kingdom, Austria, Belgium, Finland, Germany, Ireland, Luxembourg, the Netherlands, Portugal, Denmark, Italy and Spain.

163 ETUC (2007) Climate Change and employment.

One of the weaknesses of the EU ETS allocation mechanism has been the inability to allow for growth. Setting the allocations on a historical baseline has meant that countries where the sector has been growing have been subjected to more competitive pressures. Cement consumption between 2005 and 2007 has been growing in Spain and Poland compared to Germany (Figure 33). This difference in the growth of the cement sector in the 3 Member States and the fact that Member States had a wide margin of discretion in drafting their NAPs led to varying levels of allowances shortages or surpluses. The allowance allocation, as a fixed bubble, provided additional income to cement producers in Germany where domestic demand was falling. Whereas in Spain, increased demand under a fixed allocation bubble led to a very small surplus.

Allocation for Cement producers in Germany and Poland exceeded verified emissions by 12% and 14% respectively (Table 46). In retrospect, Spanish cement producers were allocated allowances more or less in line with their expected emissions. Please see Annex for allowance shortages and surpluses by installation for each of the 3 Member States. Cement installations in Germany and Poland accounted for 5% of total national allocation compared to 17% for Spain.

Table 46: Allocation versus Verified Emissions for Cement Producers in Selected Member States

Country	**Number of Installations**			**Allocated allowances (1,000 EUAs)**	**Verified Emissions (kt CO_2)**	**Difference between allocation and verified emissions**	
	Total	Surplus	Short			Absolute	Relative
Germany	48	33	13	71,450	62,531	8,919	12%
Poland	11	8	3	33,979	29,141	4,838	14%
Spain	36	25	10	82,609	82,219	390	0.5%

Source: Europa Community Independent Transaction Log (CITL), Data processed by Cembureau; Note: The allocation of allowances above does not include new entrances. For Spain, the Phase 1 allocations for the cement industry was 85,106 thousands of tonnes CO2 (including new entrances) so the overallocation of allowances for Spain for that period was around 3 thousands of tonnes of CO2 (courtesy: Oficemen, Spanish Cement Sector Association).

7.3.4.3 Impact of Allowance Allocation on Competition Distortion

Table 45 and Table 46 suggest that not only cement producers enjoyed surplus allowances there were significant differences in the surplus allowances. This is clearly a cause for competition distortion. The existence of surplus allowances has also undermined the effectiveness of the EU ETS, as it neither provided economic incentives for emission reduction nor did it impose large costs on industry. The value of surplus allowances as a share of turnover also gives an indication of competition distortion (Table 47). This share was 4% and 2% in Germany and Poland respectively compared to 0% for Spain. Thus the over-allocation for cement producers in Germany and Poland can easily be interpreted as State aid [164] and provided an income advantage relative to producers in Spain. Falling cement consumption and fairly constant production levels (Figure 33) meant that Germany exported 25% of its domestic production compared to 3% in Poland and Spain (Table 41). Cement plants have to maintain a minimum operating capacity of around 80%. A plant would have to shut down if operating capacity fell below 80%. Thus, German cement producers had to export their cement output in order to keep their plants running.

Allowance surplus helps in protecting the domestic market from imports. It provides producers with more flexibility to deal with changing domestic market conditions. Producers can lower the price of cement in the domestic market due to the additional income from the surplus allowances.

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[164] The overalloation was apparent only after the first verified emissions were reported in 2006.

Table 47: Value of Surplus Allowance and Share of Turnover

	Turnover €bil, 2006	Value added €mil, 2004	Surplus allowance Value (€mil)		Surplus allowance value as a share of turnover (1yr)
			1 year	3 year	
Germany	1,119	13,235	45	134	4%
Poland	1,322	2,381	24	73	2%
Spain	5,110	10,116	2	6	0%

Note: Turnover from Eurostat, based on NACE DI265, Manufacture of cement, lime and plaster. Value added is given at factor prices from Eurostat for the non-metal mineral industry. Value of surplus allowance calculated by multiplying surplus allowances in Table 46 with allowance price of €15/tC as an average price for Phase 1[165].

The differences in NAPs and cement demand can hurt the competitiveness of Spanish cement producers who face growing demand for cement with increasing imports to fulfil it. In Spain imports as a share of national consumption was 25% compared to 5% in Germany and 4% in Poland.

7.3.5 Effect on Cement Companies

The European cement industry is heavily consolidated. The top five global players: Lafarge, Holcim, Heidelberg, Cemex and Italcementi account for total European sales of €26 billion in 2006. Lafarge is the market leader in Europe for cement, while Holcim and Cemex compete closely for second place. Together, these three companies account for some 70% of the turnover among the five companies. Having plants in a number of EU and non-EU Member States has allowed companies to transfer their allocations between countries without having to trade on the open market. Three of the five firms above appear to be balancing their allocation on an overall, or net basis. Heidelberg "does it on an individual country basis because CO2 has the same value in all countries". Cemex, meanwhile, is considering trading allowances between facilities or countries in the second phase[166].

Various analyses conducted by carbon investment funds indicate that the groups Lafarge, Holcim and Buzzi Unicem are coming out the winners of the over-allocations granted gratis by the States, thanks to their bases, which are largely provided with quotas in central Europe (ETUC, 2007). On the other hand, Italcementi and Cementos Portland seem to be the losers in the European ETS because of their strong exposure in Spain and in Italy, 2 countries which have to make serious efforts to achieve their Kyoto objectives, but which at the same time are the 2 biggest national producers of cement in Europe, buoyed up by sustained growth in the building/public works sector in those 2 countries (ETUC, 2007).

7.3.5.1 Differences in Implementation

The differences in implementation of the EU ETS arise due to a number of factors. The number of competent authorities (CAs) differs by Member States (MSs), which can increase the regulatory burden. Some MSs have only one CA while other can have 6 CAs. The implementation of the EU ETS is governed by law, regulation or ministerial order again differing by MSs. There are also differences in implementing the monitoring and reporting and verification guidelines of the Directive. These differences in implementation are discussed in the sub-sections 3.3.1 to 3.3.4 below.

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165 To calculate the value of the overallocation we have used the average of the allowance price for each year of phase 1 (2005 approximately 25€, 2006 approximately 18€ and 2007 approximately 1€). Courtesy: Oficemen, Spanish Cement Sector Association.

166 http://www.thestrategyworks.com/articles/cement_abatement.html

Competent Authorities

The administration of the Emissions Trading Directive follows the subsidiary principle to a differing degree in the Member States. As a result, it is not always clear to other Member States or the Commission which authority is responsible for which administrative task.

Typical tasks that are carried out by the competent authorities relate to: allocation; issue of permits; issue of allowances; monitoring and emission reports; registries; accreditation of verifiers; compliance and enforcement; use of Certified Emission Reductions (CER) and Emission Reduction Units (ERU); administration of the New Entrants Reserve (NER) and information provided to the public.

More than one competent authority is involved in the administration of the Emissions Trading Scheme in all Member States. Apart from the Environment Ministries, which often are responsible for tasks such as allocation, accreditation of verifiers or administration of the new entrants reserve (NER), one or several subordinate authorities are also involved. The highest number of competent authorities (six) has been reported by France, Lithuania, Poland, Romania and Spain.

It is not possible to ascertain as to how far the number of CAs leads to variation in cost of compliance due to data limitations.

Table 48: Number of Competent Authorities in Selected Member States

Country	Competent Authorities (CA)
Germany	Total CAs – 3: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), German Emissions Trading Authority (DEHSt) and Authorities responsible for the implementation of the Federal Emission Control Act (BImSchG) under Land law (central and local government environment agencies, district chief executives, trades offices)(Land authorities).
Poland	Total CAs – 6: Council of Ministers (RM), Minister of Environment (MŚ), National Administration of the Emissions Trading Scheme (KASHUE), Polish Centre for Accreditation (PCA), The body competent for issuing permits to take part in the trading scheme (starost) (county governor), or in the case of plants incorporating an installation which qualifies as an undertaking likely to have a significant impact on the environment, Accredited auditor/Regional Environmental Protection Inspector (A)
Spain	Total CAs – 6: Consejerías de las Comunidades Autónomas (CCAA), Administración General del Estado (AGE), La Autoridad Nacional Designada para los mecanismos basados en proyectos del Protocolo de Kioto (AND), Oficina Española de Cambio Climático (OECC), Comisión de Coordinación de Políticas de Cambio Climático de Cambio Climático (Órgano de coordinación entre autoridades competentes de la Administración General del Estado y las Comunidades Autónomas) (CCPCC), Grupo Interministerial de Cambio Climático (Órgano de coordinación entre autoridades competentes de la Administración General del Estado) (GICC) and Registro Nacional de Derechos de Emisión de Gases de Efecto Invernadero (RENADE) and y las 17 Consejerías de las Comunidades AutónomasAutónomas.

Source: EEA (2008)

Regulatory Instruments

Member States have implemented the provisions of the EU ETS Directive (Articles 4 to 6) in different ways to ensure compliance with the Directive. All reporting Member States listed at least six measures which can be used to enforce compliance by operators with their permits. Blocking of operator holding accounts, prohibition on selling allowances, spot or routine checks, naming and shaming of operators and the provision of reporting formats are the most commonly used measures in the EU. Verification bodies check compliance with permit conditions in all 27 Member States.

In Austria, Bulgaria, Cyprus, Estonia, Germany, France, Lithuania, Poland, Romania, Slovakia, Spain and the United Kingdom, cooperation between the concerned competent authorities is regulated by law, regulation or ministerial order. See Box 1 and Box 2 for a brief description of the regulatory instruments for implementing the EU ETS in Germany and Poland.

A high number of regulatory instruments can be perceived as a higher compliance burden for businesses. However, it is not possible to ascertain as to how far the difference or number of regulation instruments in Member States leads to variation in cost of compliance.

Box 1: Regulatory Instruments of the ETS in Germany

The German Emissions Trading Authority (DEHSt)[167] is the national authority entrusted with the implementation of emissions trading and project-based mechanisms of the Kyoto protocol. The European Emissions Trading Directive has been implemented in Germany through several laws[168]. Most important are the following acts:

- TEHG – Greenhouse Gas Emission Trading Act: presents the national implementation of the EC Emissions Trading Directive
- NAP – National Allocation Plan: defines the amount of emissions allowances, rules and norms for each trading period
- ZuG – Allocation Act: is designed for each trading period on basis of the NAP and defines the national quantity goals for GHG emissions and the rules for the allocation process.
- ZuV – Allocation Edict: contains specific clauses, which guide the calculation of the amount of the allowances and defines which evidences need to be proofed and how this will be monitored in coincide with the TEHG.

Box 2: Regulatory Instruments of the ETS in Poland

The Regulation of the Council of Ministers on 2 October 2007 amending the regulation on the adoption of a national allocation plan for carbon dioxide emissions for the period 2005-2007 provides the list of installations temporarily excluded from the emissions trading scheme in the period from 1 January 2005 to 31 December 2007.

- Decree of the Minister of the Environment of 6 March 2007 amending the Regulation on the types of installations covered by the ETS.
- Decree of the Minister of Environment of 10 April 2006 states the condi-

[167] http://www.dehst.de/EN/Home/homepage__node.html?__nnn=true

[168] http://www.dehst.de/cln_099/nn_476596/DE/Emissionshandel/Gesetze_20und_20Verordnungen/Gesetze_20und_20Verordnungen__node.html?__nnn=true&__nnn=true#doc476618bodyText10

tions and how to determine the costs of verification of annual reports.

- Decree of the Minister of Environment dated 7 March 2006 outlines the information required to draw up national allocation plan for the EU ETS.
- Decree of the Minister of the Environment of 6 February 2006 outlines the requirements for auditors to verify the authorized annual reports
- Decree of the Minister of Environment of 12 January 2006 outlines how the monitoring of emissions of substances should covered by the ETS
- Decree of the Minister of Environment of 13 September 2005. For the appointment of the National Administrator of Emissions Trading Scheme

Differences in Monitoring and Reporting Guidelines

Monitoring and reporting of emissions by operators and independent verification play a fundamental role in the trust placed in any emissions trading scheme. The monitoring methods to be used are normally specified in the greenhouse gas emission permits and are determined on the basis of the 'monitoring and reporting guidelines' (MRG)[169] by the relevant competent authorities in each Member State.

Several Member States provide some exceptions and (temporary) derogations from the MRG in their national laws. Germany allows 3 exceptions and temporary derogations from the MRG, Poland allowed one and Spain did not allow any (EEA, 2008).

The MRG recommends the use of 'Tiers' approach with different levels of accuracy for calculation of emissions. Tier 1 is the lowest level of accuracy and increasing numbering reflects increasing accuracy. MSs are obligated to use the highest tier unless this is not technically feasible or leads to unreasonably high costs. Fifteen Member States including Germany and Spain reported that lower tiers than those included in the MRG were applied during the Phase I reporting period. Spain quoted "no available accredited laboratories" as a reason for adopting lower than minimum tiers. Germany did not provide any reasons. Poland accepted tiers below the minimum level temporally in GHG permits, although there is no complete information about individual installations (EEA, 2008).

For 2007, all Member States submitted information on coordination of EU ETS reporting requirements with other reporting obligations. More than half of the reporting Member States coordinated reporting requirements under the Emissions Trading Directive with other reporting requirements (including Poland) or are planning and preparing to do so (eg. Spain). No coordination was reported in the Czech Republic, Germany, Greece, Hungary, Luxembourg, Italy, Portugal, Romania and Sweden.

Differences in Verification

As installations would profit from monitoring reports, which underestimate actual emissions and also to align monitoring made at different installations, independent verification of these reports is required. The Emissions Trading Directive and the 'monitoring and reporting guidelines' only regulate some fundamental requirements and aspects of the verification process; details are left to individual Member States.

[169] Commission Decision 2004/156/EC of 29 January 2004 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council, O.J. L 59/1 EN 26.2.2004.

Most Member States have implemented standards and procedures to ensure and improve the quality of the verification process. Nineteen Member States (including Germany and Poland) have developed specific national verification guidance. With the exception of Austria, Belgium (Brussels and Wallonia), Estonia, Hungary, Portugal, Slovakia and Spain, all Member States based their rules and procedures on the criteria for accreditation contained in the guidelines of the European Cooperation for Accreditation (EA 6/01 and EU 6/03) and the related EN 45011 (EEA, 2008).

The procedures of accreditation and mutual recognition of accreditation also differed in Member States. Five Member States (Austria, Italy, Latvia, Portugal and Sweden) reported that all verifiers had to be accredited or accepted through their national process, independent of prior accreditation. Five Member States (Germany, France, Lithuania, Spain and the United Kingdom) reported that verifiers could work without additional accreditation if prior accreditation was in accordance with the national legislation. Simplified procedures for verifiers already accredited in another Member State are in place in Belgium (Wallonia), the Czech Republic, Luxembourg, Poland and Romania.

Competent authorities of Germany, Poland and Spain carried out independent checks on verified reports.

7.3.5.2 Complimentary Member States Policies

Member States use different policy instruments to enforce the requirements of the European environmental regulation. A DG Environment study[170] found that the impact of the instrument in place in terms of environmental investments and improvements is influenced more by the context in which it is implemented than by the nature of the instrument. However, the potential divergence in consequences of using different instruments might disturb the level playing field for companies operating in several Member States to some extent. Moreover, companies with facilities in several Member States need to become acquainted with the different instruments (e.g. a trading system, or a bubble permit system) in a particular country, which potentially leads to additional costs. The study found that, for instruments introduced at a broader level, such as the European Emission Trading System, this potential disadvantage seems smaller, apart from the potential competitiveness effects regarding non-EU competitors.

The complimentary climate change policies in Member States might impose additional burden for companies but this cannot be used as a case for competition distortion with respect to the EU ETS. In many cases pre-existing Member State climate change policies can also give companies an advantage with the introduction of the EU ETS as the signals for developing the right technology were already there. Table 49 below lists some of the main domestic climate policy for the 3 Member States.

It is not possible to ascertain as to how far the number of domestic climate change related policies leads to variation in cost of compliance due to data limitations.

Table 49: Climate Change Related Policies in Member States for the Cement Industry

Country	Member State Climate Change related policies
Germany	**Climate Protection Investment from Sale of Carbon Allowances**[171] – The German government will allocate EUR 400 million from the sales of carbon allowances in the EU emission trading market for investment in low-carbon projects. The policy will fund projects related to: Technology Deployment and Diffusion, Technology Development, Energy Production, Renewable,

[170] Sectoral costs of environmental policy (December 2007), DG Environment http://ec.europa.eu/environment/enveco/industry_employment/pdf/sectoral_costs_report.pdf

[171] www.bmu.de/english/aktuell/4152.php

Country	Member State Climate Change related policies
	Multi-sectoral Policy, Emissions Abatement and Energy Efficiency. Climate Legislation Package Enacted under the Integrated Climate Change and Energy Programme - The German government approved a new climate package of measures in June 2008, that are a legal transposition of the Integrated Climate and Energy Programme, aiming at a carbon dioxide emissions reduction of 40 percent by 2020 compared to 1990 levels. The new legislative package focuses on the transport and construction sectors. This will indirectly affect the cement industry due to higher energy efficiency standards for buildings. Energy Efficiency Action Plan – On behalf of the Federal Government, the Federal Ministry of Economics and Technology (BMWi)[172] issued a national Energy Efficiency Action Plan in November 2007 line with the 2006 EU Directive on energy services and energy end-use efficiency. The plan sums up the results of the national energy summits, the energy efficiency actions of the Integrated Energy and Climate Change Programme and underpins the aims of the Coalition Agreement by reviewing the present energy efficiency policy and proposing and/or amending additional 32 energy efficiency measures covering all sectors. Integrated Climate Change and Energy Programme[173] – In August 2007, the Cabinet of the German government decided to implement the European policy decisions, as agreed in 2007 by, the European Council of heads of state and government, meeting under the German presidency, by way of an Integrated Climate Change and Energy Programme. This is a multi-sectoral policy focussing on emissions abatement and energy efficiency. The integrate climate and energy programme aims to cut greenhouse emissions by 40 per cent to 2020 compared with 1990 levels.
Spain	**Energy Saving and Efficiency Plan 2008-12**[174] – The Spanish government on 1 August 2008 approved the Spanish Industry Minister's 2008-2011 energy saving and efficiency plan announced two days earlier. The plan contains 31 recommendations aimed at reducing carbon dioxide emissions and saving EUR 4.14 billion in oil imports, or 47 million barrels per year over four years. The new plan will cover the transport, industrial, residential, tertiary and agricultural sectors. Energy Efficiency Action Plan 2008-2012 - In late 2007, the Spanish government released an Energy Efficiency Action Plan for 2008 to 2012 to assist with implementation of the Spanish Energy Efficiency Strategy (E4) 2004-2012. The action plan responds to the conditions of high external energy dependence, energy demand growing at a faster rate than GDP, the need for energy demand management tools and the importance and difficulty of complying with the 2010 target of 12% of energy being sourced from renewables. The plan provides for a range of measures in the following areas: agriculture and fisheries, industry, public services, households and offices,

172 www.bmwi.de/BMWi/Navigation/energie,did=223436.html

173 www.bmu.de/english/climate/doc/39945.php

174 www.mityc.es/en-US/Servicios/GabinetePrensa/NotasPrensa/comparecencia290708.htm

Country	Member State Climate Change related policies
	buildings, energy transformation, and transportation. Spanish Strategy on Climate Change and Clean Energy 2007-2012-2020 – this is related to the Energy Efficiency Action Plan. The strategy is focused on 198 measures and 75 indicators in order to reach an effective emission reduction in GHGs, related to energy and the accomplishment of Kyoto targets.
Poland	**Energy Efficiency Action Plan**[175] – In accordance with the requirements of the EC Directive on energy end-use efficiency and energy services, Poland submitted its National Energy Efficiency Action Plan in June 2007. The plan sets out an indicative target for energy savings of 9% in 2016 and an intermediate target of 2% in 2010. The proposed measures depend on market and budget financing and according to the principle of least cost. For industry, it proposed measures include promotion of high efficiency cogeneration (CHP), a system of voluntary undertakings in industry, the development of an energy management system and an energy audit system for industry. Current Polish Policy: Ecological policy of Poland for 2003-2006 taking into account prospects for 2007-2012. New Project: Ecological policy of Poland for 2009-2012 taking into account prospects for up to 2016. (This is document has been accepted by the Council of Ministers and now must be accepted by the Polish Parliament)

Source: IEA http://www.iea.org/textbase/pm/?mode=cc

Domestic policies to promote the use of alternative fuels in the cement industry

Use of waste materials in the cement industry, also referred to as co-processing, contributes towards achieving significant energy and emission savings. Co-processing is the substitution, in industrial processes, of primary fuels and raw materials with suitable waste materials. The characteristic of the cement production process allows co-processing of:

- alternative fuels, which have a significant calorific value (e.g. waste oils);
- alternative raw materials, the mineral components of which mean they are suitable for the production of clinker or cement (e.g. contaminated soil)
- materials that have both a calorific value and provide mineral components (e.g. paper sludge, used tyres)

Against this background the cement industry is faced with a number of important EU regulations. The EU ETS encourages the use of alternative fuels and biomass due to the low or zero CO2 content. Furthermore, when looking at the considerable variations – per Member States – in the percentage of alternative fuels (Table 50), the impact of the EU and national regulations and policies becomes apparent. The most obvious example is the waste policy in e.g. Germany and The Netherlands, which prohibits the land filling of organic waste such as sewage sludge. The effect, in this case, is favourable for the use of alternative fuels in the cement industry, as in the case of Germany compared to Spain and Poland (Table 50).

175 www.ec.europa.eu/energy/demand/legislation/end_use_en.htm

Table 50: Use of Alternative Fuels in the Cement Sector by Member State

	Rate of Substitution (%)
Netherlands	83
Switzerland	48
Austria	46
Germany	42
Norway	35
France	34
Belgium	30
Sweden	29
Czech Rep.	24
EU average	**12**
Japan	10
USA	8
Australia	6
United Kingdom	6
Denmark	4
Hungary	3
Finland	3
Italy	2
Spain	1
Poland	1
Ireland	0
Portugal	0
Greece	<1

Source: WBSCD

The use of biomass or alternative fuel has an impact on CO_2 per tonne of cement produced. This means that a producer is able to reduce their direct carbon compliance cost by using more alternative fuels. Thus, domestic policies, which directly or indirectly create barriers to the use of alternative fuels can lead to competition distortion. The size of the distortion also depends on the level of competition from other sectors such as transport and Pulp and Paper, which also use alternative fuels (eg. bio mass).

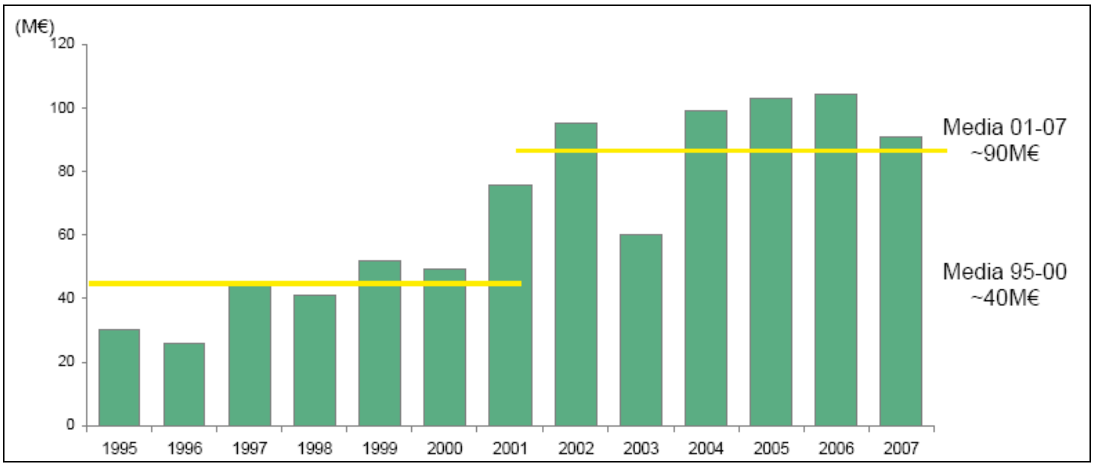
7.3.5.3 Differences in Cost of Internalisation due to Environmental Policy

Data on environmental expenditure provides us with an indication of the level of internalisation of the costs of environmental policy. Even though there is data on environmental investments and expenditures for some of the main industrial sectors by Member States (DG Environment, 2007), it is difficult to identify the separate effects of one Directive or environmental regulation on the investment decisions and the expenditures of the companies. The DG Environment (2007) study undertook a number of surveys and case studies to show the impact on sectoral costs of environmental policy. Their analysis found that it is not possible to 'extract' one driving factor out of the complex interplay of regulation at different levels, implementing policy instruments, business cycles and strategic considerations of companies.

The EU ETS is intended to internalise the cost of carbon. Industry complaints for the high cost of complying with the EU ETS cannot be considered as case for competition distortion unless certain industries are disproportionately penalised. This is a function of the allocation mechanism already discussed in Section 3.2. Furthermore, the surplus in allocation for the cement industry suggests that any form of internalisation was not required.

However, some correlation can be made between the environmental expenditure in general in the cement industry and unilateral Member State Climate Change policy (Section 3.4 above). Eurostat has data only on the environmental expenditure for the non-metal sector, which includes cement, glass and ceramics. We were able to obtain cement sector investment in environmental improvements from the Spanish cement sector association 'Oficemen'. There has been a substantial increase in environmental investment in recent years in the Spanish cement sector, with more than more than €870 million invested since 1995 (Figure 36). The main reason is that Spanish cement plants had to abide by the environmental national law in 1975 and in 8 years they had to be adapted to the European Law which implied higher investments requirements. This meant that environment investments in Spanish cement plants were concentrated in 8 years. The favourable market conditions allowed the industry to invest in the required environmental investments. The increase in environmental improvements can also be partly attributed to the EU ETS, increasing stringency in other climate change related EU and Spanish policies, high energy prices and increasing competition from cement companies in other EU countries.

Figure 36: Evolution of the Spanish Cement Sector Investment in Environmental Improvements

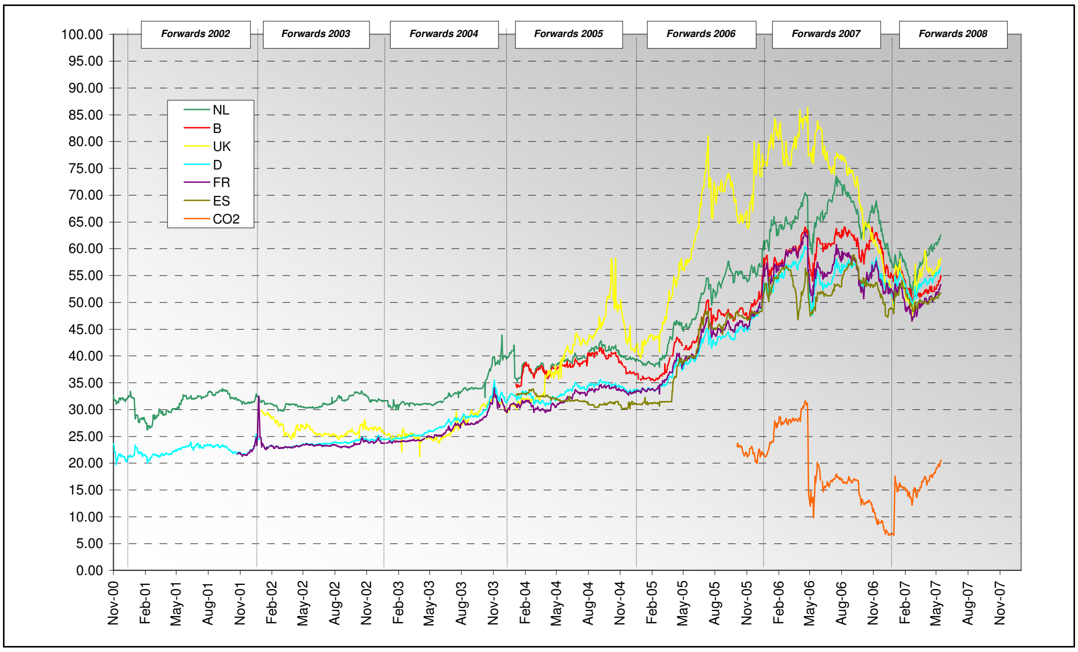


Source: Oficemen

The share of environmental expenditure in value added in the non-metal mineral sector in Germany, Poland and Spain was 2.7%, 1.9% and 1.8% respectively in 2004[176]. The higher share of environmental expenditure could be explained by the higher number of Climate Change policies in Germany compared to Poland and Spain (see Table 49) as they are both positively correlated.

Another reason for industry complaints due to the EU ETS has been the increase in electricity prices in the last 5 years. Electricity prices in most Member States have increased more than 150% since 2002 (Figure 37). There are a number of reasons for this though EU ETS allowance price has been a significant factor in the last four years. One of the main reasons is that there is no single EU electricity market, but several market and regulatory frameworks across the EU[177].

Figure 37: Differences in EU Electricity Prices (€/MWh)



Source: Platts

Secondly, many other factors affect generation prices such as high natural gas prices in 2005 or the potential use of market power by electric utilities. The European Commission published its final report, January 10, 2007, on the energy sector competition inquiry, concluding that consumers and businesses are losing out because of inefficient and expensive gas and electricity markets. Particular problems include high levels of market concentration; vertical integration of supply, generation and infrastructure leading to a lack of equal access to, and insufficient investment in infrastructure; and, possible collusion between incumbent operators to share markets.

Lastly, end-user prices are a mix of various market prices and differ between end-user categories (e.g., energy-intensive users, small enterprises, residential, etc.). The electricity costs faced by industrial energy users relate very differently to the prices observed on electricity markets as this depends on the industry's power purchasing strategies.

The increase in European wholesale electricity prices has entirely incorporated the ETS related carbon costs. The main reason for this is that power producers are able to charge the value of their CO2 allowances, including the vast majority they (90%) received for free, as an 'opportunity cost' into the

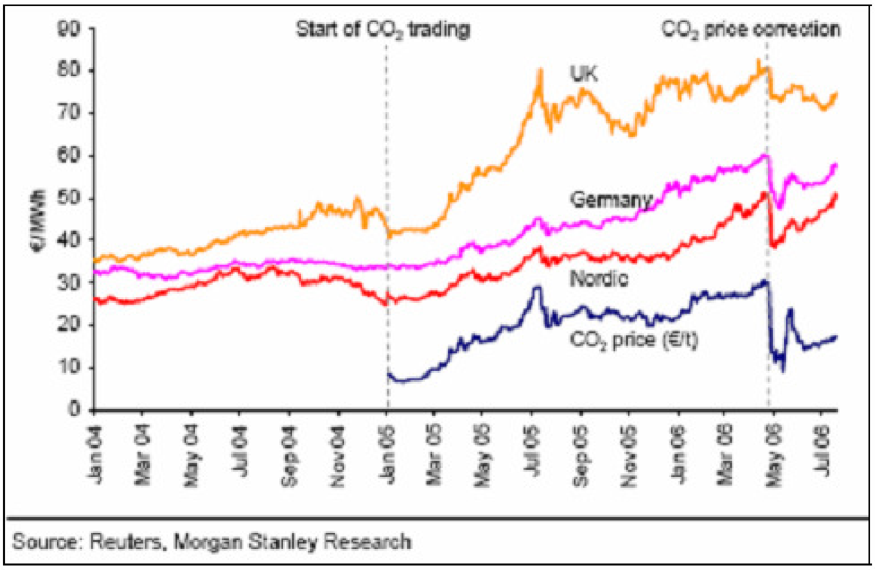
176 http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136239,0_45571447&_dad=portal&_schema=PORTAL

177 http://www.iea.org/textbase/papers/2007/jr_price_interaction.pdf

power price. In several European countries, a strong correlation between CO2 prices and electricity prices has been shown – as shown in Figure 38.

Whether or not the full opportunity cost of such free allowances finds its way to end-user electricity prices depends on several elements including: contractual agreements between suppliers and end-users, regulatory frameworks, but also the elasticity of demand and the rules used by governments to allocate EU allowances. Since all these factors can differ by member state, there is a possibility that the cost-pass through and the end-user electricity price could also differ by Member State.

Figure 38: Electricity and CO2 Prices between January 2004 and July 2006



Source: Cartal, 2006 sourcing Morgan Stanley

A report by DEFRA/DTI (2006)[178] clearly highlighted that electricity generation is a large net beneficiary of the EU ETS because of its ability to, at least partially, pass through the marginal cost of allowances and its free allocation. It also concluded that the pass-through of allowance costs has important knock-on effects for other industrial sectors. Given that base load prices and pass through ability of electricity generators might differ by Member State, this could lead to competition distortion. However, this can only by verified by company level data as electricity prices can be different for different sectors in one country and could also differ for companies within a sector. Thus, it is not been possible to quantify this distortion for the cement industry in the 3 Member States.

Theoretically, allowance price should ensure equal marginal cost but free (and over) allocations distort the signal from the carbon price. Markets get distorted as polluting industries are effectively subsidised. Which is why auctioning is superior and the impact assessment on the review of the EU ETS clearly presents this case[179].

7.3.6 Summary and Conclusion

7.3.6.1 Main findings

The study identified the following impacts of the EU ETS on competition distortion for the cement industry in 3 Member States:

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178 Competitiveness impacts of the EU ETS: A comprehensive literature review, a report prepared for DEFRA/DTI, May 2006. Frontier Economics.

179 http://ec.europa.eu/energy/climate_actions/doc/2008_res_ia_en.pdf

- There is evidence to show that the way the EU ETS is implemented using the allocation mechanism in Phase I and differing levels of growth in the cement sector led to competition distortion. The value of surplus allowances as a share of turnover in 2006 was significant for Germany (4%) and Poland (2%), compared to 0% for Spain. These allowances provided significant monetary benefits with significant differences across the 3 Member States. This advantage is very likely to affect trade and can also be argued as a form of State aid.
- The cement companies have also been affected differently, depending on the geographical location of their installations. Companies with installations in Central and Eastern Europe in general, with some exceptions (eg. Germany), have benefited more from the difference in Member Sate NAPs compared to companies with installations in Western Europe.
- There are significant differences in the way the EU ETS is implemented in Member States. There are differences in the number of competent authorities, permitting procedures and monitoring, reporting and verification guidelines. This suggests that cement producers could potentially face different costs for regulatory compliance. However, it has not been possible to quantify these cost differences.
- The over-allocation suggests that no internalisation was required for the cement producers in the 3 Member States. However, there are differences in environmental expenditure as a share of valued added in the non-metal mineral sector for Germany (2.7%), Poland (1.9%) and Spain (1.8%). At a general level greater environmental expenditure corresponds to a greater level of internalisation. This share correlates positively with the number of domestic climate change policies in the 3 member states. This might suggest that Germany's advantages from excess allowances may be somewhat balanced by its increased national requirements.
- Differences in domestic waste policies have led to significant differences in the use of alternative fuels in the cement industry in the 3 Member States. This can cause competition distortion as higher rates of substitution by alternative fuels can reduce the direct carbon cost of complying with the EU ETS. However, it has not been possible to quantify these cost differences.
- Another factor for competition distortion is attributed to the increase in electricity prices due to the EU ETS. Though there is evidence to show that the increase in electricity prices differ by Member State due to base load prices, cost pass through ability and other market factors, it is not possible to compare prices for cement producers in the 3 countries due to individual supplier contracts and purchasing strategies.

7.3.6.2 Options for Change - Next steps of the EU ETS

The first phase of the EU ETS provided a very important platform for setting up a multi-national emission-trading scheme. It also set up the necessary infrastructure for monitoring, reporting, verification including registries and has so far successfully concluded two compliance cycles. It developed into the world's largest single carbon market accounting for 67% in terms of volume and 81% in terms of value of the global carbon market[180] and also worked as the driver of the global credit market and in that triggered investments in emission reduction projects today indirectly linking 147 countries to the EU ETS through JI/CDM projects.

However, the environmental benefits of the Phase 1 has been limited due to excessive allocation of allowances in some Member States and some sectors, which must mainly be attributed to reliance

[180] The World Bank, State and Trends of the Carbon Market, May 2007

on projections and a lack of verified emission data. Once such data became available, it has corrected the market price of allowances demonstrating that the carbon market is working.

The principles and mechanisms resulting in problems during the 1st trading period recurred in most 2nd phase National Allocation Plans (NAP) of Member States. However, thanks to verified emission data and experience gathered, the Commission could much better ensure that national allocation plans result in real emission reductions. Approved NAP decisions show an absolute emission reduction of 6.5% compared to 2005 verified emissions, thus ensuring that the EU ETS, designed as a cap-and-trade system, will deliver real emission reductions[181].

Cembureau's position papers suggests that the EU ETS is ineffective in that it focuses on carbon reductions in Europe when climate change is "a global problem", to which the EU ETS is an attempt to find "a European solution". The risk is that, if the carbon price does rise as anticipated during Phase II, the scheme will act as a cap on cement production within Europe. It might then become economical to import cement or clinker from outside the EU, which would defeat the very object of the EU ETS. Many of the cement producers state that this is not their intention, but say it might be the only option in a worst-case scenario. The irony is that overall emissions could actually increase, because of those resulting from transporting cement or clinker or due to 'carbon leakage'.

An obvious solution is to change the way the EU ETS operates for the European cement industry, and rethink the grandfathering approach for allowance allocation. Cembureau, along with most of the cement producers favours a worldwide benchmarking approach instead of grandfathering. This would establish an emissions intensity benchmark, based on best practice, against which performance would be measured. As benchmarking is performance-related, it rewards efficient operation. This is the opposite of the grandfathering approach, which, by allocating permits based on previous activities, can reward the heaviest polluters and penalise cleaner producers.

For European Commission experience of the 1st period and the NAP assessment of the 2nd period gave strong reason to believe that the overall functioning of the EU ETS could be improved in a number of aspects. On 23 January 2008, the Commission adopted a proposal designed to amend the current EU ETS Directive (Directive 2003/87/EC). The proposal182 represents the outcome of discussions on the review of the Directive, as required by Article 30 and COM (2006)676 final which sets out the terms of reference for the review.

The amendment is intended to harmonise the allocation mechanism by setting an EU-wide community allocation scheme instead of Member State national allocation plans. Auctioning would be the basic principle for allocation. It proposes full auctioning as the rule from 2013 onwards for the power sector and carbon capture and storage. In order to encourage a more efficient generation of electricity, electricity generators could however receive free allowances for heat delivered to district heating or industrial installations.

For other sectors covered by the Community scheme, a transitional system is foreseen starting with free allocation at a level of 80% of their share in the total quantity of allowances to be issued, decreasing by equal amounts each year, arriving at zero free allocation by 2020. Transitional free allocation to installations would be provided for through harmonised Community-wide rules ("benchmarks") in order to minimise distortions of competition with the Community.

The amendment also proposes to link with other emission trading systems to build a global carbon market.

These measures should reduce the level of competition of distortion experienced in the first Phase of the EU ETS.

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[181] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0016:FIN:EN:PDF

[182] Ibid

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Aniceto Zaragoza Ramírez, Director General, Oficemen

Dr. Martin Schneider, Chief Execuvite, BDZ (Bundesverband der Deutschen Zementindustrie)

Annex

Table 51: Total EU Allocated Allowances and Verified Emissions

	Number of installations	Allocated allowances (1 000 EUA)			Verified Emissions (kt CO_2)			Difference between allocation and verified emissions (%)			
		2005	2006	2007	2005	2006	2007	2005	2006	2007	2005–2007
Austria	216	32 413	32 649	32 649	33 373	32 383	31 751	– 3	1	3	0
Belgium	341	58 310	59 952	60 429	55 363	54 775	52 795	5	9	14	10
Bulgaria	0	–	–	0	–	–	0	–	–	n.a.	n.a.
Cyprus	13	5 471	5 612	5 899	5 079	5 259	5 396	8	7	9	8
Czech Republic	414	96 920	96 920	96 920	82 455	83 625	87 835	18	16	10	15
Denmark	399	37 304	27 908	27 903	26 476	34 200	29 407	41	– 18	– 5	3
Estonia	50	16 747	18 200	21 344	12 622	12 109	15 330	33	50	39	41
Finland	626	44 666	44 618	44 620	33 100	44 621	42 541	35	0	5	11
France	1 100	150 412	149 967	149 776	131 264	126 979	126 635	15	18	18	17
Germany	1 942	493 482	495 488	497 302	474 991	478 017	487 004	4	4	2	3
Greece	153	71 162	71 162	71 162	71 268	69 965	72 717	0	2	– 2	0
Hungary	254	30 236	30 236	30 236	26 162	25 846	26 837	16	17	13	15
Ireland	121	19 237	19 238	19 240	22 441	21 705	21 246	– 14	– 11	– 9	– 12
Italy	1 044	216 150	205 050	203 255	225 989	227 439	226 369	– 4	– 10	– 10	– 8
Latvia	102	4 070	4 058	4 035	2 854	2 941	2 849	43	38	42	41
Lithuania	110	13 499	10 577	10 318	6 604	6 517	5 999	104	62	72	80
Luxembourg	15	3 229	3 229	3 229	2 603	2 713	2 567	24	19	26	23
Malta	2	2 086	2 167	2 286	1 971	1 986	2 027	6	9	13	9
Netherlands	405	86 452	86 388	86 477	80 351	76 701	79 875	8	13	8	9
Poland	869	237 558	237 558	237 543	203 150	209 616	209 618	17	13	13	15
Portugal	265	36 909	36 909	36 909	36 426	33 084	31 226	1	12	18	10
Romania	244	–	–	74 343	–	–	69 605	–	–	7	7
Slovakia	190	30 471	30 487	30 487	25 232	25 543	24 517	21	19	24	21
Slovenia	99	9 138	8 692	8 246	8 721	8 842	9 049	5	– 2	– 9	– 2
Spain	1 066	172 161	166 186	159 717	183 627	179 700	186 534	– 6	– 8	– 14	– 9
Sweden	763	22 289	22 484	22 846	19 382	19 889	15 348	15	13	49	24
United Kingdom	1 105	206 072	206 005	215 875	242 515	251 151	256 569	– 15	– 18	– 16	– 16
EU-27	**11 908**	**2 096 444**	**2 071 741**	**2 153 048**	**2 014 017**	**2 035 608**	**2 121 647**	**4**	**2**	**1**	**2**
EU-25	11 664	2 096 444	2 071 741	2 078 704	2 014 017	2 035 608	2 052 042	4	2	1	2
EU-15	9 561	1 650 248	1 627 234	1 631 391	1 639 169	1 653 323	1 662 586	1	– 2	– 2	– 1
EU-10	2 103	446 196	444 507	447 314	374 848	382 284	389 457	19	16	15	17
EU-2	244	–	–	74 343	–	–	69 605	–	–	7	7

Source: EEA (2008)

Figure 39: Allowance shortages and surpluses for all cement installations, Phase 1, Germany (Difference between allocated and verified emissions)

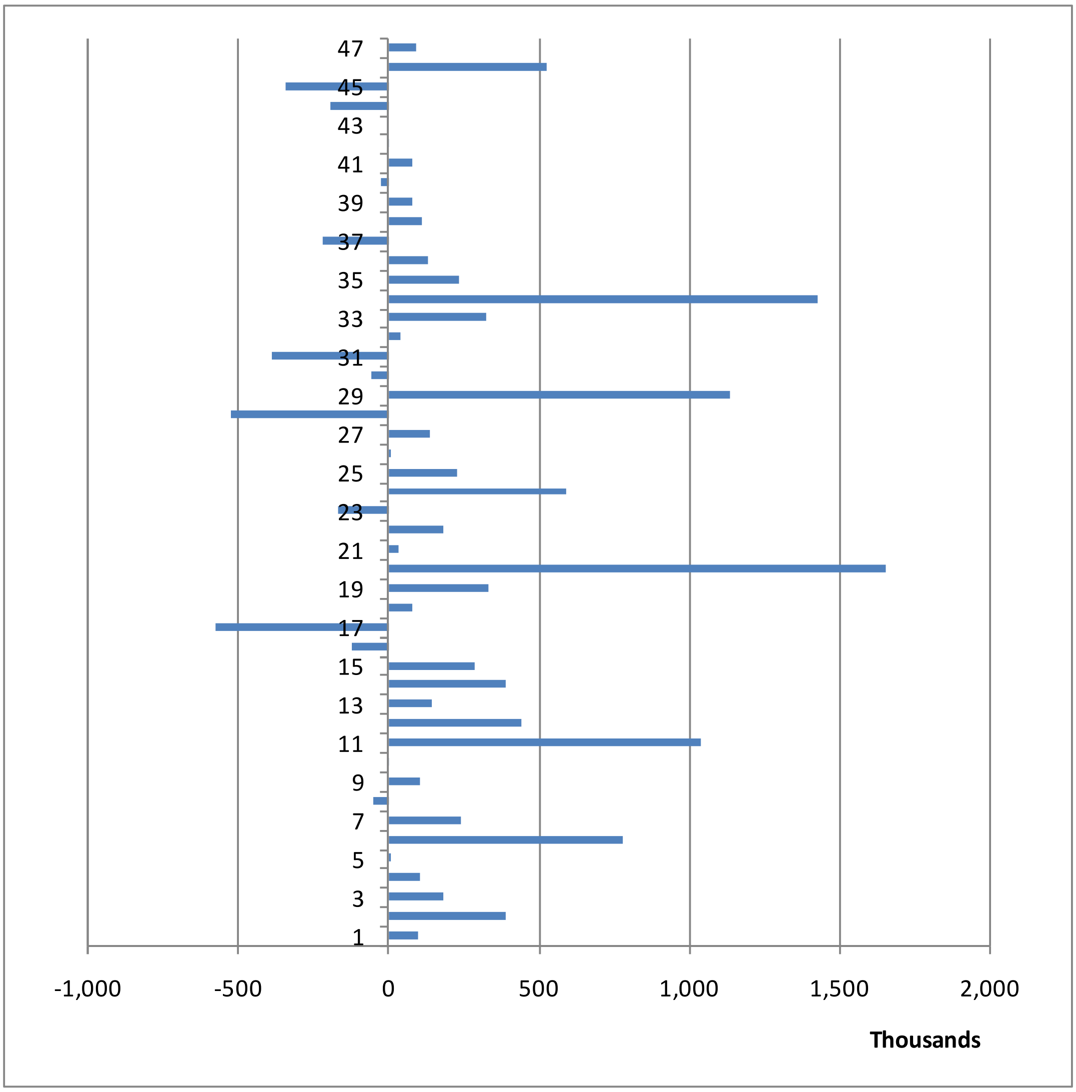
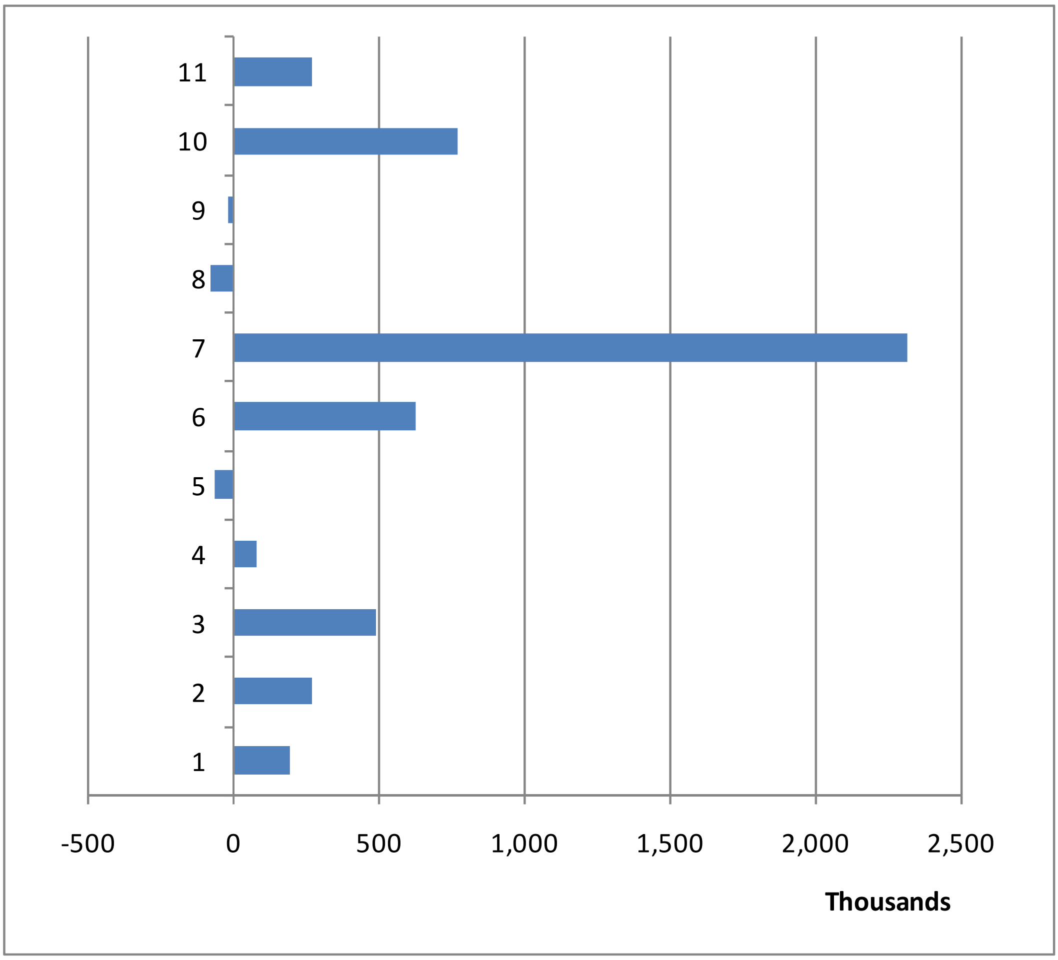
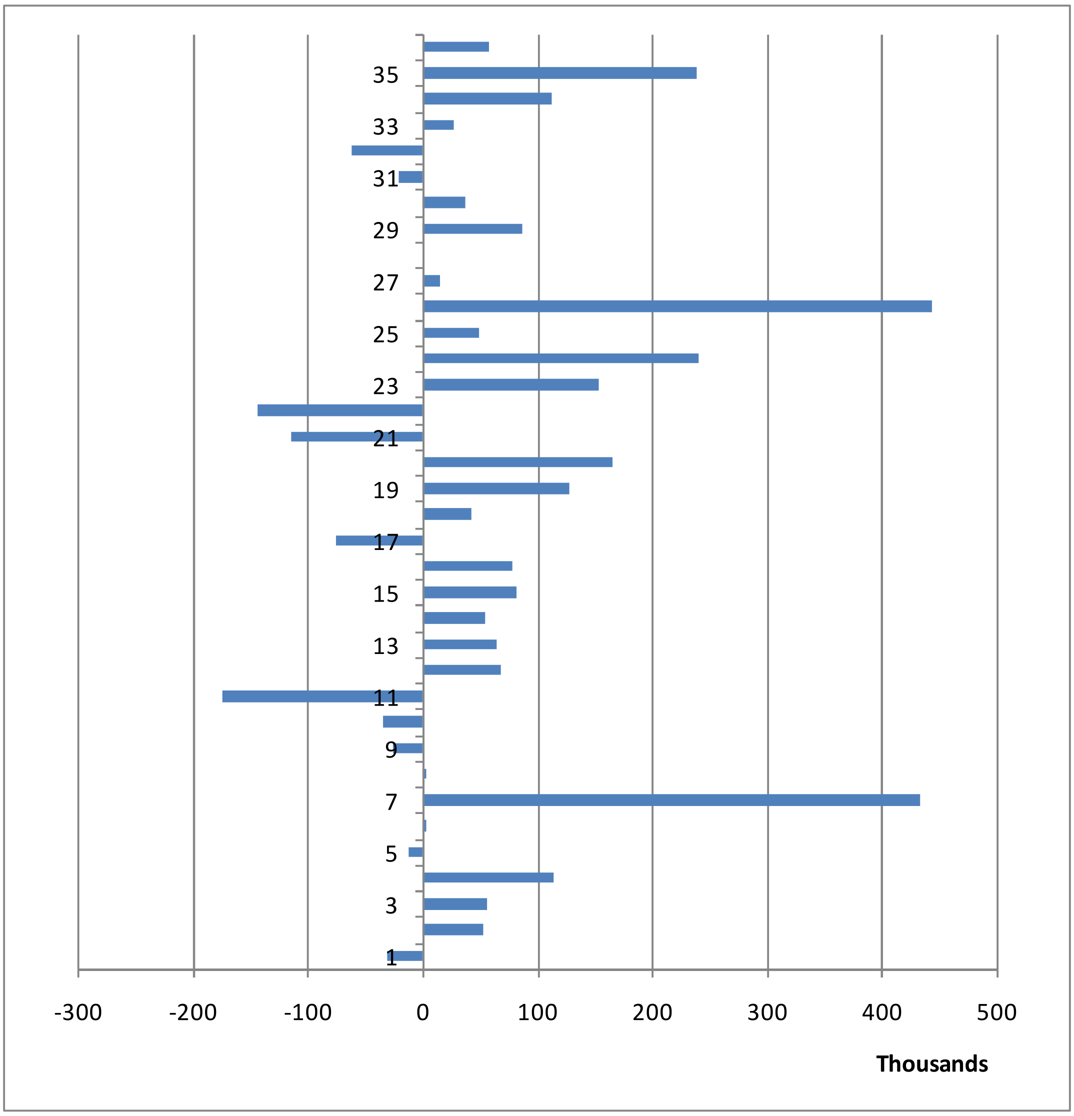


Figure 40: Allowance shortages and surpluses for all cement installations, Phase 1, Poland (Difference between allocated and verified emissions)



Source: Europa Community Independent Transaction Log (CITL), Data processed by Cembureau

Figure 41: Allowance shortages and surpluses, Phase 1, for Spain (Difference between allocated and verified emissions)



Source: Europa Community Independent Transaction Log (CITL), Data processed by Cembureau

7.4 *The WEEE Directive and the European Single Market*

By Stefan Werland – FFU

7.4.1 Summary

The study examines effects of the WEEE Directive on the European Single Market. The Directive was adopted in 2003 and is currently under review. Member States are given leeway when transposing the directive. This includes the organisation of compliance systems. From an environmental economic perspective, the study finds that the directive eliminated existing market distortion: some EU Member States had already introduced WEEE regulations before the Directive came into force while others did not have such regulations. This led both diverging *costs of internalisation* and *costs of regulation* for the use of the environment across the Member States. Potentially, the pre-existing regulation would have imposed trade barriers on either electronic goods or on end of life products of this kind. Thereby, the directive has contributed to the functioning of the European Single Market. Although the WEEE Directive provided common minimum requirements, market distortions remain, although they were much smaller which now stemmed from *costs of regulation* – mainly from different transaction costs and from diverging costs for treatment operations. The Commission's proposal for a renewed WEEE Directive which was published in December 2008 would partly repeal these problems. It introduced a higher degree of standardisation by providing for harmonized reporting requirements and standardised definitions, but still left the main source of cost divergences – the choice between different compliance systems – to the Member States.

7.4.2 European Policy

7.4.2.1 The WEEE Problem

Waste electrical and electronic equipment (WEEE) is the fastest growing waste stream in the European Union (EU). According to various estimations, it is growing three times faster than municipal waste (Ökopol et al.). A total of 10.3 million tonnes of Electrical and Electronic Equipment (EEE) is sold in the EU each year and according to estimates from 2005, WEEE arising amounts to a total of 8,3 to 9,1 million tonnes per year. By 2020 it is expected to grow to 12,3 million tonnes (CEC 2007/IA/17). On average, every individual in one of the EU-15 Member States each year discards 14-24 kg of WEEE. Improper or substandard treatment of WEEE creates environmental harm, especially through the release of hazardous substances. In 2006, some 90% of WEEE in the EU was still disposed without adequate treatment (DG Joint Research Centre: 1).

EEE as a product group is extremely diverse and characterized by rapid innovation cycles. Large household appliances, such as washing machines, stoves, and fridges, make up a huge share of the domestic WEEE relative to its total weight. Considering the total number of products discarded large household appliances account for only 16%. Consumer equipment, such as TVs, videos, and hi-fi sets, contribute almost 13% of the total. TVs make up most of the weight in this category. The remaining 10% of domestic WEEE consists of information- and communication technology (ICT), tools, toys, monitoring and control equipment, and lighting.

The amounts of WEEE that is collected and treated vary according to sector and country (Table 6). According to estimations by UNU, 25% of WEEE from medium sized appliances is collected and treated while the rates for larger appliances are at 40%. Targets of 75% for large and 60% for medium appliances are reachable according to assessments done by UNU (UNU 2007).

7.4.2.2 *The WEEE Directive*

In 1996, WEEE was identified as a primary waste stream by the European Parliament[183] (EP). The EP asked the Commission to work out a proposal for the management of WEEE. According to the EP, the proposal was to be based on the principle of producer responsibility.[184] Since the second half of the 1990s, several Member States had either enacted or announced their own national regulation. In 1998, shortly before the Commission presented its proposal, Germany, the Netherlands, Denmark and Sweden had national regulations. Finland, France, Austria and UK were waiting for a European regulation. Italy had announced a compulsory regulation for 1999 if the industry did not implement an own system of collection. France and Austria negotiated agreements with the industry. Other countries (Greece, Ireland, Portugal) had not taken initiatives at all. Overall, the picture was quite disperse and according to the differences in regulatory standards, the costs for collection and recycling varied considerably between the Member States (European Parliament 1998). On this background, the European Commission developed a proposal for more uniform standards. The Directive on Waste Electrical and Electronic Equipment (2002/96/EC; WEEE Directive) was adopted on 27 January 2003. It entered into force on 13 February 2003. Member States were required to transpose the Directive by 13 August 2004.

It aims at increasing the reuse, recycling, and other forms of recovery of such waste. Member states are to "strive to set up efficient collection schemes" in order to "minimise the disposal of WEEE as unsorted municipal waste and to achieve a high level of separate collection of WEEE" (WEEE Directive, (16)).

The WEEE Directive is complemented by Directive 2002/95/EC on the Restriction of the use of certain Hazardous Substances (RoHS) in electrical and electronic equipment. The RoHS Directive has been separated from the WEEE Directive: While the RoHS Directive must be applied without changes (as it is based on Article 95 EC Treaty), the WEEE Directive is based on Article 175 EC Treaty and follows a minimum requirements approach: Since the WEEE Directive uses environmental protection as legal basis, Member States have discretion to go beyond the requirements of the Directive and are free to apply stronger regulations.

The study will investigate into the effects of the WEEE Directive on the European Single Market. It will not assess its effectiveness in terms of solving environmental problems. These issues are dealt with in length in the mentioned impact assessments (Ökopol et al., DG Joint Research Centre, UNU).

The WEEE Directive has been chosen as a case study since Member States have significant flexibility in the transposition of the Directive. This possibly leads to diverging cost structures for producers of electrical and electronic equipment across Member States. The WEEE Directive explicitly states that "in particular, different national applications of the producer responsibility principle may lead to substantial disparities in the financial burden on economic operators" (WEEE Directive (8)). Thus, the study first explores whether the transposition of the WEEE Directive in its recent form led to competition distortions in the European Single market.

Second, since treatment of WEEE was not standardised in the EU before the Directive came into force, it will be determined whether the directive led to a removal of an existing market distortion. Since some Member States (e.g., Sweden) had introduced take-back regulations for Electronic and Electrical Equipment before the enactment of the European regulation, the directive explicitly aims at removing "substantial disparities in the financial burden on economic operators" across the Member States (WEEE Directive (8)).

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[183] Resolution of 14 November 1996, Official Journal of the European Communities, 2.12.1996, p.241

[184] Cf, WEEE Directive, (5).

Third, the study estimates whether a more uniform European approach would be likely to abolish possible – remaining or newly created – competition distortions. For this purpose, the proposal for a renewed WEEE Directive which was issued by the European Commission in December 2008 will be considered. Thus, the study will also determine whether the identified market problems are resolved under the new proposal.

The study focuses on possible impacts of the WEEE Directive on the single market, it does not aim to perform an overall evaluation of the directive. The directive is chosen as an exemplary case for European regulation with a considerable variation in the Member State implementation.

7.4.2.3 Review process and new proposal

The WEEE-Directive is currently under review. After the impact assessment and a number of assessment studies (Ökopol et al., DG Joint Research Centre, UNU)[185] were conducted, the Commission published a proposal for a revised directive in December 2008. The proposal entails some major changes in order to harmonise implementation and to lower the administrative burden for producers and administrations. The review is part of the Commission's better regulation and simplification strategy[186].

7.4.2.4 Pre-existing Market Distortion?

Basically, market distortions are situations where producers from different Member States compete on the same market and under different conditions. As pointed out in Chapter 5, from an environmental economic perspective, a perfectly undistorted market would exist in a situation where all external costs for the use of environmental resources are internalised and all competitors bear the same costs for the use of the environment. A competition distortion is a situation "in which the internalisation of environmental externalities and resulting internalisation costs differ" (p. 88). On the other hand, environmental policy also might worsen existing or even create new competition distortions. The study focuses on situations where differing transpositions of an EU policy may lead to differences in costs for economic actors across the European Union. In this respect, the study distinguishes between costs arising from internalisation (e.g. from the mandatory acquisition of new technical equipment) and the cost of regulation (e.g. transaction costs associated with a policy instrument, e.g. reporting obligations).

Some Member States (Belgium, the Netherlands, and Sweden) had already introduced national collection targets and producer responsibility schemes before the Directive came into force. Accordingly, in these countries, costs for the use of environment (as sink for disposal) were to a certain extent already internalised, and economic actors faced transaction costs from a specific environmental policy. For example, the DG Joint Research Centre report estimated costs resulting from the Swedish WEEE regulation in 2002 to be €0.47 per kg, with producers providing for an reserve of ca. €9 Mio to ensure the operation of the take back scheme (DG Joint Research Centre: 144). At the same time, other Member States had not introduced such fees. Hence, since comparable costs were not to be found on other markets, costs for the use of environment (as sink for WEEE) diverged across Member States – what constituted a competition distortion in environmental economic terms.

7.4.2.5 Affected Industry

The scope of the WEEE Directive is very broad. EEE in Article 3(a) is defined as: "equipment which is dependent on electric currents or electromagnetic fields to work properly and includes equipment

[185] The studies can be found at http://ec.europa.eu/environment/waste/weee/studies_weee_en.htm

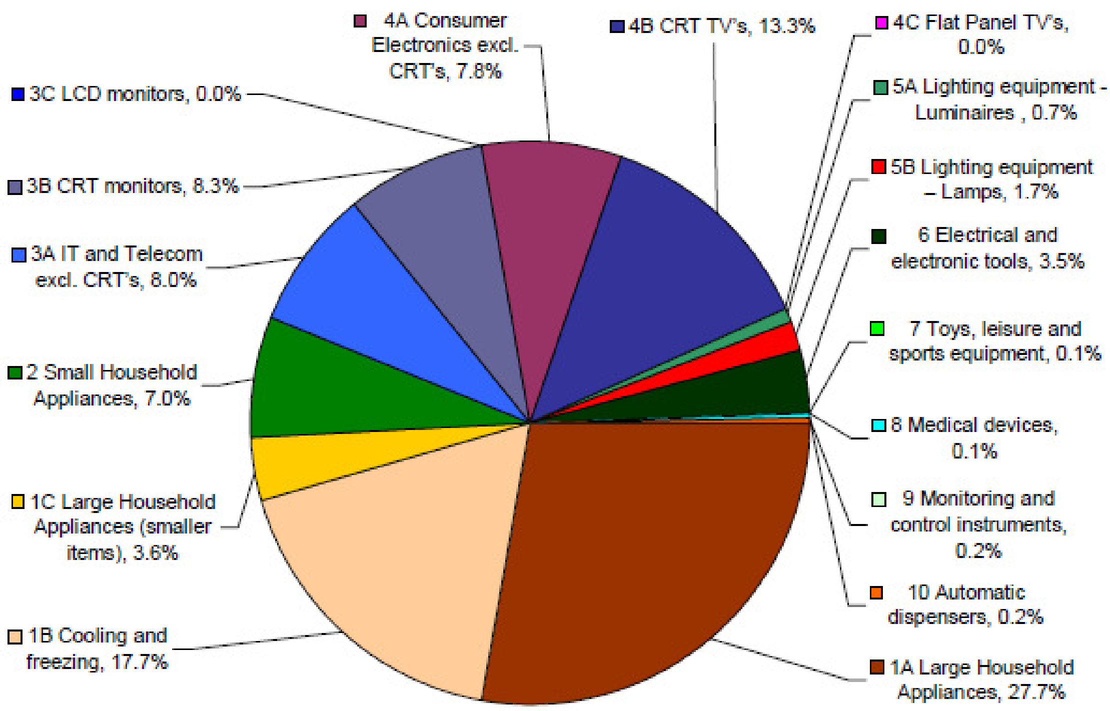
[186] COM (2005) 535 final:
http://europa.eu.int/comm/enterprise/regulation/better_regulation/simplification.htm

for the generation, transfer and measurement of such currents and designed for use with a voltage rating not exceeding 1000 volts for alternating current and 1500 volts for direct current."

Although domestic economic actors are mentioned in Article 1 of the Directive ("operators involved in the life cycle of electrical and electronic equipment, e.g. producers, distributors and consumers and in particular those operators directly involved in the treatment of waste electrical and electronic equipment"), producers remain the main target group and ultimately are held responsible for their products (principle of extended producer responsibility, EPR).

According to the Directive (Art.3 (i)), a producer is any person who manufactures, sells or re-sells products under his own brand or who imports or exports EEE on a professional basis (this broad definition has not been taken over into all Member States transpositions). Although they are mentioned in Art.1, the WEEE Directive does not make treatment operators or other downstream actors responsible for the fulfilment of the given targets.

As the classification in product categories provided in Annex 1 of the Directive (Tab.1) demonstrates, the scope of affected industries is quite diverse, ranging from producers of large household appliances such as washing machines, stoves, and fridges to producers of smaller household appliances and consumer equipment such as TVs, videos, and hi-fi sets. Producers of IT/telecommunications equipment, tools, toys, monitoring and control equipment, and lighting are also affected.



Graph 1: Breakdown of WEEE in 2005. Sour 1

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The structures of the targeted producer sectors are also diverse: While there are only few producers of large household appliances, structures are much more heterogeneously for example for small electric devises. Most manufacturers, both from within and from outside the EU are present on several Member States' markets; i.e. the same – domestic, EU and non-EU based – producers of EEE generally compete on the same markets.

7.4.2.6 European Ideal

The WEEE Directive aims at achieving a high level of collection of WEEE and at providing better management of WEEE. For this purpose, Member States are to set up collection schemes for private WEEE. The directive aims to internalise the costs of disposal or recycling to the producer. Thereby, incentives should be given for a consideration of the waste treatmeant already in the stage of product design. According to the principle of extended producer responsibility (WEEE Directive, (5)), producers are to bear legal, physical, and economic responsibility for the environmental impacts of their products throughout their life-cycles. Thus, producers shall cover the costs for take-back, recycling, recovery and disposal of the waste arising from their products. These costs for its future disposal are to be absorbed when a product is placed on the market, using financial guarantees. Producers must strive to ensure that WEEE is treated according to the best available technology and that recycling and recovery capacities are enough to fulfil the targets. The WEEE Directive provides for a number of standards that Member States must transpose and implement in order to achieve the desired outcome. For example, the Directive provides a collection target of 4kg WEEE from private households per capita and year (Art. 5 (5)). However, the means to achieve this are left largely to the Member States as shown in the following.

7.4.3 Instruments

This paragraph identifies and describes the instruments proposed in the Directive. While some instruments are mandatory (such as producer registration and minimum recycling target), there is some leeway concerning the form of realisation in other instruments.

Registration

All producers which put EEE onto the European Market have to be registered in those Member States where their products are sold. They are to provide information about the amounts of EEE which were put onto the Member States' markets and about the amount of waste collected, reused, recycled, or recovered. For this purpose, Member States are asked to set up registers of producers and to transmit the gathered information to the European Commission biannually (WEEE Directive, Art.12).

WEEE Collection and Treatment

According to Article 5 (2) of the Directive, final holders and distributors must be able to return WEEE free of charge (physical responsibility). Member States are held responsible to set up take-back systems for WEEE from private households which are free of charge for the last owner of a product. Producers are to finance "at least the collection, treatment, recovery and environmentally sound disposal of WEEE from private households deposited at collection facilities" (Art.8, 1.). However, the Directive does not state clearly who is in charge for the financing and provision of collection points and whether producers or municipalities are to be held responsible for this task (cf., DG Joint Research Centre: 12). The Directive does not prescribe a specific collection scheme, but leaves the concrete form of realisation to the Member States.

Responsibility and Financing

According to the WEEE Directive, Member States must ensure that all producers give a financial guarantee for recycling when placing a product on the market. This should avoid the generation of orphan products which currently represent 10-20% of the products placed on the market. To avoid such situations, producers are to provide a financial guarantee which ensures that the collection and treatment of their products will be financed at the end of their lives. This might be done by joining a producer responsibility organisation, by an insurance contract, or by setting up a closed bank account. (Art.8 (2))

Product Design

The WEEE directive aims at minimising environmental impacts of products by influencing their design. Thus, producers should create products that are easy to dismantle and to recover. Producers of EEE are required to label their products clearly to allow easier identification and dating (WEEE Directive (21)). Labelling also helps to inform consumers of the separate collection of waste equipment (Art.10). Furthermore, technical design features that prevent equipment from being reused should be avoided (Art.4).

Harmonisation of Schemes

Finally, the Directive explicitly notes that "different national applications of the producer responsibility principle may lead to substantial disparities in the financial burden on economic operators" and that "having different national policies on the management of WEEE hampers the effectiveness of recycling policies." (WEEE Directive (8))

7.4.4 Member States Implementation

7.4.4.1 Identification of cases

Since producers of EEE generally compete on the same markets, the most severe competition distortion would arise when regulations apply exclusively to domestic or exclusively to foreign producers while leaving the respective others unregulated (discrimination). However, since the point of regulation is market access, the WEEE Directive applies both to domestic as well as foreign producers – and both compete under the same conditions in the respective markets. Cases of interest in this study are those where diverging transpositions of the same Directive in Member States lead to diverging costs for producers, retailers and treatment operators. Stronger regulations in one Member State might induce higher prices for products sold by domestic retailers in the respective market and possibly lead to an increase in (private) purchases from other Member States. This might become more problematic with the increase of trans-boundary internet sales. Producer definitions across Member States are not consistent and sometimes exclude internet distributers who export EEE from other countries to the domestic market (e.g. Sweden excludes distance sellers from the producer definition[187]) However, there are no data on price effects in specific Member States or on changes in transboundary trade of EEE available yet.

Costs of internalisation

From an environmental economics perspective, a situation of undistorted markets exists when all competitors have to internalise the same costs for the use of the environment. Costs of internalisation comprise those costs for enterprises that arise from the fulfilment of requirements of the WEEE Directive. These might vary because of deviations of national standards from the European Ideal.

The WEEE Directive had to be transposed by August 2004, the collection and recovery targets became binding in December 2006. All Member States transposed the Directive, adopting the minimum requirements contained in the Directive (collection of 4kg WEEE per capita). No Member State adopted higher targets. Thus, no diverging direct costs of implementation can be expected to be found across Member States. Different costs from adapting to the same target may appear, for example when some Member States already had collection schemes in place before the Directive came into force. However, since such costs stem from achieving a common standard, and are only temporary until a common standard is reached across the Member States, they cannot be considered market distortions, but rather contribute to the removal of an existing market distortion (cf., case 1 - European policy removes historical market distortion).

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[187] Swedish Ordinance on producer responsibility for electrical and electronic products, issued on 14 April 2005: SFS 2005:209, Section 4.

Costs of regulation

Costs of regulation are those costs that stem from the specific choice of instruments and measures which are applied in order to fulfil the requirements of the WEEE Directive. These instruments define for example who is made responsible for the fulfilment of requirements, the distribution of costs that possibly arise from the Directive.

There are differences which might lead to diverging cost structures for economic actors: Diverging implementation can be identified according to producer registration and reporting requirements, and in the allocation of responsibility for collecting WEEE. Such costs are subsumed under the category costs of regulation. Cost relevant issues which are connected to costs of regulation include the frequency and depth of reporting obligations for producers, registration fees, costs for guarantees, or the organisation of take-back systems.

One basic difference between compliance schemes is the number of producer compliance organizations which are charged with managing the take-back and recycling of WEEE in the Member States. The ARCADIS/RPA study concludes that the organisation of the compliance schemes in the Member States is of central concern for costs from WEEE management and treatment (ARCADIS/RPA: 250).

Some Member States have a single compliance organization which is responsible for the take-back of WEEE. The compliance organisation takes over the collection and treatment of WEEE. Under this system there is an obligatory membership for all producers which sell products in the respective Member State. Most Member States with smaller markets and those with pre-existing collection schemes introduced such a collective model (Cf., DG Joint Research Centre; Ökopol et al.).

Other Member States employ a system with several, competing compliance organizations which are responsible for the take back of WEEE. Producers (either individually or as part of consortia) conclude direct contracts with treatment service providers. The task of coordinating the scheme (determination of financial responsibilities, provision and transport of containers for/from collection points etc.) lies with a clearing house. Major markets, such as the UK, France, Germany and Italy have adopted such a market based model (Cf., DG Joint Research Centre; Ökopol et al.).

A Study conducted by HP in 2006 indicated that costs for treatment of WEEE differed significantly between Member States with competitive collection schemes and clearing houses and those employing monopolized collection systems (HP 2006).

These differences may lead to diverging costs for the internalisation of the same environmental impact throughout different Member States (costly regulation) and accordingly to market distortions. This situation might be specifically problematic when the same producers compete on several markets. A producer with a higher market share in one MS with more costly regulations might face higher overall costs than his competitor:

	MS1: high costs	MS2: low costs	
Producer A	Market Share: 80%	Market Share: 10%	Comparatively high costs
Producer B	Market Share: 20%	Market Share: 70%	Comparatively low costs

In this case, a more uniform regulation might as well abolish such distortions.

Other sources of costs

Studies (conducted e.g., by DG Joint Research Centre or WEEE Forum) identified further variables that influence cost structures across the Member States. These factors include the amount of WEEE collected and treated, population size and population density, transport distances, wage levels, consumer behaviour, value of appliances, treatment standards, and landfill and disposal regulations in the respective Member States (DG Joint Research Centre; WEEE-Forum2008). While these are no direct effects of the Directive, but rather intervening variables which might be used as justification for deploying diverging instruments and regulations in some Member States.

Other relevant sources of costs which stem directly from overlapping legislation are diverging landfill regulations. Such issues are also found in the ELV case study; since the WEEE case study uses a narrower focus on direct effects of the Directive, they will not be dealt with here.

7.4.4.2 Selection of Case Studies

In order to determine the effects of different collection schemes, Germany and Sweden were selected as case studies. While both dispose of industries producing large amounts of EEE and both collect considerable amounts of WEEE, the organisations of take back systems are very different. While Germany follows a competition oriented approach, Sweden has a single national compliance scheme. Thus these two countries stand exemplarily for the two types of compliance systems which can be found in the EU (individual vs. collective schemes).

The case studies will investigate into and compare cost structures which emerge from the diverging national compliance systems.

In the following, the cases will be examined according to the categories:

- Organisation of the National System
- Allocation of Responsibilities
- Costs from Historic WEEE
- Costs from Registration
- Costs from Reporting Requirements
- Costs from Guarantees
- Overall Costs from the Compliance Scheme

7.4.4.3 Germany

Organisation of the German System

Germany is one of the biggest producers of EEE worldwide. Estimates on WEEE arising in Germany vary between 0.75 and 1.3 million tonnes[188]. Germany transposed the WEEE and RoHS Directives by in the *Act Governing the Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Equipment* (ElektroG)[189], which entered into force in March 2005.

Germany applies a national approach to producer definition. According to ElektroG, Art.3 (11), a producer is any person or legal entity, who either manufactures and places EEE under an own brand onto the German market, or who resells EEE under an own brand, or who imports EEE into Germany and places it on the market or exports it to another EU Member State and provides it directly to a user in that country. Consequently, the actor who brings a product onto the domestic market for the first time is regarded as producer of the device – and therefore is held responsible for the correct disposal of 'his' products. In order to avoid orphan products, distributors who knowingly sell new EEE from non-registered producers are deemed producers themselves (Art.3 (12)).

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[188] According to the Federal Environmental Ministry (UBA) and the Zentralverband der Elektrotechnik- und Elektronikindustrie (ZVEI), WEEE is rising between 1.1-1.3 million tonnes (Umweltmagazin 2006). Newer estimates using data from 2006 are around 750.000 tonnes (BMU 2008).

[189] http://www.bmu.de/files/pdfs/allgemein/application/pdf/elektrog_uk.pdf

The collection and treatment of WEEE is organized in form of a competitive clearing house model. That means there is no single compliance organization but a multitude of compliance schemes. To manage and co-ordinate the take back of WEEE, the government requires producers to set up a clearing house institution (ElektroG Art.6(1)). This was done with the establishment of the EAR foundation (Stiftung Elektro-Altgeräte Register). Before gaining market access, producers have to register with EAR and to provide an annual guarantee which ensures the treatment of WEEE in case a producer becomes insolvent.

The Elektro-Altgeräte-Register (EAR) Foundation

Member States are urged to set up a producer register and to annually provide the Commission with data, e.g. on quantities of EEE which was placed onto their market, or collection rates. For this purpose the the Elektro-Altgeräte-Register (EAR) Foundation was set up as the central network organizing registration and take-back activities. The EAR centrally coordinates the allocation of obligations to producers (clearing house function). The foundation was founded by the industry associations 'Federal Association for Information Technology, Telecommunications and New Media' ('Bundesverband Informationswirtschaft, Telekommunikation und neue Medien e.V., 'Bitcom) and 'German Electrical and Electronic Manufacturers´ Association' ('Zentralverband der Elektrotechnik und Elektronikindustrie e.V.', ZVEI) in order to fulfil the requirements from the ElektroG. It is industry funded and managed but has received necessary sovereign powers ('hoheitliche Aufgaben') from the government to act as clearing house (ElektroG §17). It acts under the supervision of the German Federal Environmental Agency (BMU 2006)190.

EAR maintains administrative, organizational, and verification functions, but is not responsible for the take-back or treatment of WEEE. Producers have to report data about the number of products put on the market and provide evidence for the existence of an insurance. To ensure that WEEE is treated adequately producers have to conclude contracts with service providers and to provide evidence for these contracts to EAR. Since details about these contracts are confidential, no data about costs publicly available.

Allocation of Responsibilities (take back and treatment of WEEE)

According to the ElektroG 9(3), local authorities are responsible for the collection of WEEE from private households. This includes the obligation to set up collection points "at reasonable distance" from consumers where end users can return end-of-life devices free of charge. Installation and running costs of collection points may be financed through local waste taxes but not from fees levied against consumers.

Producers are responsible for financing WEEE treatment from collection points onwards. This includes the provision of containers for the collection of WEEE and the absorption of transport costs. Producers then have to pick up WEEE at municipal collection points upon the register's request.

According to ElektroG, 13(1) there are several ways in which take-back responsibilities can be calculated. Either, producers can choose to use the amount of sold units, i.e. its market share per product category as basis for the calculation. Otherwise, the producer can pay according to the share of his products of the total amount of WEEE. The share will be determined by examining (sorting) samples of WEEE arising.

Costs from historic WEEE

Producers are collectively responsible for products which were sold before 13 August 2005. Their obligations are determined using their market share per product category in the month when the WEEE arises. The respective share is calculated by the EAR foundation.

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[190] http://www.bmu.de/english/waste_management/doc/print/36888.php

Costs from Registration

Producers are obliged to register with EAR before gaining market access (central register function). Costs of registration are laid down in the "Cost Ordinance on the Electrical and Electronic Equipment Act": For the first registration per producer, for the first brand, and the first product group, EAR currently charges €90 ("Stammregistrierung"). The registration of a further brand or product group costs €50. Furthermore, producers must provide guarantees for financing the recycling cost of WEEE from private households. Currently, the EAR charges €180 for the mandatory audit of the guarantee (if the producer joins a collective compliance system, charges are currently €165). The guarantee has to be confirmed annually, which accounts for €115. (cf. Table 10). If a product is to be classified as B2B, no insurance will be needed. However, EAR will charge €165 as non-recurring fee for registration.

Costs from Reporting Requirements

Producers are to provide the following data to the EAR: The amount of B2C (Business to Consumers) products placed on the market (number and weight of sold units) on a monthly basis; and the number and weight of sold B2B (Business to Business) products annually; the amount of WEEE collected from municipal collection points and through own collection systems on an annual basis and by product category; and the amount of WEEE reused, recycled and exported by April 30 of the following year.

Taking into account the frequency of reporting (monthly) and labour costs, UNU (137) estimate that one additional hour used per required reporting in Germany sums up to costs of €314.04 per year191. According to this study, the average economic impact of reporting activities on each single producer per year (depending and influenced by the number of reporting activities required in each Country and labour wages), under the assumption of 8 hours/report, ranges from €2.500 per year for Germany to EUR 14 per year for Romania. (Table 8, UNU: 196)

Costs from Guarantees

The provision of an insolvency proof financial guarantee is required when registering as a producer of EEE for private purposes. Producers must provide an annual financial guarantee to cover the waste management costs of "new" WEEE192. Producers in any case (no matter whether they use individual compliance or collective schemes) are obliged to register with the EAR foundation and to provide financial guarantees which ensure that B2C WEEE will be cared of even in case a producer quits the market.

Producers may participate in a collective guarantee system together with other producers. If a producer joins a collective scheme, its contribution is calculated using its amount of EEE placed on the market in the current year multiplied by the expected return rate (in per cent) and multiplied by the expected costs for WEEE treatment (€/tonne) (ARCADIS/RPA:242). Financial guarantees can either be given in form of a frozen bank account, but also by contracting insurance. Since the risk that the insurance policy will be activated is low (i.e. when the last producer of a specific product group finally quits the market), the Ökopol et al. study claims that insurance premiums charged to producers are negligible (Ökopol et al.: 143).

[191] The number is calculated by the formula: "wage costs * frequency (=12) * h/reporting (=8) = hourly increase per year". The estimations are based on the assumption that reporting takes 8h per reporting period. These are average numbers, while individual information given by German stakeholders varied between less than one hour to up to 10 hours (UNU:138).

[192] Placed on the market after 13th August 2005.

Overall costs

The ARCADIS/RPA study presents estimations about costs of WEEE for different products. The data were provided by one producer which was interviewed for ARCADIS/RPA study. They include costs from collection, treatment, and the maintenance of the clearing house:

	PDA	Digicam	Laptop	PC	Inkjet Printer	Flat Screen
Germany	0,01€	0,01€	0,15€	0,38€	0,12€	0,33€

Table 1: Cost of WEEE in €/sold unit. Source: ARCADIS/RPA: 250.

Bitkom and ZVEI estimated in 2004 that costs of compliance with the German regulation would amount to €350m. to €500m annually.[193] However these estimates assumed 1.1m tonnes of electro-scrap arising per year. The latest estimate is 1.8m tonnes annually[194] (incl. treatment). In 2007, Ökopol et al. put overall costs from the operation of the national clearing house to €9.600.000 annually, what equates €1.574 per registered producer.

Compared to the overall market volumes for EEE goods, these figures are rather small: For example the market volume for information and communication technology in Germany is more than 140 billion EUR (BITKOM 2009).

7.4.4.4 Sweden

Organisation of the Swedish System

The WEEE Directive was transposed by Ordinance (SFS No. 2005:209) which entered into force in August 2005. Sweden had introduced a take back system already before the WEEE Directive. Contrary to the German case, where different compliance schemes are available for producers, Sweden employs a collective collecting system. In terms of WEEE collection, Sweden has achieved the highest rates of collection reported in Europe, with a total of 15.8 kg/capita/year in 2006 (Ökopol et al.).

Same as Germany, Sweden employs a national producer definition. According to the Ordinance on producer responsibility for electrical and electronic products (SCS 205:209), producers are those actors who manufacture and/or sell EEE under their own brand, or sell EEE which cannot be attributed a specific producer. Sweden-based professional importers and exporters of EEE (distance sellers) are also deemed producers. However, distance sellers from other EU Member States who sell products in Sweden are not deemed producers. All producers have to be registered with the Swedish Environmental Protection Agency. The EPA is the enforcement body of Swedish WEEE legislation. Before gaining market access producers have to register with the EPA and to submit information about their products.

El-Kretsen

Sweden employs a collective compliance approach to WEEE collection. Although Sweden also allows for individual compliance schemes, the vast majority of producers are members of a collective scheme most often for financial considerations.

The scheme is run by El-Kretsen, which is owned by 21 trade associations and manages the take back and treatment of both B2C and B2B products. Producers must register with El-Kretsen or set up own

[193] http://www.pressebox.de/pressemeldungen/bitkom-bundesverband-informationswirtschaft-telekommunikation-und-neue-medien-ev/boxid-21399.html

[194] ENDS Europe, 23 March 2006.

collection and treatment systems. El-Kretsen is financed by membership fees. Non-recurring Membership fees are €360 or an annual fee of €52 can be paid.

El Kretsen was established already in 2001 as single national compliance scheme. In 2007, it served 1149 enterprises as take back provider (El-Kretsen 2008). In 2002, costs for WEEE collected in Sweden were at ca. €0.47 per Kg (DG Joint Research Centre: vii). At this time, producers provided an estimated reserve of ca. €9 Mio, equating a three months operating reserve for El Kretsen.

When transposing the Directive, only minor adjustments had to be undertaken to the scheme (DG Joint Research Centre: 9); for example, producers were made responsible also for providing the collection infrastructure for WEEE from private households (Ökopol et al.: 156). Until then, municipalities were financially responsible for the maintenance of collection points. However, El-Kretsen signed contracts with municipalities in which producers agreed to cover costs of WEEE transport and treatment while financial responsibility for the maintenance of collection sites de facto stayed with municipalities (cf. El-Kretsen 2006). This contract is effective until at least 2010 (Ökopol et al.: 171).

Allocation of Responsibilities (take back and treatment of WEEE)

Most products are charged per weight unit put on the market. Since El-Kretsen is the only service provider, examples of costs are available:

Fee examples		**ICT-Products Price developement**
Refrigerators/Freezers	€ 30 (FG incl.)*	2001€ 0,59/kg
Microwave own	€ 2,5 (FG Incl.)*	2002-2003 € 0,39/kg
Vacuum cleaners	€ 1,5(FG Incl.)*	2004-2005 € 0,34/kg
Laptop computer	€ 0,33/Kg (No FG)*	2006€ 0,34/kg
Mobile phones € 0,02 (No FG)*		Computers€ 0,03/kg
		Monitors€ 0,24/kg
*FG = financial guarantee		Other IT*€ 0,19/kg (average)*

Table 2: Fee examples: El-Kretsen. Source: http://www.ejkl.ee/content/files/Ewa.pdf

Costs from historic WEEE

Producers are held responsible for financing the collection, recovery and recycling of historic WEEE. Their contribution is calculated according to the actual market share of producers in the respective product category.

Costs from Registration

The Environmental Protection Agency (EPA) charges ca. 300€ (3000 SEK) annually for the producer registration.

Members have to report the number of sold products to El-Kretsen. Fees are then charged according to the type of product and reported sales volumes.

Costs from Reporting Requirements

Producers who sell EEE on the Swedish market and/or act as distance seller to other countries have to supply data about their products to the EPA. According to Section 9 of Ordinance SFS 2005:209, these data comprise quantities of products, specified by product type, expressed in weight and numbers on the Swedish and foreign markets. Basis for reporting are product categories as outlined in the WEEE Directive Annex 1A; reporting requirements refer both to B2C and B2B products. Moreover, producers are to declare, how they intend to fulfil their responsibilities and how WEEE treatment will be financed (SFS 2005:209).

Reporting has to be done on an annual basis. Taking into account the frequency of reporting obligations and labour costs in Sweden, the UNU study (137) estimates that one additional working hour per reporting would amount to a cost increase of €30.43 per year195. Assuming an average of 8h per report, annual reporting requirements in Sweden would make up to ca. €240.

Costs from Guarantees

Other than in Germany, membership in collective schemes until recently was sufficient as guarantee; the EPA did not demand additional financial guarantees from members of El-Kretsen (Ökopol et al.:52)196 However, a proposal for "suitable guarantees" was issued in late 2007. All producers who sell B2C products on the Swedish market now have to ensure that there is money set aside to guarantee the future disposal of their products – even if they take part in a collective scheme. The guarantee is calculated according to the amount of sold unity per year and estimated costs for disposal. A guarantee may be delivered using an insurance, a bank guarantee, a blocked bank account, or by participating in a collective financing solution (Naturvardsverket 2009).

Overall Costs:

The ARCADIS/RPA study presents estimations about costs of WEEE per sold unit for different ITC products which were provided by one producer. The estimations for Sweden include costs for collection, treatment, communication, and contributions to municipal costs.

	PDA	Digicam	Laptop	PC	Inkjet Printer	Flat Screen
Sweden	0,05€	1,10€	1,52€	3,80€	1,32€	3,42€

Table 3: Cost of WEEE in €/sold unit. Source: Arcadis/RPA: 250.

Overall operating costs from the WEEE Directive in Sweden (of registration and compliance scheme) were estimated by Ökopol et al. to be €99.400 annually, which equates €92 per registered producer.

7.4.4.5 Conclusion:

The following table presents data about the costs which result for producers from the management of WEEE. The data were provided by one producer and published in the ARCADIS/GPA study. It indicates significant differences in the cost per sold unit.

These costs comprise costs from treatment and the maintenance of collection systems. For most categories, costs in Sweden are ca. tenfold the costs in Germany.

[195] The number is calculated by the formula: "wage costs * frequency (=12) * h/reporting (=8) = hourly increase per year" The estimations are based on the assumption that reporting takes 8h per reporting period.

[196] However it has to be noted that the EPA currently is working on a guidance documents which contains provisions about what can be deemed as "suitable financial guarantee" (cf., Ökopol et al.)

	No. of TB Schemes for IT	PDA	Di-Cam	Laptop	PC	Inkjet printer	Flat Screen
Sweden[1]	1	0.05€	0.10€	1.52€	3.80€	1.33€	3.42€
Germany[4]	>12	0.01€	0.01€	0.15€	0.38€	0.12€	0.33€
1: includes collection, treatment, communication and contribution to municipal costs							
4: includes collection, treatment and clearing house.							

Table 4 : Costs for WEEE in €/sold unit. Source: Arcadis/RPA: 250 (extracts).

Referring to these data, ARCADIS/RPA suggest that

"costs of dealing with WEEE seem to be higher in those countries with fewer take-back schemes and lower in those countries with a higher number of available take-back schemes. [...] The figures do, however, need to be treated with caution since other factors in addition to competition between a number of take-back schemes may also provide contributory factors to the differences in costs [...] are not included in some countries."

However, since these data are aggregated and comprise different categories, it is not clearly quantifiable which fraction stems from treatment, the maintenance of clearing house, or municipal collection points.

The following table compares certain cost categories aside from the collection and treatment of waste in Germany and Sweden.

	Germany		Sweden
Costs from Registration	First Registration: €90 Further brand / product group: €50 Audit of guarantee (EAR): €180 Confirmation guarantee (annually) €115 B2B classification: €165	=	€ 300/year
Costs from Reporting	€2.500/year (assumption: 8h/reporting) (UNU) 1h increase/report: €314.43/year	> x 10	€240/year (assumption: 8h/reporting) (UNU) 1h increase/report: €30.43/year
Costs from Guarantees	Depending on compliance scheme; insurance premiums charged to producers are **"quite low"** (Ökopol et al.)	0	n.a.
Costs from Historic Waste	Responsibility according to actual market share	=	Responsibility according to actual market share
Financial responsibility for collection points	Municipalities	=	Producers (de facto: municipalities)
Overall Costs of System Operation	Ca. €9.600.000 for operation of clearing house = €1.574 per producer (Ökopol et al.) Overall cost of compliance estimated €350m-500m annually (BitKom/ZWEI)	> x 17	Ca. €99.400 annually for operation of compliance scheme = € 92 per producer (Ökopol et al.)

Table 5: Transaction Costs in German and Swedish WEEE Scheme

Table 4 shows that costs for WEEE per sold unit are much lower in Germany than in Sweden. Since these costs are aggregated and include costs from different variables (the operation of the clearing house for the German case and costs for contributing to municipal collection points in Sweden), they are only partially comparable. At the same time, table 5 shows that transaction costs in Germany are significantly higher than in Sweden. While costs from registration, costs from guarantees and costs from the management of historic waste seem to be comparably, transaction costs from reporting are ca. tenfold higher in Germany than in Sweden. Ökopol et al. estimate that costs from operating the German compliance system even exceed costs in Sweden ca. 17fold. One main difference in this respect is the frequency of reporting periods which is much tighter in the German case (monthly vs. annually).

The opposing trends in overall costs for compliance systems and costs per unit can be explained by the design of the respective compliance system.

Thus, the case study has shown that different compliance systems lead to diverging cost structures for producers on the Member States' markets – which possibly lead to competition distortions. These data indicate the existence of possible market distortions which are caused by "costly regulations" (different costs for the same use of environment):

- On the one hand, Germany employs more costly regulation. Most importantly, the tight reporting obligations lead to costly regulation in Germany. There are no indications that these regulations lead to better compliance or better environmental impacts.
- Costs for the treatment of products per unit prices in Germany are much lower than in Sweden. This seems to be due to the different organisation of compliance schemes (competition based vs. monopolistic).

7.4.5 Industry

7.4.5.1 Summary of Complaints

The following paragraph summarises the complaints of the affected industry sectors. Sources are stakeholder consultation documents,[197] the mentioned studies[198] and statements made by industry associations.

Most complaints of industry stakeholders centre on unnecessary transaction costs which derive from different transpositions of the Directive in the Member States. Concerns were expressed about diverging reporting requirements across the Member States. According to industry representatives, these lead to "discrepancies and barriers to fair competition" (DG Joint Research Centre: xi) and to unnecessary costs from reporting obligations. Differences in reporting requirements relate to the products covered by the Directive, or to units to be reported, for example by number of sold devices, by weight, or by volume (cf., Wilson 2007). Ökopol et al. (93) indicate that

"the largest concern raised by industry stakeholders is the lack of harmonisation between the administrative functions of the national producer registers. Actors claim that they must adhere to up to 27 varying requirements for reporting."

Besides the additional burden, it was claimed that these inconsistencies lead to diverging cost structures in different Member States; mostly connected to the depth and frequency of reporting obligations and the organisation of compliance systems (collective vs. individual schemes). One additional issue was the financing of collection points. For example, a representative of municipalities judged

[197] Available online: http://circa.europa.eu/Public/irc/env/weee_2008_review/library?l=/&vm=detailed&sb=Title [25.10.2009]

[198] DG Joint Research Centre, Ökopol et al., ARCADIS/RPA.

the mandatory financing of take back infrastructures in Germany through municipalities as non-compliant with the Directive and as hidden subsidy (Wilson 2007).

In summary, industry representatives urged for providing a "level playing field" through harmonizing legislative requirements and introducing comparable administrative procedures such as consistent registering and reporting requirements across Member States (Huisman 2006: vii). Industry complaints relate to costs of regulation (mostly transaction costs), for example different costs for producer registration.

It is interesting to note that the most severe source of cost differences (organisation of schemes) is not mentioned by industry representatives.

7.4.5.2 Changes in competitiveness

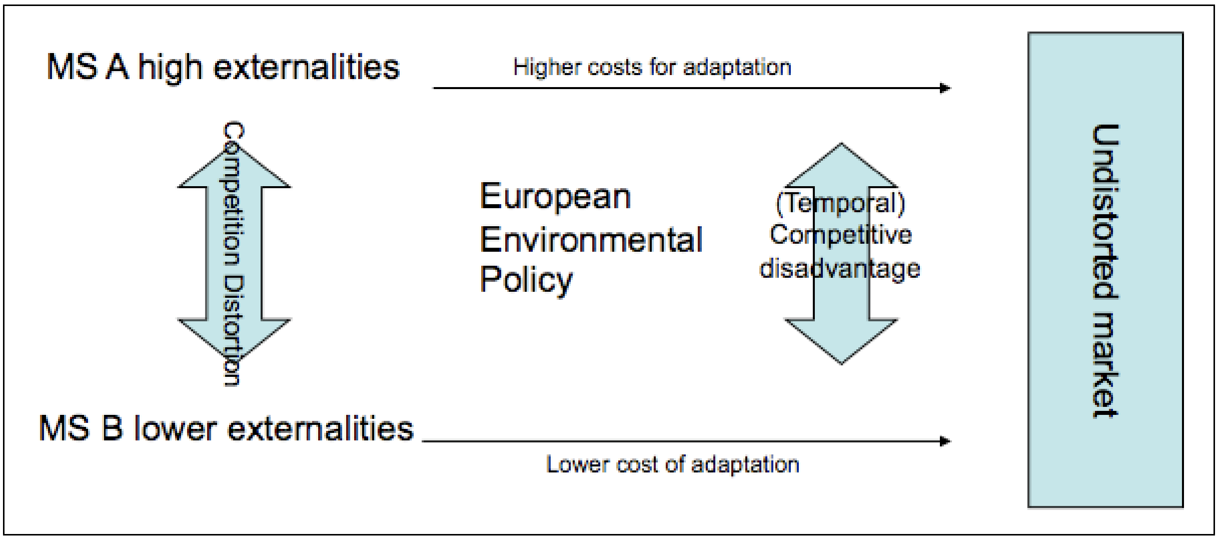
The case-study indicates that different cost structures which stem from different transpositions of the WEEE Directive exist throughout the EU Member States.

Although regulation relates in equal measure to all producers which compete on the respective Member States' markets (non-discrimination), costs from the use of the environment differ across Member States. This constitutes a market distortion in an environmental economic sense. Economic actors do not internalise the same environmental effect for the same costs. The study indicates that this is mainly due to costly regulation. This might become relevant for competition for example in the case mentioned earlier, with the same producers competing on several same markets and with different market shares

7.4.5.3 Competition distortion

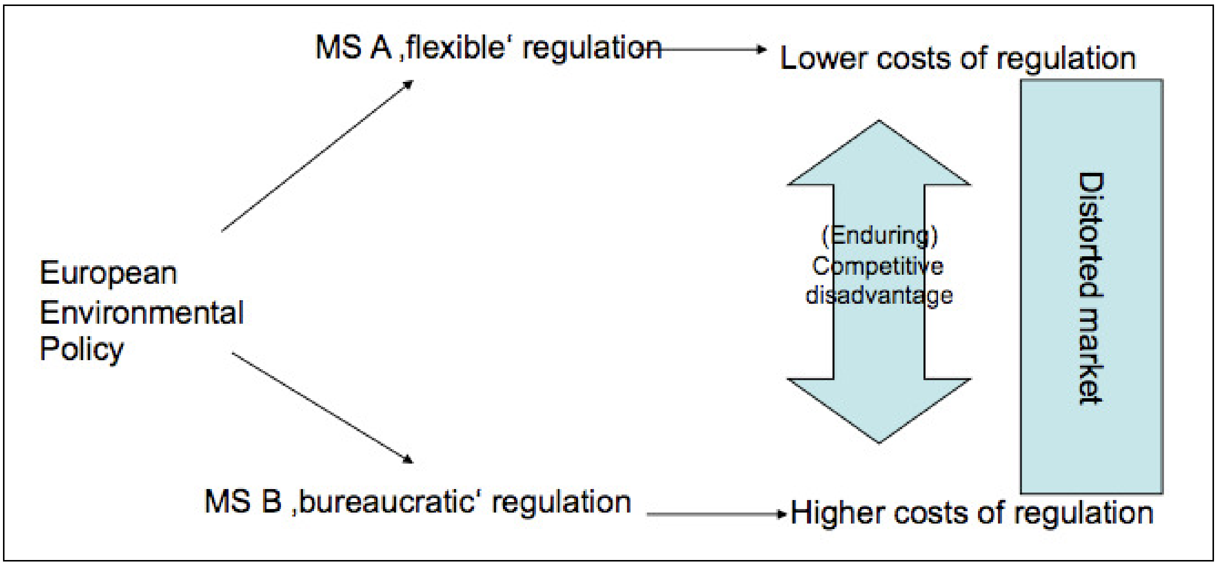
Referring to the different types of competition distortions identified in Chapter 5, several cases can be found in this case study:

First, the WEEE Directive targeted at removing an existing competition distortion which existed when only few Member States introduced WEEE legislation. As the first Swedish regulation has shown, the introduction of WEEE legislation resulted in cost effects for the use of the environment. However this was only the case in few Member States while the remaining did not charge producers.



Case 1 - European policy removes historical market distortion

When transposing the WEEE Directive, all Member States adopted the same minimum requirements in a non-discriminatory way – what removed an existing competition distortion. Second, there are no indications for Case2 - market distortions with some Member States staying below a European 'ideal' of resource use. Third, however, there are strong indications that the transpositions of the WEEE Directive also gave rise to 'new' market distortions which stemmed from costly regulation (Case 3). Such a market distortion exists when Member States deploy different instruments for implementing a policy while aiming at the same level of environmental protection specified under the same standards. As long as the additional costs (from diverging reporting requirements, e.g.) do not lead to a better internalisation of costs from the use of the environment but to an enduring competitive disadvantage, this is judged a case of competition distortion.



Case 3 - MS implement costly regulation

Concerning possible Case 4 (additional measures) it can be stated that neither Sweden nor Germany adopted stronger measures which would lead to higher internalisation costs for the use of environment.

It needs to be noted that costs from treatment and disposal make up a relevant (probably: the highest) share of overall WEEE costs in the Member States. Thus, they possibly contribute to competition distortions; and diverging landfill taxes and gate fees for the disposal of WEEE can be judged an additional measure (although not mentioned in the WEEE Directive). This phenomenon can also be found in the End-of-Life Vehicles case study in this volume and will not be dealt with in this specific context.

7.4.5.4 The Revised WEEE Directive

In December 2008, the European Commission published a proposal for the revision of the WEEE Directive (COM(2008) 810 final). This chapter asks whether the proposed revision of the WEEE Directive tackled the identified problems.

Reviewing the first period of the WEEE Directive, the European Commission concludes that

"technical, legal and administrative problems that result in unintentionally costly efforts from market actors and administrations, [...] lack of level playing field or even distortion of competition and unnecessary administrative burden."

Overall, the proposal aims at higher standardisation across Member States. Most important issues of the proposal in the context of this study are:

- A collection target of 65% of the average amount of EEE placed on the market in the two preceding years

- the harmonisation of reporting and registration obligations. By making registration obligations inter-operational, producers will have to register only in one Member State to operate on several national markets;
- the standardisation of targeted product categories;
- the harmonisation of definitions. For example, definitions of treatment operations explicitly refer to those given in the EU Waste Directive;
- Member States are asked to hold producers responsible also for the collection of private WEEE.

With the reference to the renewed EU Waste Directive, the Commission proposal contributes to higher standardisation and removes some sources of potential market distortions. In particular the 4 kg per capita objective was not reflecting the national conditions. However, the proposal still leaves the design of compliance systems which was identified as most relevant source of cost differences across the Member States. Thereby, the Member States may still adopt inefficient systems which impose higher burden on the industry compared to other Member States.

7.4.6 Conclusion

The WEEE directive targeted an existing market distortion: treatment schemes existed in only few Member States. This led to different degrees of internalisation and, accordingly, to diverging costs for the use of the environment. Thus, on the one hand, the WEEE Directive led to the removal of an existing competition distortion by introducing same targets (costs from internalisation).

At the same time, the transposition of the WEEE Directive led to different costs across the Member States. These were not costs from implementation but transaction costs (registration, reporting requirements) and – mainly – inefficiencies from different collection systems. This led to a situation where costs for the internalisation of the same target differ across Member States. While there existed good reasons for leaving leeway to Member States when transposing the Directive (population density; pre-existing national systems etc.), from an environmental economics perspective, this situation can be judged a case of distorted markets from costly regulation. Thus, although non-discriminating against foreign producers, the leeway given in the transposition of the Directive possibly contributed to competition distortions.

The new proposal by the commission aims at reducing cost differences through higher standardisation and adoption of definitions from waste legislation (= higher standardisation). While the proposal targets one source of competition distortions it leaves the most relevant source of inequalities, the organisation of compliance schemes, unregulated.

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Annex

#	Treatment category	Current % collected of WEEE Arising
1A	Large Household Appliances	16.3%
1B	Cooling and freezing	27.3%
1C	Large Household Appliances (smaller items)	40.0%
2,5A,8	Small Household Appliances, Lighting equipment – Luminaires and 'domestic' Medical devices	26.6%
3A	IT and Telecom excl. CRT's	27.8%
3B	CRT monitors	35.3%
3C	LCD monitors	40.5%
4A	Consumer Electronics excl. CRT's	40.1%
4B	CRT TV's	29.9%
4C	Flat Panel TV's	40.5%
5B	Lighting equipment – Lamps	27.9%
6	Electrical and electronic tools	20.8%
7	Toys, leisure and sports equipment	24.3%
8	Medical devices	49.7%
9	Monitoring and control instruments	65.2%
10	Automatic dispensers	59.4%

Table 6: Estimated amounts of WEEE collected and treated as a percentage of the total amount of WEEE in the EU27 in 2005 according to UNU 2007

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ANNEX IA

Categories of electrical and electronic equipment covered by this Directive

1. Large household appliances
2. Small household appliances
3. IT and telecommunications equipment
4. Consumer equipment
5. Lighting equipment
6. Electrical and electronic tools (with the exception of large-scale stationary industrial tools)
7. Toys, leisure and sports equipment
8. Medical devices (with the exception of all implanted and infected products)
9. Monitoring and control instruments
10. Automatic dispensers

Tab 7: WEEE Directive, Annex 1A

The following quantifies the economic burden relating to reporting activities for each producer (according to different Member States), in the initial assumptions of 8 hours requested for each reporting activity.

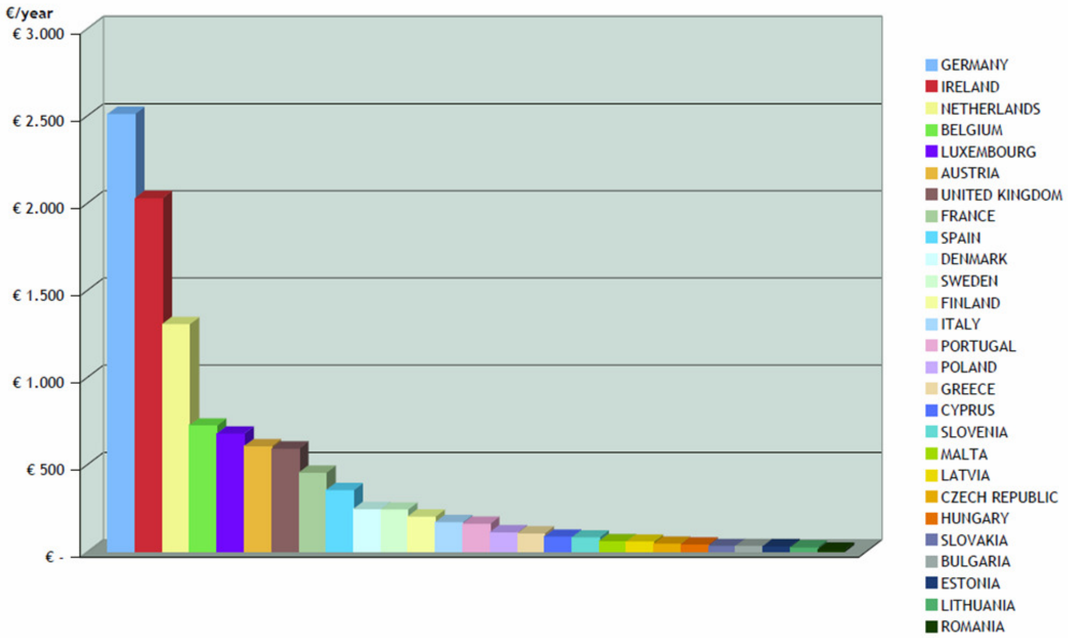

Figure 23: Annual economic burden per producer in reporting activities: analysis on average of 8 hours

Table 8: Annual economic burden per producer in reporting acitvities. Source: UNU 2007: 136

Gebührenverzeichnis

Nr.	Gebührentatbestand	Gebühr in Euro
1	**Registrierung**	
1.01	**Stammregistrierung** je Hersteller, erster Marke sowie erster Geräteart	90,–
1.02	**Ergänzung der Stammregistrierung nach Nummer 1.01** um jede weitere Marke einschließlich einer Geräteart sowie jede weitere Geräteart zu einer Marke	50,–
1.03	**Aktualisierung von Mengendaten zu bestehenden Registrierungen nach den Nummern 1.01 und 1.02** je Änderungssitzung	60,–
1.04.a	**Vollprüfung einer hersteller-individuellen Garantie** je Hersteller, erster Marke sowie erster Geräteart	180,–
1.04.b	**Vollprüfung einer Garantie basierend auf einem vorab durch die Gemeinsame Stelle geprüften Herstellergarantiesystem** je Hersteller, erster Marke sowie erster Geräteart	165,–
1.04.c	**Erweiterung einer nach Nummer 1.04.a und 1.04.b nachgewiesenen Garantie auf eine andere Geräteart** je Hersteller für jede weitere Marke einschließlich einer Geräteart sowie jede weitere Geräteart zu einer Marke	50,–
1.04.d	**Änderung bzw. jährliche Aktualisierung hinsichtlich Menge und Ermittlung einer oder nachträglicher Wechsel zu einer nach Nummer 1.04.a, 1.04.b oder 1.04.c nachgewiesenen Garantie bei unveränderter Geräteart** je Änderung, Aktualisierung oder nachträglichem Wechsel	115,–
1.04.e	**Änderung sonstiger Garantiedaten** je vorgenommener Änderung	50,–
1.04.f	**Prüfung der Glaubhaftmachung nach § 6 Abs. 3 Satz 2 des Elektro- und Elektronikgerätegesetzes** je Registrierung	150,–
1.05	**Sonstige Registrierungsdatenänderung** je Änderungssitzung	30,–
1.06	**Sonderaufwand bei nichtelektronischer Datenübergabe** je entgegengenommenem und bearbeitetem Vorgang	40,– bis 400,–
1.07	**Erteilung einer Bescheinigung über die Registrierungspflicht**	40,– bis 7 500,–
2	**Bereitstellungsanordnung**	25,–
3	**Abholanordnung**	32,–
4	**Sanktionen**	
4.01	**Garantieaufstockungsanordnung**	40,–
4.02	**Verwarnung bei nicht erfolgter Bereitstellung**	40,–
4.03	**Verwarnung bei nicht erfolgter Abholung**	40,–
4.04	**Widerruf der Registrierung**	bis zu 75 Prozent der Gebühr nach Nummer 1".

Table 9 Registration fees in Germany. Source: BMU 2007, http://www.bgblportal.de/BGBL/bgbl1f/bgbl107s2825.pdf

8 Conclusions

The definition of market distortions is far from easy and trivial. Not every change in the relative competitiveness can be classified as market distortion. Whenever European environmental policies are enacted, the national implementation takes place on the background of different technological and economic conditions, natural resources and different political preferences in the Member States. Thereby, a tailored implementation is not only quite legitimate but in many cases also more efficient than a uniform approach. A competition distortion would emerge if, in the absence of a European environmental policy, an industry would have cheaper access to natural resources (or opportunities for emissions) because of laxer standards compared to another country. A second source of competition distortion would be if the implementation of European environmental policies imposed less costs to industry because of laxer standards measured compared to the European standards in the implementation. Hence, not every difference in the costs for industry represents a market distortion, but lower costs may be part of the competitive advantage of a country or an indication of higher preferences. There is no clear cut definition of competition distortion. As variations in costs is not a sufficient attribute, it requires in addition a political judgement. A competition distortion can be expected if

- a Member State remains in its implementation below the agreed European standard
- and this leads to less costs and a competitive advantage for its industry

Such market distortions have to be distinguished from differences in the distance to target: The structure of the industry, the technologies used and the natural conditions are quite often leading to differences in the costs of achieving an agreed European standard. However, by adapting more efficient technologies and changing the structure of industry, this competitive disadvantage can be overcome. While a competition distortion is permanent, a competitive disadvantage because of a greater distance to target is temporary. An appropriate reaction in the first case is a further harmonization, while in the second case, additional time or resources might be granted to achieve the standards.

European environmental policies contribute to a removal of market distortions by levelling the playing field for economic actors. The costs for using natural resources or for the release of emissions to the environment vary considerably because of different natural conditions, but also because of pre-existing environmental policies. But even when European legislation is already enacted, the directives or framework directives leave discretion to the member states on the actual implementation. Accordingly, the degree of internalisation of environmental costs still varies across European Member States. For the regulation of products, uniform European standards and norms have been successfully set up, for example the RoHS or recently the REACH regulation. For large segments of products, there are clearly defined and fully harmonized European standards. A competition distortion is not possible any more (although the costs of production may vary across Europe). Even if there are higher (non-discriminatory) national standards, this does reflect higher environmental preferences, but does not necessarily imply a competition distortion.

For process norms, this is different: permitting procedures, process standards etc. are still largely in national responsibility. With our analysis, we can demonstrate that there is an overall tendency for a convergence. The case studies, however, show that there are still unharmonized areas of environmental policies that give advantages to the local industries in one MS compared to others.

In our research approach we distinguish between the notions of competition distortion and changes in relative competitiveness. Most research on competition distortion in the context of the environment relates to taxes and subsidies and is undertaken in economic modelling (e.g. Eichner 2005, Noiset 2003). Empirical research on the effects of environmental policy on business concentrates on the notion of competitiveness. Similarly, industry complaints on European environmental policies focus on the change in relative competitiveness rather than on the levelling of playing field in Europe. Our study is a first attempt to empirically investigate the effects of EU environmental policy from the perspective of competition distortion in relation to the Single Market.

In all of the examined cases, the rules at the European level allow for considerable leeway in the implementation. In several cases, it is difficult to identify the European standard, as the directives only describe procedures, or remain vague regarding the objectives. These are results of political compromises and gives leeway to different interpretations and, accordingly, implementation of the directive. This is motivated by differences in the distance to target and in differences in the preferences of the actors involved. Without a clear target and an according European standard, it is not possible to judge if a national implementation fails to achieve this standard. This is a major caveat of the empirical work, but also for the legal and the political judgement if there is indeed a market distortion or not. We encountered such difficulties for example in the case of the environmental liability directive (ELD) which does not define substantive standards. In other cases, where a European standard is given, it is difficult to assess and dispute if the measures taken are sufficient to achieve the standard: An example is the 0.9 % target of the GMO directive. It is left to the Member States to decide what this implies in regards of the distance of GMO crops to conventional crops. In this case, a European standard on the measures would be easier judged if Member States were meeting the standard rather than having a threshold on the environmental quality only. The VOC directive has similar shortcomings: Although some measures are described, their choice is left to the Member States and the limit value is defined by an overall reduction in the emission. In such cases, an ex post assessment is only possible if the measures taken are appropriate. Only for few cases, the European ideal is readily available and easy to identify. This is the case for example in the limit value of 120g/km CO_2 emissions by cars.

The availability of a European standard can be categorized as follows:

European standard	Examples	Implication for a judgement on market distortions
No measurable European standard; directive is based on procedural law	ELD	Not possible or ex post only
The directive describes a process to develop a common European standard	IPPC	Market distortions cannot be expected if MS bind themselves to the common standards
European standard is based on environmental quality, measures are not defined	GMO	Judgement on market distortions is possible ex post only
European standard is defined regarding an overall reduction of emissions, MS may select on measures	VOC, WEED, WFD	Judgement is possible if the impact of the measures on achieving the European standard is known
European standard is clearly defined in the regulation and fully harmonized	120g/km CO_2	Market distortion cannot be expected

From the perspective of the single market, a clear European standard, which includes a definition of measures taken by the Member States, is preferable over vague objectives. If a full harmonisation is not justified, discretion might be given on the measures, but they should be well defined in the directives to allow a judgement on possible market distortions.

The case studies confirm that a leeway for the Member States is legitimate and necessary due to differing economic, social, cultural or administrative requirements. It allows a more efficient implementation. The result of the analysis on individual cases show, however, that there are at least in part very heterogeneous approaches by the Member States that have led to market distortions. The leeway is used by some Member States to stay below the European standard. In all four in-depth case studies, there are Type 2 market distortions ("MS below European 'ideal' of resource use") and partly also Type 3 distortions ("MS implements a costly regulation"). In each of the examined policies, the Member States have had considerable discretional authority in the implementation of these policies. This is particularly relevant to the approach of the administrative implementation, partly also to the extent of the requirements imposed at the national level from the perspective of time and content. In addition to the existing leeway, the Member States have not sufficiently implemented or have failed to transpose parts of the European legislation. And, where the legislation has been transposed, it is not always enforced. With this background, it is not surprising that each concerned industry is being offered very different starting conditions, which influences costs and thereby the competition situation for these industries.

The impacts of the market distortions by the differing approaches of the Member States are not easily quantifiable. There is evidence for large impacts on cross-boundary trade in the case of the European emission trading for the cement industry. In other cases, we were able to identify some quantitative data that indicate market distortions, but the magnitude was so small that cross boundary impacts could not be expected (e.g. WEEED). However, in most cases, statistical data is not readily available. Furthermore, the available data is largely based on industry estimates. The case studies show that industry does not distinguish between changes in the relative competitiveness and market distortions. By mixing the cost categories, potential market distortions are easily exaggerated.

When doing an impact assessment or an ex post evaluation, efforts should be undertaken to distinguish between the different cost categories. For the assessment of market distortions, the following categories are important:

- Costs to achieve the European standards, resp. potential benefits if Member States have not implemented the European ideal. A competition distortion can be expected if the costs for using environmental resources vary because the standard remains below the European ideal. This entails costs for emissions, disposal or extraction of resources. Such categories refer more often to the costs of operation rather than for investments.
- Costs that might arise from differences to the target because of pre-existing national regulation or because of different natural or structural conditions. These costs are more often related to investments: The adaptation to the European standard may require restructuring and investments to adapt to efficient technologies.
- Administrative burden imposed by the implementation of the European regulation. For this cost category, the measurements of administrative burden by the governments might be utilised. However, so far there is no agreed standard for the measurement. For a cross-national comparison, a standardised measurement of administrative burden would be required.

It has to be noted that there is much evidence that stricter standards are not necessarily leading to higher costs. Instead they provide incentives to adopt more efficient technologies, which then turn into competitive advantages.

This might explain that we found surprisingly few complaints by industry on potential market distortions caused by differences in costs. In spite of the unquestionable existence of Member States with laxer standards and accordingly fewer costs for industry, the topic is hardly addressed by economic actors. The following reasons may explain this:

- The magnitude of market distortions is often unclear, and they might be below a value that has impacts on cross boundary trade.
- The resulting costs from differing implementation could be passed on to the consumers and therefore, from the perspective of industry, is of little relevance.
- Although differing implementation might lead to significant cost differences within Member States, the studies underlined that national industry sectors partly favour flexibility in standards. This is an indicator for markets, which keep on being separated; products are either not traded, or they do not compete directly with each other through product differentiation due to high costs of transport.
- Addressing the recurring market distortions would lead to more stringent requirements for industries in the concerned countries. Type 2 market distortions ("MS below European 'ideal' of resource use") for the most deviating Member States create a need to enact more stringent standards. For the concerned industry in these countries, this might lead to higher costs. European industry associations would not normally pick up a theme that could potentially damage a portion of its members. National industry associations from countries that are negatively affected by market distortions are more likely to address the issue, but have less influence on the European level. They will rather stress the topic in the national policy-making process and try to generate a slower or less challenging implementation. Within the framework of the study, this has only partly been verified.
- Their larger members naturally dominate the relevant industry associations. Larger players also have a greater chance to use market distortions to their advantage by strengthening their activities in those locations where the best conditions for them exist. Smaller companies, on the other hand, are often not able to avoid the consequences of the market distortions because they lack the resources either to analyze the situation, but even more importantly, they lack the resources to gain political influence.

All in all it has to be considered, that due to systematic reasons already mentioned, there is a deficit in the debate on market distortions due to differentiated implementation of European environmental policies. This requires political institutions, especially the Commission, to keep a watchful eye. A positive sign to recognize is that in the examined cases, currently emerging amendments to the legal guidelines will lead to a diminishment in market distortions. This fact should in the future be greatly valued.

European environmental policy has the potential to correct existing market distortions resulting from differing internalization of environmental costs. There are several examples among the case studies, in which either pre-existing national implementation had distorted the markets or a market distortion would have occurred with the increasing importance of cross boundary trade and the creation of the internal market. It is of advantage during this process to concretely define substantial European standards and address the topic of national implementation. The ETS and its accompanying national allocation plans can be considered as a model, even if the case study has shown a need for further improvement of this mechanism. An over allocation of permits at each national industry level should be prevented.

To summarize the findings of the study in a nutshell:

- The concept of market distortions should be clearly distinguished from changes in the relative competitiveness of industries. This should be reflected in impact assessments and evaluations of European policies.
- The distinction between market distortions and changes in competitiveness does imply a differentiation in cost categories that are attributed to the environmental policy and its implementation. It should be distinguished between operating costs, costs for one off investments and administrative burden. The different cost categories need to be standardized. It should be considered to make them subject of the monitoring mechanisms of the internal market.
- European environmental policies have contributed to the removal of existing market distortions because of pre-existing national legislation which caused differences in the costs for using natural resources. The case studies show that without European environmental policies, the internal market would be endangered.
- However, the great degree of discretion for the Member States in the implementation is misused in some cases to stay below the European standard. The magnitude of market distortions that arise from this is difficult to quantify but in most cases does not have impacts on cross boundary trade.
- A further harmonisation does not necessarily require a change in the legal basis and a shift from directives to regulations. As an alternative, the European ideal standard could be clearly described together with a set of effective measures for their achievement. The Member States may be free to choose from this set of measures. To avoid undue disadvantages because of uneven distances to target, the time horizon for the achievement can be extended or costs for investment and restructuring become compensated. However, this should not lead to a vague definition of objectives and measures of the European policies.